

Opportunity in Early Education: Improving Teacher-Child Interactions  
and Child Outcomes

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### Abstract

An underlying theoretical assumption in research about the quality of early childhood education is that ecological features of preschool programs *directly* impact children's development. In this chapter, we examine this assumption in light of more complex models of context-outcome relations in development. We conclude that ecological theories of development applied to preschool contexts posit that: 1) children's interactions with physical and social resources in classrooms are the direct mechanisms through which children learn; and 2) and characteristics of teachers (e.g., level of education, field of study) and classrooms (e.g., class size, curriculum), which tend to be the targets of program policies and regulations, have indirect and moderated effects on children's learning within preschool classrooms. This theoretical framework is then used to inform the design of in-service and pre-service teacher training programs that focus on high quality emotional, instructional and organizational interactions in classrooms that support children's development of school-related competencies.

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Attending preschool produces short-term and long-term benefits for children (e.g., Lazar, Darlington, Murray, Royce, & Snipper, 1982; Reynolds, 2000; Schweinhart, Barnes, & Weikart, 1993; FPG Child Development Institute, 2005; Lamb & Ahnert, 2006), and benefits to communities that strongly outweigh their costs (e.g. FPG Child Development Institute, 2005; Barnett & Masse, 2007; Reynolds, Temple, Robertson & Mann, 2002). There is an extensive research literature that identifies a wide variety of features of preschool programs that are associated positively with developmental outcomes of children who attend; most of this work reflects a broad focus on program *quality*. A generation of experimental and natural history studies, using strong methods, clearly demonstrate that variations in the quality of how programs are designed and structured have consequences for children's physical and psychological well-being and development of social and academic competencies as a function of opportunities afforded to children in early education settings (e.g., Howes, 1990; NICHD-ECCRN, 1999; NICHD-ECCRN, 2002a; Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg, et al., 2001). However, across these numerous studies, there is mixed evidence concerning which program quality features have the strongest impacts on which developmental outcomes, and for whom, triggering debates about which, if any of these features should be the focus of policy or program development initiatives. This inconsistency in results, conclusions, and interpretations of evidence related to program quality is the focus of the present chapter. We argue that one reason for inconsistent findings across studies has been an improper assumption evident in both theory and analytic approach that all

features of preschool programs that are collapsed under the category of quality impact children's development *directly*. This analysis then posits that actual interactions in classrooms or settings (with adults, peers, materials) are the mechanisms responsible for the effects of early education on child outcomes, and that program improvement efforts aimed to influence child outcomes must explicitly target these interactions, if they are to yield desired effects.

We organize the remainder of this chapter around two primary aims: 1) to describe a theoretical framework based upon the Bioecological Model of Development (Bronfenbrenner & Morris, 2006) that organizes various inputs of that ecology in relation to effects on children's development, and 2) to discuss the implications of this framework in informing two intervention efforts—a teacher professional development programs, and a teacher pre-service training course—that aim to magnify the effects of attending preschool by improving the quality of interactions that children directly experience in classrooms.

### *Ecological Features of High Quality Preschool Programs*

Nearly every regulation pertaining to public preschool programs emphasizes the importance of providing high quality services. Yet, despite all of the attention directed toward high quality preschool, there is no singular approach for conceptualizing, defining, or measuring preschool quality. This lack of clarity has a pronounced effect on the field—state and program policy becomes organized around a wide range of quality metrics, each of which may have different ways in which they exert effects on child outcomes; and program development and professional development efforts begin to target resources and delivery mechanisms to any or all of these various quality measures. The

risk to the field, of this lack of clarity, is confusion about inputs, outcomes, and the links that connect them, which in the end can erode our capacity to understand effects of early childhood programming, improve those effects, and communicate clearly about those effects to the public.

Differences in how teachers, parents, and professional organizations define quality are profound. Teachers may define high quality preschool in terms of the type of curriculum used, and the quality of the space, furnishings, and learning materials that support their implementation of this curriculum. Parents' definitions may concern whether the program is open for extended hours, is located near their home or work, has flexible scheduling, whether teachers appear emotionally supportive of their children's needs, or whether children are learning the letters and numbers. Professional organizations concerned with the well-being of young children (e.g. American Public Health Association and the American Academy of Pediatrics [APHA & AAP, 1992], the National Association for the Education of Young Children [NAEYC, 2005], and the National Institute for Early Education Research [NIERR, Barnett et al., 2004]) typically define quality as whether programs meet recommended minimum standards for aspects of infrastructure and design (e.g., child-teacher ratio, teacher level of education). With different groups advocating for improved program quality, but lacking precision in definitions and conceptualization of putative effects, the end result is a somewhat mixed public impression of the benefits and approaches for improvement, of early childhood education.

As we noted earlier, the research evidence regarding program quality and its effects on child outcomes is rather mixed, in part (as we will demonstrate) because of the

lack of precision in definition, conceptualization, and measurement. Research examining associations between preschool quality and children's development has included a wide range of measures of preschool quality, which can be categorized into two broad types (Lamb, 1998; Phillips & Howes, 1987; Vandell & Wolfe, 2000). One category concerns features of programs' infrastructure and design that are targeted by regulation or financing, such as the nature and level of teacher training and experience, adoption of certain curricula, class size, child-to-teacher ratio, and whether or not the program offers additional services to children and their families. For example, the National Association for the Education of Young Children (NAEYC) recommends that lead teachers have an associate's degree or equivalent and supplemental training in early childhood education, child development, or special education; assistant teachers have at least a high school diploma or GED; all teachers' participate in professional development training; a maximum class size of 16 children and the maximum child-to-teacher ratio of 8 to 1 for three-year-olds; and a maximum class size of 20 children and the maximum child-to-teacher ratio of 10 to 1 for four-year-olds (National Association for the Education of Young Children, 2005). The National Institute for Early Education Research (NIEER) defines high quality preschool as whether programs adhere to the following 10 structural benchmarks (Barnett et al., 2004). 1) teachers have a bachelor's degree; 2) teachers have received specialized training in teaching four-year-olds; 3) teachers complete at least 15 hours/year in-service training; 4) assistant teachers have a child development associate's degree or equivalent; 5) a comprehensive curriculum that cover domains of language/literacy, math, science, social-emotional skills, cognitive development, health, physical development and social studies; 6) a maximum class size less than or equal to

20 children; 7) a child-teacher ratio of 10:1 or better; 8) at least 1 meal served each day; 9) vision, hearing, health screening/referral for children; and 10) at least 1 family support service, which may include parent conferences, home visits, parenting support or training, referral to social services, and information relating to nutrition.

Program features have also been conceptualized and assessed in terms of the classroom processes that children *directly* experience while they are enrolled in programs. Process quality includes the quality of the physical resources available to children in classrooms, as well as the quality of interpersonal interactions between children and teachers (Hamre & Pianta, 2007; Harms, Clifford, & Cryer, 1998). High quality classroom interactions can be conceptualized (Hamre & Pianta, 2007) as comprising three distinct domains—emotional, instructional, and organizational—and indeed there is empirical support for these three domains as providing a model for categorizing and conceptualizing the domains of teacher-child interactions in classrooms that has proven valid from preschool through elementary school (Hamre, Pianta, Mashburn, & Downer, 2007). High quality emotional contexts are evidenced by interactions characterized by a positive emotional tone, a lack of expressed negativity, teachers' sensitivity to students' emotional and instructional needs, and a high regard placed on students' interests, motivations and points of view. High quality instructional contexts comprise interactions that promote higher order thinking rather than fact-based learning, feedback to students that expand learning and understanding rather than the correctness of students' responses, and frequent usage of language and language stimulation techniques by teachers. Well-organized classrooms are characterized by

teacher interactions that effectively manage children's behavior, time and routines to maximum learning opportunities, and instructional activities and materials.

In addition to the quality of teacher-child interactions, a focus on the quality of classroom processes that children directly experience in early education programs also includes conceptualization and measurement of interactions among peers and interactions that children might have with materials that stimulate learning. And, there is some evidence that interactions with peers, particularly involving language, may have an effect on learning independent of teacher-child interactions (Mashburn, Justice, Downer & Pianta, 2007). However, there is less strong support for the contention that interactions with the physical environment and learning materials stimulate learning independently of adults' or peers' social presence in those interactions (Mashburn, 2007).

#### *An Ecological Theory of Preschool*

As described briefly above, for over twenty years, the field has produced studies about effective early childhood programs that have sought to identify features of preschool programs that have the strongest positive benefits for children; a coarse classification of these features suggests three primary foci: teacher characteristics (level of education, field of study), classroom characteristics (class size, child-to-teacher ratio, curriculum type), and classroom processes (physical environment and social environment). The prevailing organizing framework that has guided this research has been Bronfenbrenner's (1979) Ecological Systems Theory of Development. The theory posits that individuals are embedded within multiple ecological settings, and the individual both affects and is affected by these settings. The most proximal influences on development are the multiple *microsystems* within which the individual spends time,

most notably the family and school/classroom environment. Development is also affected by *mesosystems* that comprise interactions between microsystems (e.g., connections between the family and school/classroom), the *exosystem* that includes distal forces such as the school system, the community, and the mass media, and the *macrosystem* that involves even more distal inputs such as societal conditions, economic patterns, and national customs and values.

Ecological Systems Theory identifies the importance of interactions across levels of this ecology on the developing individual, by positing that distal conditions and forces influence development at least in part as a consequence of how they shape proximal processes and opportunities. Thus, from a conceptual and theoretical standpoint, this theory highlights that understanding the ecology of early childhood education and its effects on child development would need to carefully attend to ways in which features of the ecology interact with one another – moderating and mediating effects and influences over time – in relation to child outcomes; a fairly complex framework that would shape equally complex research designs as well as understandings of policy and program development. However, much of the research related to preschool effects has focused primarily on the main, or direct, effects of various parameterizations of quality in a “horserace” type of analysis. Figure 1 depicts this framework that has served as the implicit model in research that examines the extent to which children’s development is influenced by various features of the preschool environment.

Not surprisingly, results from studies of the effects of preschool quality on children’s outcomes using this framework provide a complicated and convoluted story about which features of preschool programs influence which developmental outcomes,

and for whom. Most studies include one or more of these measures of preschool quality and examine their direct associations with children's development. In general, studies that have examined associations between the quality and developmental outcomes provide support that higher quality is associated positively with children's development of school-related competencies (Byrant, Burchinal, Lau, & Sparling, 1994; Lamb & Ahnert, 2006; Peisner-Feinberg & Burchinal, 1997; Vandell, Henderson & Wilson, 1988; Schliecker, White, & Jacobs, 1991; Howes, Phillips & Whitebook, 1992; Hestenes, Kontos & Bryant, 1993; Dunn, 1993; Howes & Smith, 1995; NICHD-ECCRN, 2002a; NICHD-ECCRN, 1999; Peisner-Feinberg, et al., 2001). From these studies, it is quite reasonable to conclude that enrollment in early childhood education programs confers benefits with regard to child development, and that the higher the "quality" of the program (defined heterogeneously) the more positive the outcomes, a conclusion that in turn has driven expansion of state-funded pre-kindergarten and a focus on improving quality.

However, as efforts to improve quality have been a primary focus, it is equally clear that relations between preschool quality and development tend to be small (NICHD-ECCRN & Duncan, 2003), significant associations are not evident across all studies (e.g. Goelman & Pence, 1987; Kontos, 1991; Kontos & Feine, 1987; Deater-Deckard, Pinkerton & Scarr, 1996; Chin-Quee & Scarr, 1994), results may depend, in part, upon child characteristics such as sex (Baydar & Brooks-Gunn, 1991; Bryant, Burchinal, Lau, & Sparling, 1994), race/ethnicity (Bryant, Peisner-Feinberg, & Clifford, 1993; Burchinal, Ramey, Reid, & Jaccard, 1995; Peisner-Feinberg & Burchinal, 1997) and home and family risk factors (Baydar & Brooks-Gunn, 1991; Bryant, Burchinal, Lau & Sparling,

1994; Caughey, DiPietro, & Strobino, 1994; Peisner-Feinberg & Burchinal, 1997; Hagekull & Bohlin, 1995). Results also depend upon which features of program quality are included in studies and how they are measured.

Thus, results from studies that emanate from the implicit assumptions reflected in the model depicted in Figure 1 report, by and large, suggest positive associations between children's development during preschool and features of preschool programs children attended, but there are notable inconsistencies. Thus, the general conclusion gained from these studies that preschool is a benefit is modified almost immediately when looking across the literature, with the proviso that it appears *that different features of preschool programs have different impacts on different developmental outcomes for different children* — which leaves policy-makers, program administrators, and early childhood educators who are responsible for the design and structure of effective preschool programs with little guidance about how best to design programs that are most beneficial for children who attend.

We argue that the lack of cogent understanding of the effects that features of preschool programs have on children's development is due, in part, to an improper theoretical specification for how ecological features of preschool programs such as teacher and classroom characteristics act to affect children. As depicted in Figure 1, studies tend to include a variety of features of preschool programs and examine the extent to which each is *directly* associated with development, which overly simplifies the ways that the ecology influences development. Not surprisingly, extensions of ecological theory as described in the Bioecological Model of Development (Bronfenbrenner & Morris, 2006) articulate a more appropriate specification for how ecological settings

influence development, which identifies direct, mediating and moderating effects. In the next section, we consider these concepts, particularly mediation and moderation, in relation to understanding (and studying) the effects on children's development of various quality features of preschool settings. Our aim is to offer an alternative explanation of how different features of preschool programs transmit benefits to children who attend that could be useful to guiding program development and policy and better aligning expectations of research with the actual designs of various studies.

### *The Bioecological Model of Development*

At the time, Bronfenbrenner's advancement of an ecological perspective on development helped to shift the focus of developmental research from outside of the laboratory and into contexts within which development occurs. However, Bronfenbrenner (1986, p. 287) notes that this pendulum may have swung too far, resulting in "a surfeit of studies on 'context without development'". This is true in the case of research on ecological impacts on development within preschool settings, which has almost exclusively examined only direct impacts of the preschool settings on children's development.

Bronfenbrenner and Morris (2006) refined the Ecological Systems Theory with the Bioecological Model of Development to provide a more precise explanation for how ecological settings impact development. The first proposition of this theory states that human development takes place through processes of progressively more complex reciprocal interactions between the individual and the persons, objects or symbols in the individual's immediate external environment that occur on a fairly regular basis over extended periods of time. The second proposition states that the form, power, content,

and direction of the proximal processes affecting development vary systematically as a function of the environment, person and time (Bronfenbrenner & Morris, 2006)

These two propositions, when applied to preschool settings, provide a more sophisticated and complex specification about how ecological features of preschool programs influence children's development than the implicit model involving direct effects of preschool settings on development depicted in Figure 1. In this revised frame, learning within preschool settings is viewed as the direct result of a child's sustained interactions with both physical and social resources in preschool settings. Interactions with physical resources must be appropriate for the ability level of the child, become increasingly complex to meet the growing demands as the child develops, are used regularly and for extended periods to offer continual challenges that promote growth, and occur in the absence of other individuals. One example of the application of this theory of development is the Montessori framework, which applies these principles to the design of class activities and learning environments. Within Montessori classrooms, materials are arranged by subject area, engage all five senses, are available by the child's own choice and are used at the child's own pace, and the teachers' roles within these classrooms are to support this process by preparing the environment, helping to facilitate children's use of the resources, and protecting the child's concentration from interruption.

The first proposition also states that social interactions between a child and his or her teachers and peers are a mechanism through which ecological forces impact children's development. Recent theoretical work by Hamre and Pianta (2007) specifies that social interactions within classrooms comprise three distinct emotional, instructional and organizational domains, and high quality interactions are characterized by positive,

emotionally supportive relationships between teachers and children, use of rich language and instructional techniques that develop concepts, and well-organized materials, activities and behavioral patterns. Thus, a proposition consistent with the Bioecological Model of Development posits that *children's frequent and sustained exposure to high quality physical and social resources through interaction processes in classrooms is the direct mechanism through which development occurs.*

The second proposition applied to preschool programs indicates that the extent to which interactions with physical and social resources within classrooms impact children's development depends upon characteristics of the individual and characteristics of the classroom environment<sup>1</sup>. From this perspective, child characteristics<sup>2</sup> and classroom characteristics (e.g., class size, ratio, type of curriculum) *moderate* the associations between the quality of interactions and children's development. This interaction between child risk characteristics and quality of classroom processes has been tested in numerous studies—and there is evidence that children who experience greater social and economic risks benefit more from higher quality social and physical environments than their more advantaged peers (Baydar & Brooks-Gunn, 1991; Bryant, Burchinal, Lau, & Sparling, 1994; Bryant, Peisner-Feinberg, & Clifford, 1993; Burchinal, Ramey, Reid, & Jaccard,

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<sup>1</sup> The impacts of interactions on children's development also depend upon time, such that the impacts may be more or less effective for children of different ages or developmental stages. Since preschool programs serve children with rather homogeneous ages and developmental stages, the impacts of time on the associations between physical and social interactions on children's development may be less pronounced than in contexts that include children with more variability in age, such as elementary schools.

<sup>2</sup> The interaction between child characteristics and preschool quality on development is often described as the extent to which preschool quality has differential effects on development depending upon the level of children's risk, which suggest that risk is a moderator of the association between preschool quality and development. This interaction is more appropriately specified as the moderating influence of preschool quality on the association between child risk characteristics and development, which is consistent with how this interaction is tested in a multi-level framework.

1995; Peisner-Feinberg & Burchinal, 1997; Caughey, DiPietro, & Strobino, 1994; Hagekull & Bohlin, 1995).

The Bioecological Model of Development applied to preschool programs also identifies *indirect* effects that teacher and classroom characteristics have on children's development. As stated previously, children's development is the direct result of their interactions within physical and social resources in classrooms. Within this framework, teacher characteristics (e.g. level of education, type of training, and amount of professional development in which teachers participate), which are so often the focus of policy or program development efforts, are expected to influence children's development through their impacts on the quality of interactions with social and physical resources that children experience in classrooms. For example, higher levels of teacher education, specialized training in early childhood education, and participation in intensive and coherent professional development programs are proposed to improve the quality of emotional, instructional, and organizational interactions that teachers' facilitate within their classrooms, and the ways that classrooms are structured to provide children opportunities for sustained engagement with appropriate physical materials. Thus, teachers' level of education and type of pre-service and in-service training have indirect (mediated) effects on children's development to the extent that teacher characteristics impact the quality of classroom interactions that children experience with physical resources and other individuals. There is modest evidence for the mediating effects of preschool teacher training on children's outcomes from the NICHD Study of Early Child Care, which found that the positive effects of higher levels of teacher education on

children's cognitive and social competence was explained by a higher quality relationship between the caregiver and the child (NICHD-ECCRN, 2002).

The Bioecological Model of Development (Bronfenbrenner & Morris, 2006) also identifies how classroom characteristics such as class size, child-to-teacher ratio, and curriculum impact children's development. As with teacher education, these structural features of program quality are not proposed to have direct impacts on children's development as has been presumed in previous research and depicted in Figure 1. Instead, these classroom characteristics may impact children's development in two ways. First, similar to the mediating role that teacher characteristics have on children's development, a small class size, favorable child-to-teacher ratio and comprehensive curriculum may directly influence the quality of interactions children experience in classrooms, which in turn, affects children's development. The first step in this mediated pathway has been confirmed in a study of first grade classrooms that found that classrooms with smaller class sizes and lower child-teacher ratios had higher quality instructional and emotional interactions (NICHD-ECCRN, 2004). A mediated process was also tested among preschool classes, and results indicated that the positive effects of small class sizes on children's development of cognitive and social competence was mediated by the quality of care giving that children experienced in classrooms (NICHD-ECCRN, 2002).

In addition to the mediating effects of classroom characteristics on development, the effects of high quality interactions with social and physical resources on children's development may be moderated by these features of the classroom environment. In other words, class size, ratio, and curriculum type are features of preschool classrooms that

may magnify or reduce the direct effects that classroom interactions have on children's development. No studies to date have tested the extent to which the impacts of high quality classroom processes on children's development depend upon features of the classroom such as the number of children enrolled, child-teacher ratio, and type of curriculum used. However, there are a number of plausible examples of the potential moderating effects of classroom characteristics on the association between high quality interactions and children's development: Classrooms with stimulating and developmentally appropriate physical resources may have a stronger influence on children's development of academic competencies in classrooms that use a curriculum that structures activities in ways that better support their usage of these materials. Positive social interactions between teachers and children may have a stronger influence on children's development of social competencies in classrooms with better child-to-teacher ratios, so that individual children may have more opportunities to engage in supportive interactions directly with a teacher. Teachers' use of high quality language modeling techniques in their interactions with children may have a stronger influence on children's development of language skills when used with a curriculum that provides more opportunities for language-focused instruction. Teachers' use of organizational strategies that effectively manage children's behavior may have a stronger influence on children's development of self-regulatory skills within classrooms with fewer students than classrooms with many students. Figure 2 presents a model of the mechanisms through preschool programs influence children's learning derived from the Bioecological Model of Development (Bronfenbrenner & Morris, 2006), which identifies a mediating role of teacher and classroom characteristics and a moderating role of classroom

characteristics in affecting the developmental outcomes of children who attend preschool programs.

*Implications for policy and program/professional development*

This ecological framework indicates that features of preschool programs impact development in the following ways: 1) Children's interactions with physical and social resources in classrooms are the direct mechanisms through which preschool programs transmit benefits to children. 2). Classroom characteristics (e.g., class size, ratio, and curriculum) and teacher characteristics (e.g. level of education and field of study) may have indirect effects on children's development to the extent that they have direct impacts on the quality of interactions with physical and social resources that children experience within classrooms; 3) Classroom characteristics are also classroom conditions that may, in part, determine the extent to which high quality interactions impact children's development.

Thus, the features of preschool settings that matter most for children's development are interactions children directly experience; and as such, *we argue that definitions of preschool quality should focus on the physical and social resources that children directly experience within preschool programs; and that teacher characteristics and classroom conditions be defined as part of program design and infrastructure that help support this linkage between the quality of interactions and children's development.* This re-positioning or re-framing is not just a semantic activity—it explicitly defines quality in a more narrow way in terms of interactions that produce developmental change—which has important implications for program improvement efforts that effectively increase the benefits conferred to children resulting from attending preschool.

One can readily see the implications of this definitional narrowing and precision with regard to policy-making and the policy debates taking place. To the extent that policy-making is about investments in early childhood programs and outcomes, then to appropriately evaluate the return on those investments (and we argue, to better target investments in the first place), there must be definition be a focus on interactive processes in settings. Failure to recognize this reality and adhere to its implications is likely to only result in continued arguments about the importance of this or that structural feature, and investments at that level that may or may not penetrate to the actual processes that are responsible for learning and development (Hamre & Pianta, 2007). Thus as programs at the state, Federal, or even local levels are scrutinized with regard to policies that might not only expand enrollment but actually deliver desired outcomes in terms of children's development, then central to policy-making should be consideration of interaction processes. More specifically, this means that metrics for quality should focus more narrowly on interactions, rather than consist of a mixture of conceptually and functionally heterogeneous indicators of mostly structural and design features. Investments in program improvement then would use interaction process metrics as benchmarks, standards, and outcomes. Immediately evident, from this definition of quality, is that efforts to improve programs that have an intended effect to raise children's developmental functioning, must focus very directly on improving these interactions and their links to children's learning. Thus, professional development would need to be far more directly designed to target, and linked to, adults' interactions with children. We describe two such efforts in a later section of this chapter.

This theoretically-based framework for defining high quality preschool requires methods for measuring quality of children's experiences in classrooms, and there are instruments that utilize systematic observations of classroom interactions to provide a metric for quality of classroom interactions. The Caregiver Interaction Scale (CIS; Arnett, 1989) is an observational measure that assesses the nature of teachers' social interactions with children along three dimensions—harshness, sensitivity and detachment. The Classroom Assessment Scoring System (CLASS, Pianta, LaParo & Hamre, 2007) measures the quality of emotional, instructional and organizational supports evident in teachers and children's interactions in classrooms. The Early Childhood Environment Rating Scale-Revised (ECERS-R; Harms, Clifford, & Cryer, 1998) assess the quality of multiple dimensions of the quality of the social and physical environments in classrooms.

Measures that are aligned with the definition of preschool quality above serve as a lens for assessing the nature of children's direct experiences in classrooms, and they have been used extensively in large-scale studies involving several thousand US early education classrooms. Results from these studies clearly demonstrate that the quality of child-teacher interaction is mediocre, varies widely across classrooms and effective curriculum implementation is inadequate (NICHD ECCRN, 2002b; Peisner-Feinberg & Burchinal, 1997; Pianta et al., 2005). Thus, these measures not only present a rather grim description of the quality of interactions that children directly experience in classrooms; they also identify a target for intervention efforts that enhance children's development of social and academic competencies during preschool. The next section describes two teacher training programs—one in-service professional development program and one

pre-service training course—that adopt the above definition of high quality preschool and provide supports to teachers that improve the quality of interactions that children directly experience in classrooms.

### *In-service Professional Development*

There is currently widespread agreement that the training and professional development of the early education workforce is a key component for ensuring that early childhood education programs make good on the hopes of policy-makers, parents, and educators for improving children's success in school (Bogard & Takanishi, 2005; Zaslow & Martinez-Beck, 2005). Consequently, identifying effective, relevant, and scalable approaches to training the early education workforce is of paramount importance. Professional development for teachers has a history of incoherence and ineffectiveness (Ball & Cohen, 1999); in-service teachers pursue learning opportunities on their own (e.g., weekend workshops), pick up advice within informal settings at school (e.g., in the lunchroom), attend district-mandated workshops, and learn from daily experiences with children in the classroom (Wilson & Berne, 1999) without attention to how these experiences systematically and progressively are linked to classroom performance. Short-term training, often knowledge- or technique-based, is the most common form of in-service training with substantial variation in nature and quality and virtually no evidence of effectiveness (Birman, Desimore, Porter, & Garet, 2000; Garet, Porter et al., 2001). Workshops fall short in a multitude of ways: teachers are in a passive learner role; content is vague, irrelevant or disconnected from classroom context; and there is limited follow-up (Haymore-Sandholtz, 2002). Yet contemporary estimates of annual spending on professional development range from \$2,000-\$7900 per teacher, which in a city such

as Chicago totaled \$193 million in 2002 (Odden, Archibald, Fermanich, & Gallagher, 2002). There is virtually no evidence of positive effects for any of the approaches paid for by these funds.

Drawing from the literature on adult learning (Abdal-Haqq, 1995; Darling-Hammond & McLaughlin, 1995; Putnam & Barko, 2000; Richardson & Anders, 2005), educators have started to conceptualize and design professional development as a pursuit of knowledge and skill that is active, collaborative, linked to classroom context, and embedded in school culture (Darling-Hammond & McLaughlin, 1995; Lieberman, 1995). Even the No Child Left Behind legislation (U.S. Dept. of Education, 2002) describes high quality professional development for teachers as intensive, sustained and classroom-focused. Emerging from this re-conceptualization of teacher education is a shift from static, knowledge-based focus of training to the use of coaching, mentoring, and consultation approaches that provide more continuous, practice-focused support and guidance to teachers (Ingersoll & Kralik, 2004; Pianta, 2005).

Mentoring or coaching approaches that provide ongoing support and feedback about instruction and classroom practices are being acknowledged as a potentially effective and perhaps most direct path to producing high quality teaching, both in pre-k (Landry et al., 2006; Pianta, 2005) and in K-12 (Ingersoll & Kralik, 2004). Given that these approaches are identified by teachers both as relevant and as reducing isolation (a particular problem for pre-k teachers), it is not surprising that “coaching” and “mentoring” now dominate the teacher-training landscape. However, we argue that unless professional development models a) focus on specific teacher-child interactions/implementation as targets; b) anchor interaction targets in standardized,

validated measurement systems and c) use consultation procedures that are both justifiable and standardized, then in the long run even this promising approach to training and supporting teachers will join the other discarded and discredited efforts to improve teaching.

MyTeachingPartner (MTP) is a professional development program for preschool teachers designed to support effective teacher-child interactions through a collaborative, web-mediated consultation process and web-based video exemplars of effective practices. The conceptual basis for the MTP approach is that effective professional development for pre-k teachers (and for those in K-12) requires extensive opportunities for a) *observation* of effective instructional, language, and social interactions between teachers and children, through analysis and viewing of multiple video examples based on validated observation tools, and b) repeated *opportunities for individualized feedback and effectiveness-enhancing support* related to a teacher's own interactions with children (e.g., Landry, et al., 2006; Pianta et al., 2007; Wasik, Bond, & Hindman, 2006). Central to the MTP approach is that *all* observations of classroom interactions, as well as feedback and support to teachers, are based upon a shared, standardized framework for defining and observing classroom interactions, the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2007), which has been validated via links to growth in child outcomes within large-scale studies, many of which even isolate classroom effects from family influences (Mashburn et al., 2007; Hamre & Pianta, 2007; Pianta, Belsky, Houts, Morrison, & NICHD ECCRN, 2007).

An initial, experimental study of the effects MTP tested whether it was possible to provide professional development experiences for early educators that enhance their

classroom interactions with children and children's development of literacy skills. Specifically, the MTP approach to professional development included two components: a) access to video exemplars of high-quality teacher-child interactions tied to specific dimensions of the Classroom Assessment Scoring System (CLASS) and b) a consultation process that provides regular, multi-modal, ongoing, targeted feedback to pre-k teachers through a standardized protocol that focuses on specific dimensions of teachers' emotional, organizational, and instructional interactions with students, using the CLASS as the basis for a common, validated understanding of teacher behavior. Two models of training were implemented for two years and compared in this longitudinal study: 1) Web Only, in which teachers received workshop training in the curriculum and had access to the video exemplars, and 2) Consultancy, in which teachers received the same workshop training as the other condition but who also received the regular, web-mediated consultation. Every two weeks, teachers videotaped their implementation of an instructional activity and shared this footage with the research team. In the Consultancy condition, web-mediated interactions between a teacher and consultant then focused on: a) observing the video footage and identifying a teacher's behaviors with students and their effects; b) problem-solving to identify and implement alternative approaches as needed and receiving feedback on such attempts; and, c) establishing a non-judgmental and non-evaluative supportive relationship with a knowledgeable individual (Hadden & Pianta, 2006). This process was facilitated by the following cycle of events, repeated each two weeks over the course of a year. Teachers videotaped their implementation of an instructional activity in either language/literacy development or social competence, mailed the tape to their consultant, who then edited the tape into a series of 1-2 minute

segments that focused on a specific aspect of interaction. Those edited segments and accompanying specific written feedback and questions posed for teachers' response were then posted on a private website for the teachers' viewing and response. Teachers and consultants then met on-line in a video-chat to discuss the prompts and feedback, and to problem-solve.

Results from the first year of the study indicate that teachers participating in the Consultancy condition had more positive growth compared to teachers in the Web Only condition for each of the dimensions of teacher-child interactions. For three dimensions of interaction quality—Teacher Sensitivity, Instructional Learning Formats, and Language Modeling—the rates of change were significantly different between teachers who participated in the Consultancy condition and teachers who participated in the Web Only condition. Thus, teachers exposed to Consultancy supports, in contrast to those who received support only via on-demand access to video-resources on the web, showed greater improvements in aspects of interaction that involved reading and responding to students' cues, using a variety of formats to actively engage children in instruction, and intentionally stimulating language development. Results also indicated that the effects of the MTP Consultancy on improving Teacher Sensitivity and Instructional Learning Formats were stronger in classrooms with a higher proportion of children living in poverty. In particular, when classrooms had 50% of children classified as poor, there were no differences in rates of change between teachers in the Consultancy and Web Only conditions. However, in high poverty classrooms, teachers who received the consultation supports had greater increases in the quality of teacher-child interactions than teachers who did not receive these supports.

For teachers who participated in this study for two years, we examined the extent to which MTP consultancy affected children's development of language and literacy skills. Results indicate that children whose teachers participated in the consultation made significantly greater gains in receptive language skills than children whose teacher participated in the web-only condition. In addition, the impacts of the consultancy on children's development of pre-literacy skills were stronger during the second year of the study compared to the first, and among teachers with fewer years of experience teaching pre-school. Thus, overall these results provide evidence that the MTP approach that targets improving the quality of emotional, instructional, and organizational interactions that children directly experience in class is effective at changing teacher behaviors and promoting children's development of language and literacy skills.

#### *Pre-service Teacher Training*

Enrollment of 3- and 4-year olds in early education programs now approaches 70% of the population and the numbers are growing annually (National Institute for Early Education Research [NIEER], 2004; West, Denton, & Germino-Hausken, 2000). The rapid expansion of public preschool programs has placed heavy demands on the supply chain for early childhood educators, with estimates of 50,000 new teachers needed by 2020 (Clifford & Maxwell, 2002). States currently rely on a variety of strategies to meet these needs: teachers with elementary grade certifications and teachers with 2-year degrees may be "grandfathered" into certification (Clifford, Early, & Hills, 1999); many teachers take required courses while already employed and use worksites for student teaching (Howes, James & Ritchie, 2003); several states address the staffing and qualification crisis by improving salaries and benefits; and others encourage child care

and preschool providers to seek additional training and the early childhood education system becomes more formal and programmatic (see Peters & Bristow, 2005; Pianta, 2005).

These efforts to meet the demand for “trained” teachers are moving ahead rapidly without any systematic evaluation of their impact on the nature and quality of instruction in classrooms and on child outcomes (Clifford, Early & Hills, 1999; Hart, Stroot, Yinger, & Smith, 2005; Ramey & Ramey, 2005), which is recipe for continued mediocrity and inequity that ultimately undermines the promise of early education to close the achievement gap. Leveraging the value of public investments in preschool education requires that research and development efforts focus on identifying effective and replicable approaches to teacher training that produce positive, and even accelerated, gains in children’s academic performance (Brandon & Martinez-Beck, 2005; Ramey & Ramey, 2005).

The National Center for Research in Early Childhood Education’s (NCRECE) main program of research addresses this pressing need to establish an empirical basis for the effectiveness of teacher training in early childhood settings. The primary objective of this work is to design, implement, and evaluate teacher training programs that establish empirical, causal links from specific experiences in teacher preparation and support (i.e., coursework and inservice consultation) to high quality implementation of language and literacy instruction. The result will be an organized, manualized training approach for improving teaching quality in literacy and language development that shows demonstrable effects on children’s language and literacy outcomes, which may be applied

to any of several sectors of the workforce supply chain through coursework or inservice professional development.

The training program adopts the definition that high quality preschool involve emotionally, instructionally, and organizationally supportive interactions that children directly experience with physical and social resources in preschool programs. The training materials provides a sequence of focused coursework that promotes knowledge about the types of interactions that influence children's development, skills in detecting effective interactions in classrooms, and skill in delivery of effective interactions. An experimental study of the effects of this training will begin in February 2008 to assess the benefits in improving the quality of teachers' interactions in preschool classrooms, as well as the impacts on children's development of language and literacy skills.

### *Conclusions*

The recent creation and expansion of public preschool programs has led to the current state in which formal education begins for a majority of children at age 4. To realize the benefits of preschool programs in closing achievement gaps for children who experience social and economic risks and in reducing the incidence of difficulties among all children in their adjustment to school, there is a need to better understand the mechanisms through which preschool transmits benefits for children who attend. The Bioecological Model of Development (Bronfenbrenner & Morris, 2006) articulates these processes through which preschool impacts children's development, and the quality of children's interactions with social and physical resources in classrooms are the primary influences on children's learning and development. Thus, promoting high quality interactions in preschool should be the primary target for effective intervention efforts.

Results of MyTeachingPartner, an in-service professional development program, provides encouraging evidence that high quality interactions can be promoted through individualized, one-on-one teaching consultation, which can yields measurable benefits for children's language and literacy skills. Current work conducted by the National Center for Research in Early Childhood Education uses a similar framework to design a course to promote teachers' knowledge of and skills in providing high quality interactions. The promise of early childhood education depends in large part on the professional development and training of teachers in instructional/interaction skills (Zaslow & Martinez-Beck, 2005), and pre-service and in-service teacher training that targets high quality interactions in classrooms have the powerful potential to prepare children to enter school ready to learn.

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Figure 1

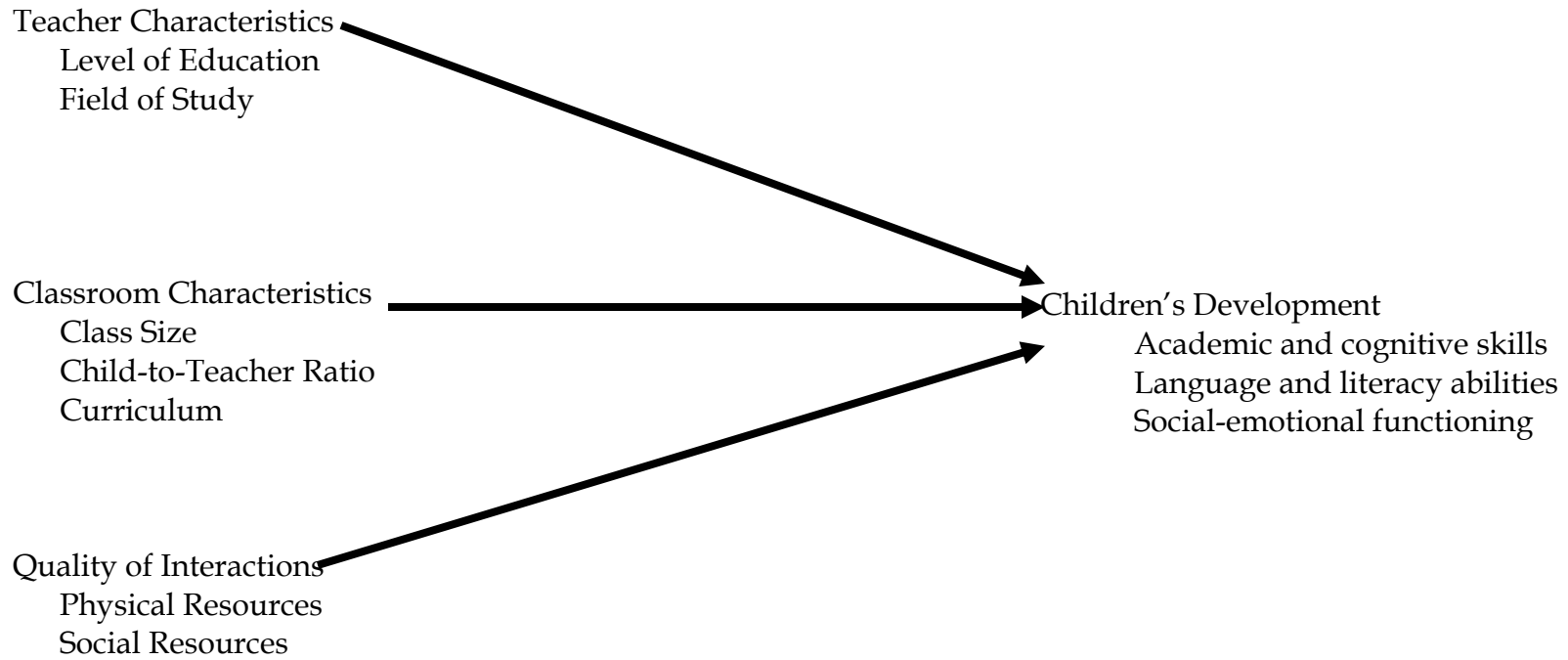


Figure 2

