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The current study examined preschool teachers' beliefs and practices during children's play in high and low quality outdoor environments in child care centers. Children's physical activity was measured using accelerometers. Videotapes of children and teachers during outdoor play were analyzed quantitatively and qualitatively to understand teachers' practices and children's play behaviors. Additionally, teachers were interviewed to understand their beliefs of children's outdoor play and outdoor environment. Quantitative results indicated that children's activity levels were higher when teacher's activity levels were higher, and children engaged in higher levels of play when teachers showed high involvement during outdoor play. Qualitative results revealed that teachers considered outdoor settings as important in facilitating children's physical development, social development, and learning about nature, and believed their role was to supervise children, help them find a direction in play, and interact with them during outdoor play. Teachers' practices ranged from monitoring children to facilitating their play, but they rarely participated in play with children. Overall, teachers' beliefs and practices, and children activity levels and play differed by high and low quality outdoor settings. Policy implications for teacher preparation programs, importance of the outdoor classrooms and future research are discussed.

PRESCHOOL TEACHERS' BELIEFS AND PRACTICES OF
OUTDOOR PLAY AND OUTDOOR ENVIRONMENTS

by

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CHAPTER I

INTRODUCTION

Child care participation in the United States has skyrocketed in the past few decades. The country has seen some significant changes in demographics, family structure, gender roles and families' needs for economic security. Trends in maternal employment have undergone change with the number of women in the workforce increasing from 47.4 % in 1975 to 71.4% in 2008. In the year 2008, 64% of mothers of children under the age of 6 years were employed (U.S. Department of Labor, 2009), and 72% of women with children under the age 6 were working full-time in 2006 (U.S. Department of Labor, 2007). These changing trends have altered the family structure and influenced ways in which young children were traditionally cared for. Participation of children in out-of-home care is rapidly rising and consequently, the demand for child care services has increased. This growing reliance on non parental care has led to the emergence of early childhood care and education as an issue of public concern as well as a major component of U.S. social policy (Helburn & Bergmann, 2003).

Child Care in the U.S.

Children of working parents under non-parental care are most likely to be cared for either in child care centers, family day care homes, by another relative, a nanny, or babysitter. The Child Care Licensing Studies (1978, 1984 & 2005) conducted by the National Association for Regulatory Administration (NARA) report that the number of

child care centers have almost quadrupled in the past three decades- from 25,000 in 1977 to 116,000 in 2004. About 32% of children below the age of 5 years with a working mother participate in center based care (Smolensky & Gootman, 2003). Preschool children also spend a substantial number of hours in non-parental care each week. The National Survey of America's Families (2002) revealed that forty-two percent of children under the age of 5 with an employed mother spend 35 hours or more per week in non-parental care, 19.9% spend about 15-to-35 hours, while 16.5% spend 1-to-14 hours in non-parental care (Capizzano & Main, 2005). The participation of preschoolers in non-parental care also differs by race and ethnicity. African American children (41%) are the more likely to receive center based care, as compared to White children (35%). Among the various ethnic groups, Hispanic children (20%) show least participation in center based care (Story, Kaphingst, & French, 2006). As the enrollment of children in out-of-home center based care is rising the issue of quality in child care centers has come to the forefront with research in the field of early childhood education focusing on children's participation in high and low quality care settings.

Child Care Quality

The concept of quality in early childhood education is dynamic (Buell & Cassidy, 2001) and influenced by various contextual features (Burchinal & Cryer, 2003; Love et al. 2003). Identifying the different aspects that account for quality care is a difficult task since it is dependent on various factors ranging from those at the macrosystemic level, such as subsidy policies and child care regulations (Rigby, Ryan, & Brooks-Gunn, 2007), to the microsystemic level in which the child is immediately involved , such as teacher-

child interactions. The meaning of quality also differs based on the context of the environment, such as the indoor environment or the outdoor setting. Research on child care quality has emphasized on the indoor classroom environment, often neglecting the role of outdoor quality on children's development and learning. Studies on child care quality have noted that different countries may examine and highlight different aspects of quality as they create their early childhood programs (Pascal & Bertram, 1994; Tietze, Cryer, Barrio, Palacios & Wetzel, 1996).

Components of Quality

The quality of child care and early childhood programs in the United States is often defined using two broad dimensions: structural and process quality indicators (NICHD Early Child Care Network, 2002; Howes, Phillips, & Whitebook, 1992). Structural features refer to the "regulatable" aspects of care (Howes et al., 1992). Structural features are aspects of the child care environment that are affected by a variety of influences such as government regulations, center policies, adult-child ratio, group size, and teacher characteristics such as teacher education/training (NICHD Early Child Care Network, 2002; Phillipsen, Burchinal, Howes, Cryer, 1997), teachers' beliefs about developmentally appropriate practices and their instructional activities (Abbott-Shim, Lambert, & McCarty, 2000), years of teacher experience (Dunn, 1993), professional development training (Burchinal, Cryer, Clifford & Howes, 2002), and economic aspects of care, such as staff wages, benefits and parent fees (Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000). Process quality represents children's experience in child care, which includes their interactions with their providers and their peers, the activities and

materials with which they are engaged, caregiving quality, cognitive and language stimulation, health and safety practices (NICHD Early Child Care Network, 2002) and developmentally-appropriate activities (Bryant, Burchinal, Lau, & Sparling, 1994; Kontos & Dunn, 1993; Wolery, Strain, & Bailey, 1992).

In an attempt to further clarify the constructs of structural and process components of quality, Cassidy, Hestenes, Hansen, Hegde, Shim, and Hestenes (2005) revisited the items on a commonly used quality measurement scale that are considered to be indicators of structure and process quality. Their understanding of structure and process emerged from their extended discussions about each of these indicators. They elucidate that the structure component of quality is independent of adult-child, child-child and adult-adult interactions in the child care environment. Process component, on the other hand, requires some level of interaction between adults and children or children themselves. Their efforts have made researchers question the indicators of the structural and process constructs. Studies like these further reiterate the idea that the definition and understanding of the components of quality are based on the context of the environment. Research highlighting the link between the structural and process indicators of quality has found that high quality interactions occur more frequently in classrooms where the child-staff ratios are low, and teachers are more educated and trained (Howes, et. al, 1992; NICHD Early Child Care Research Network, 1996, 2000). Additionally, in such classrooms children perform better across a range of cognitive and social measures (NICHD Early Child Care Research Network, 1999).

Quality in early childhood classrooms is measured frequently using the Early Childhood Environment Rating Scale (ECERS; Harms & Clifford, 1980), the Early Childhood Environment Rating Scale-Revised (ECERS-R) (Harms, Clifford, & Cryer, 1998), the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2007), the Assessment Profile for Early Childhood Programs (Abbott-Shim & Sibley, 1998) and the Classroom Practices Inventory (Hyson, Hirsh-Pasek, & Rescorla, 1990). Indicators of quality and the resources to measure indoor classroom quality are well defined and widely available. However, quality indicators, as well as instruments to assess the outdoor classroom quality are in the initial stages of development and not easily available to early childhood teachers and professionals.

Quality and Child Outcome

It is widely accepted that high quality child care promotes children's development and learning (Lamb, 1998; Vandell & Wolfe, 2000). Children in higher-quality child care centers performed better on measures of cognitive skills (NICHD, 2003) and social skills (Peisner-Feinberg, Clifford, Culkin, Howes, & Kagan, 1999), as compared to children in lower-quality centers who were less competent in language and social development (Whitebook, Howes, & Phillips, 1989). In classrooms that met professional standards for teacher-child ratios, an important component of high-quality classrooms, children were involved in elaborate peer play and scored higher in adaptive language compared to children in classrooms with higher child-teacher ratios (Howes, Smith, & Galinsky, 1995).

Outcomes for children participating in high and low quality classrooms are well researched. However, it is important to recognize that these studies have been conducted

mainly using the indicators of quality for the indoor environment. Very few investigations have been done on children's development and learning in the child care outdoor environment, and studies on children's outcomes in high and low quality outdoor environment are further limited. The current study will investigate preschool children's play in high and low quality outdoor environments, examine teacher practices in high and low quality outdoor environments, and explore teachers' beliefs about outdoor play and environments. Subsequently, the following sections will provide an overview of preschool play, teacher-child interactions, and teacher beliefs.

Play

Play is the most commonly researched topic in early childhood education. The value of play in children's development has been underscored by various theorists, researchers and educators of young children (Bredekamp & Copple, 1997; Fromberg, 1999; Rubin, Fein & Vandenberg, 1983; Vygotsky, 1978). Children's play is categorized based on the cognitive aspects of their development (Piaget, 1962; Smilansky, 1968) as well as their social development and participation with peers (Parten, 1932). Children's play is influenced by a number of factors, an important one being the physical environment in which play takes place (Shim, Herwig & Shelley, 2001), such as the outdoor play setting. The role of play in enhancing development and learning in children is widely acknowledged, however, the value of children's outdoor play and the types of children's behavior in outdoor environments have received little empirical attention.

Child Care Regulations on Outdoor Play

Regulations for child care facilities are enforced at the state level. Each state imposes specific requirements that providers must meet to operate legally (U.S. General Accounting Office, 2000). Most states articulate requirements related to safety and health, minimum indoor and outdoor space, teacher qualifications, etc. States also enforce regulations with respect to safety and sanitation in the child care outdoor environment. For example, outdoor areas need to be fenced, playground equipment need to be securely anchored, outdoor space must be clear and free from hazardous objects like glass, nails, etc., and staff member need to be present during all outdoor activities to provide direct supervision.

The National Resource Center for Health and Safety in Child Care and Early Education maintains a website on individual states' child care licensure regulations (<http://nrc.uchsc.edu/STATES/states.htm>). Regulations related to the amount of time children should be outdoors, and the minimum outdoor space per child differs widely across states. Thirty-eight states and the District of Columbia require that child care centers have outdoor time each day, weather and health permitting. Eight of these states and the District of Columbia specify the duration for which children should be outdoors every day. Most states require at least one hour of outdoor time. Mississippi and the District of Columbia require two hours of outdoor time per day for full day programs. Many states also specify the amount of outdoor space that should be made available to each child. For example, most states (such as Alaska, North Carolina, Louisiana, etc.) require child care facilities to provide a minimum of 75 square feet of outdoor space for

each child at any one time. However, variations exist among states, with some states like Georgia permitting a minimum of 100 square feet of outdoor play area for each child, Alabama requiring a minimum of 60 square feet of outdoor play area per child, while others (for example Nevada) providing as less as 37 ½ square feet of usable outdoor play area for each child. An overview of each state's specific data provides a snapshot of the current policies related to outdoor play and outdoor environments in the country. These policies form a part of the macrosystem that influence individual development. These regulations and decisions also trickle down to the individual classrooms and play an important role in enhancing our understanding of children's behaviors and teachers practices during outdoor play. Moving to the idea of teacher practices, the next topic will focus on the role of teachers' beliefs, practices and the importance of teacher-child interactions for children's development.

Teacher Beliefs, Practices and Teacher-Child Interactions

Teacher behaviors (Cassidy & Buell, 1996) and teacher-child interactions (Kontos & Wilcox-Herzog, 1997) form important components of child care quality. Literature on teacher behaviors has linked teachers' instructional practices to their explicit and implicit beliefs about children, about appropriate classroom practices, about classroom set up, etc. Teachers hold various beliefs, either consciously or unconsciously, and these beliefs guide their actions and practices (Richardson, 1994). While teacher beliefs and their links to classroom instructional practices have been well documented (Nespor, 1987; Wilcox-Herzog, 2003) few studies have examined teachers' beliefs about the outdoor play and environment, and its influence on teachers' practices outdoors. One study conducted on

preschool teacher's beliefs and practices during outdoor play found that teachers' beliefs about outdoor play and outdoor environments influenced the way they set up the outdoor environment for the children. It affected their beliefs about their role during outdoor play, and also what they actually did during children's outdoor play (Davies, 1996, 1997).

The value of positive teacher-child interactions for promoting children's development (for example, Pianta, La Paro, Payne, Cox & Bradley, 2002) is well documented. Although the importance of teacher-child interaction is recognized, studies have consistently pointed out that children spend a significant amount of time in the day not interacting with the teachers (NCEDL Multi-state study of publicly-funded pre-k programs, 2005). This issue of low levels of interactions is further evident during children's outdoor play time where teachers rarely interact and participate with children during outdoor play, (Brown & Burger, 1984) and primarily supervise and monitor children (Davies, 1997). Low levels of teacher engagement and teacher-child interactions can have a negative impact on children (Hestenes, Kontos, & Bryan, 1993) and also deprive children of the growth and learning opportunities gained from positive interactions with adults.

The current study will contribute to the field by bridging gaps in the literature on children's outdoor play and outdoor environments. The study will explore teachers' beliefs and practices during preschool outdoor play. Bronfenbrenner's Ecological System's theory and Vygotsky's Sociocultural theory will be used to understand teachers' beliefs, their practices, and the role of teacher-child interactions during outdoor play. The theoretical frameworks used in this study will be discussed next, followed by a

review of relevant literature, research questions, and the method of conducting the current study. Finally, the results of the study will be presented and further discussed.

CHAPTER II

THEORETICAL FRAMEWORK

Exploring teachers' beliefs and practices during preschool children's outdoor play requires an understanding of the mechanism through which teachers' beliefs influence their practices, and also the role of teacher-child interaction during outdoor play. In an attempt to investigate these aspects, the contexts in which teachers and children operate will be studied, and the role of teacher-child interactions will be closely examined using Bronfenbrenner's Ecological theory and Vygotsky's Sociocultural theory.

The importance of teachers' beliefs and their interactions with children can be analyzed using Bronfenbrenner's Ecological theory (1979, 1988) now known as the Bioecological model (1998). The model includes four main components- Process, Person, Context and Time (PPCT) and the dynamic interactions between them. Process constitutes the interactions between the organism and the environment that function over time. Bronfenbrenner (1998) referred to the proximal processes as the chief mechanisms that produce human development. Proximal processes are bidirectional, and include interpersonal interactions as well as interactions with objects and symbols in the immediate environment. For example, children's interactions with the teachers during outdoor play, as well as their interactions with the outdoor environment qualify as processes that could influence their development. Person refers to a developing individual who is actively involved in his/her own development. Each person brings along unique

characteristics, experience, ability, knowledge and skills that play an important role in determining the course of development and also affect the course and strength of proximal processes. Within the framework of this study, teachers' characteristics such as years of experience, ability to facilitate outdoor play, knowledge and appreciation of nature and natural elements, etc. can either foster or hamper children's learning in the outdoor environment. Preschool children's characteristics such as their age, activity levels, skills, etc. can also influence teachers' interactions with them during outdoor play. Context is the environment in which the individual is embedded. An understanding of the characteristics of a context can aid in determining whether specific aspects of the environment either promote or impede development. In the current study, the quality of the outdoor environment and what the environment affords for the child's learning and for the teachers' practices outdoors will be a key context in examining children's play and teachers' behaviors in outdoor settings.

Bronfenbrenner (1988) hierarchically categorized the context at four progressive levels. The microsystem, which is at the innermost level, is the immediate setting that contains the individual, and has most impact on the life of the developing person. For example, home, school, outdoor environment, etc. The mesosystem consists of links between two or more microsystems in which the individual is present. An example of a mesosystem is the link between the home and the school. Parents' expectations of safety for their children during outdoor play may compel teachers to supervise children. The exosystem includes processes taking places between two or more settings, such that at least one of these settings does not contain the developing individual. The amount of

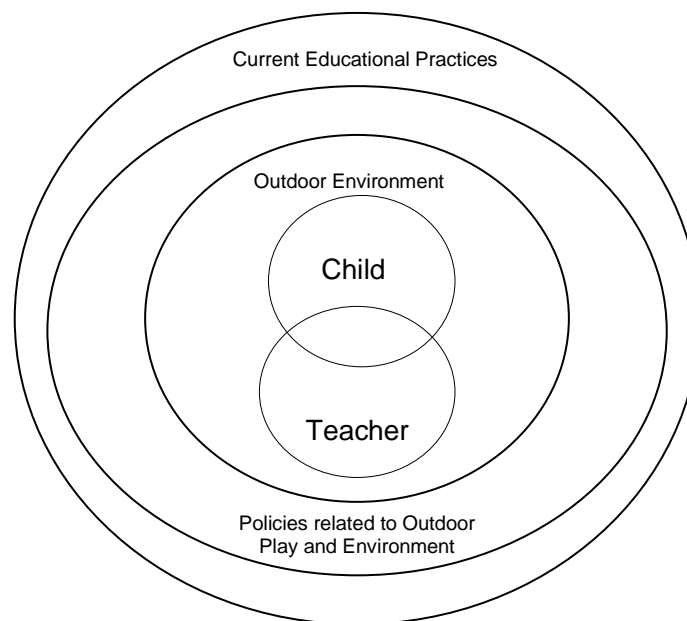
emphasis on outdoor play by the director of the child care center will impact practices such as time spent by children and teachers outside, and teachers' decisions to incorporate the outdoor environment in their curriculum and activities. Finally, the outermost system, the macrosystem, constitutes the cultural values, customs, and laws that exist in the society and affect the individual's interactions in his immediate microsystems. Statewide guidelines on to how long children need to play outside, the regulations for the amount of space available to each child in the outdoor environment, and so on, have an impact on children's outdoor play and teachers' practices. Overall, nationwide practices leaning toward the push for academics such as the No Child Left Behind act, as well as the fear of children spending time outdoors (Louv, 2005) have an impact on children's play and interactions in outdoor settings.

The last dimension of the PPCT model is Time. Time refers to the changes that take place over a period, not just within individual people, but also in the physical environment that the individual belongs to. Bronfenbrenner (1998) classifies time into successive levels. Microtime refers to the continuity and discontinuity that can alter the proximal processes. Changing some aspects of the outdoor environment to improve its quality can change the interactions that take place between children and teachers. Teacher-child interactions are also affected by changes in teachers' beliefs and practices that take place over a time period through formal education, staff development, and so on. The periodicity of these changes, also known as mesotime, is an important consideration while studying teachers' beliefs and practices during outdoor play. The concept of macrotime highlights the expectations and events that keep changing in the larger society,

both within and across generations. The history of playgrounds for young children in the United States has changed from open natural areas to those with anchored metal structures, to big artificial plastic equipment over the past few decades. The changing needs of the society and heightened concern with safety and regulations have altered the way in which playgrounds are designed for young children.

The PPCT model therefore forms the theoretical basis for this study. The current study will focus on the interactions between teachers and children in the microsystem of the outdoor environment. Figure 1 is a graphical representation of the factors that affect teacher-child interactions outdoors.

Figure 1: Ecological Model of Factors Affecting Teacher-Child Interactions in the Outdoor Environment



The role of teacher-child interactions is also emphasized by Lev Vygotsky's Sociocultural theory. Vygotsky (1978) focused on the transmission of culture- the values, beliefs, traditions, of a specific group, to the next generation. Social interactions, cooperative dialogues, and joint activities with more mature members of the group help children acquire skills, master activities, and think in ways that are meaningful in a society's culture (Berk, 2008). The most popular concept from his theory, the zone of proximal development, has been widely applied to the field of education. Vygotsky (1978) defined the zone of proximal development as the "distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). Guided activities with adults and collaboration with more capable peers may take place not just in the indoor setting but also in the outdoor environment during outdoor play.

Vygotsky's description of the zone of proximal development includes the idea that learning is clearly reciprocal (Tudge & Scrimsher, 2003). When teaching/learning takes place, a zone of proximal development is created in the course of interactions in which both partners learn and change. For example, during an outdoor play session children may show interest in exploring the natural environment and closely examining bugs and ants. When the teacher engages with the children in this exploration children's knowledge about natural elements may increase as teachers provide more information about natural elements (where the bugs live, what they look like, what they eat, etc.). In this process it is not just the children who learn from the teacher. Teacher may learn

about their children's interests and develop new activities based on their interests.

Teachers' interactions with children in the outdoor setting may lead to changes in their beliefs about their practices and teaching instructions. However, the few studies that have been conducted on teachers' practices in outdoor play, report that most teachers have been found to be uninvolved and rarely participate in children's play outdoors (Brown & Burger, 1984).

In conclusion, Bronfenbrenner's Bioecological Theory and Vygotsky's Sociocultural Theory, form the theoretical basis for the present study. The following section will focus on the literature on children's outdoor play, teachers' beliefs and practices in the outdoor environment.

CHAPTER III

REVIEW OF LITERATURE

Play

Play is the core of many philosophies and frameworks that focus on educating and caring for young children. Various theorists and researchers have conceptualized children's play as involving creativity, exploration, experimentation, adaptation, learning, communication, socialization, acculturation, and mastery (Ashiabi, 2007; Piaget, 1962; Schwartzman, 1978; Vygotsky, 1978). Play has been defined as meaningful; intrinsically motivating; pleasurable; freely chosen; symbolic; actively engaging, opportunistic and episodic; imaginative and creative; fluid and active; and predominantly for the moment, therefore concerned more with means rather than ends (Rubin, Fein, & Vandenberg, 1983; Fromberg, 1999; Sturgess, 2003). The most enduring classification of children's play comes from the work of Parten (1932) who categorized play on the basis of social participation, and Smilansky (1968) who studied the development of play according to children's cognitive development.

Parten (1932) developed categories of play based on two aspects of social participation, extensity and intensity. Extensity refers to the number of social contacts made by an individual, while intensity refers to the kind of groups participated in the role of the individual in those groups. She categorized play as: (a) unoccupied behavior, where the child is not involved in any kind of play, (b) onlooker, in which the child spends most of his time watching other children play, (c) solitary play in which the

plays alone and independently, (d) parallel play, in which the child plays alone but near other children who are involved in the same or similar activity, (e) associative play where the child plays with other children, and (f) cooperative play, where children play in a group taking different roles and sharing common goals. In a different vein, Smilansky (1968) characterized play into four types based on level of cognition involved: (a) functional play which includes exploring the physical capacity and environment, (b) constructive play that involves building, manipulating and/or creating, (c) dramatic play indicated by pretending imaginary situations, and (d) games-with-rules, where children accept and follow the limitations of external rules. Though play continues to be the center of many investigations in early childhood education, most of them have looked at children's play behaviors in the indoor classroom environment with very few focusing on children's behaviors and activities in the outdoor classroom environment.

Concept of Outdoor Play

The emphasis on the natural outdoor environment and its impact on children's development appears in the early childhood literature beginning as early as the 18th century. Pioneers in education such as Rosseau, Pestallozzi, Froebel, Dewey (Wellhausen, 2002), and Gandhi (1998) have stressed that children learn through nature and should have the opportunity and the freedom to explore, observe and appreciate things in a natural setting. The value of outdoor play for children, however, has declined over the years, and children's ability to learn outdoors has been underestimated (Henniger, 1993). In the sections to follow the history and evolution of outdoor play and environments will

be discussed, followed by research on children's outdoor play, the quality of outdoor environments, and the impact of outdoor play on children's overall development.

*History and Evolution of Outdoor Play and Outdoor Environments
in the United States*

For most of history when children had the freedom to play, their first choice was often to escape to the nearest wild place - whether it was big tree, a bushy area in the yard, a stream, or the woodland nearby (Pyle, 2002). Two hundred years ago, most children spent their days surrounded by fields, farms, or in the wild nature at its edges (Chawla, 1994). The idea of educating children emerged when childhood came to be acknowledged as a separate phase of life. Jean Jacques Rousseau's (1712-1778) who is credited with this idea of describing childhood as a separate stage of life, believed that experiences in the natural outdoor environment were central to educating young children (Graves, Gargiulo, & Sluder, 1996). Rousseau never implemented his educational ideas into actual practice, however, his ideas had a powerful influence on other educators and philosophers who attempted to apply his philosophy into educational practice (Wellhousen, 2002). Inspired by Rousseau's vision, Johann Pestalozzi, a Swiss educator (1746-1827) directed two schools in which he practiced Rousseau's ideas by giving children the freedom to learn from nature. He promoted activities such as nature walks, observing and appreciating the natural settings, etc. An important aspect of his philosophy was role of the teacher in children's learning. The role of the teacher was to provide children with materials from nature and allow them to use all their senses to explore those materials (Frost, 1942). Like Pestalozzi, Friedrich Froebel (1782-1852), the

creator of the first kindergarten in Germany, was also influenced by Rousseau's educational philosophies. As a child, Froebel spent hours exploring the outdoors, and later planned and provided opportunity for both indoor and outdoor play in his kindergarten program. Outdoor activities were carefully planned and implemented as a part of the kindergarten curriculum (Wellhousen, 2002). He encouraged his kindergarten students to be involved in outdoor activities such as nature study, growing plants in the garden, etc. (Frost, 1992 in Wellhousen, 2002).

As various educational philosophies were being brought to the forefront in different parts of the world, the American education system was influenced by these ideas. The state of playgrounds and outdoor environments in the U.S. were also influenced by outdoor areas in other parts of the world. The first formal playground in the U.S., an outdoor gymnasium, was introduced in 1821, and was patterned after playgrounds in Germany. These included indoor gymnasium equipment modified for outdoor use (Mero, 1909). The interest in such playgrounds gradually decreased, leading to the emergence of 'sandgartens' (heaps of sand) in 1886, which became popular with children of all ages (Sapora & Mitchell, 1948). The progressive education movement (Graves, 1990) marked by the work of philosopher John Dewey (1852-1952), introduced novel ideas in education based on democratic principles and scientific methods. Dewey recognized the importance of physical activity and movement for children. Gymnasium work, an opportunity for physical exercise during the school day, was considered important in developing moral and intellectual control (Wellhousen, 2002). Both the kindergarten movement started by Froebel, as well as the nursery school movement started in the early

1900s accentuated the role of play in children's learning. The early American kindergartens espoused Froebel's ideas and responded to his call for play by adding standardized devices such as swings, seesaws, climbing equipment, etc. to their playgrounds. With time, such structures replaced the rich natural environment that Froebel favored (Frost, Wortham, & Reifel, 2001). Eventually, as kindergartens in the U.S. became a part of the public school system, activities considered to be more academic in nature gained more importance and the significance of play and playgrounds in educating young children slowly diminished (Frost, et al., 2001). Other socio-political and economic trends in the country have also influenced change in the role of outdoor play and the state of outdoor environments for young children. The trend of standardized testing was introduced in the 1980's, and it brought along the overemphasis on intellectual development, and the pressure of developing young children's skills in math, science and literacy to get students of all ages ready for the tests (Elkind, 1982). This trend has continued to the present day and is resulting in less time being provided to children for outdoor play experiences.

Frost, et al. (2001) mapped the evolution of public school and public park playgrounds in the U.S. based on three eras: (a) manufactured appliance era, (b) novelty era, and (c) modular design era, also characterized as the standardized era. The manufactured era began early in the 20th century when businessmen began to see the potential for sales of playground equipment and bombarded the playground market with huge steel structures such as swings, slides, merry-go-rounds, and a range of trapeze devices. The novelty era, roughly in the 1950's and 1960's brought in the lifeless, fixed

molded concrete forms, replicas of amusement park devices and theme equipment patterned after animal figures, etc. The most influential change in the 1970's and the 1980's was the emphasis on modular wood equipment which included decks and play events which added challenge, continuity, and linkage to play. The standardized era emerged in the beginning of the 1980's after the United States Consumer Product Safety Commission's (USCPSC) published a book on public playground safety, followed by the American Society for Testing and Materials' (ASTM) publication on consumer safety performance for playground equipment. The idea of safety in the outdoor environment led to the establishment of specific guidelines for playground equipment. Consequently, manufactured equipment took over the natural features of the outdoor environment making playgrounds safer, but greatly reducing the possibility of complex, flexible and creative play and learning opportunities provided by plants, trees, and other such the natural elements found in the outdoor environment.

To summarize, learning through play and outdoor experiences has been a fundamental part of various philosophies that informed practices about educating young children. Until a few decades ago outdoor play and experiences in the nature for children were emphasized and practiced. With the society undergoing various macrosystemic changes, the value of outdoor play has been undermined and the quality of outdoor environments for children is rapidly decreasing.

Outdoor Play and Outdoor Environments for Preschool Children

Outdoor play experiences can be as effective as indoor play in stimulating young children's development (Henniger, 1993). The outdoor environment is a unique learning

setting which supports an array of activities different from those provided by the indoor setting (Talbot & Frost, 1989). Although the outdoor play setting, from its inception, is associated with physical movement, physical skills, and vigorous exercise and play, children experience a great sense of freedom in such settings (Davies, 1996). When outdoors children follow their own creativity by using natural materials such as water, dirt, leaves and so on in their play. The large spaces provide opportunities for children to use their whole body to explore, plan, and implement these plans without limitations on noise and activity (Perry, 2003). Playgrounds are better than indoor classroom settings for activities that are messy or loud (Greenman, 1988). More friendly, non-violent, rough and tumble play and pretend play experiences such as superhero or war play that are discouraged indoors can be accommodated outdoors (Frost, et al., 2001).

Recent studies on outdoor environments have noted that outdoor settings have the potential to enhance children's development in all domains (Henniger, 1993; Davies, 1996). However, research has shown that children today spend significantly less time outside and as a result, are losing contact with the nature around them. In *Last Child in the Woods*, Richard Louv (2005) coined terms like *nature deficit disorder* and *outdoor deprivation* to highlight the issue of decreasing time spent by children outdoors.

Greenman's (2003), discussion about this deprivation warns:

With each passing year, children are losing ground literally. Children are increasingly entrapped in the concrete web of our good intentions. Children are increasingly fenced off from the world out of fear, convenience, and often a combination of apathy and ignorance. Both at home and in childcare, children are losing time, space, and the variety of experience outdoors that has been integral to the development of human kind. They are losing habitat (p. 284).

Many factors have led to this decline in the opportunities provided for outdoor play. One such factor is parents' fear and concern for children's safety. A study by Clements (2004) revealed that 82% of mothers of children between the ages of 3 and 12 identified crime and safety concerns as one of the main reasons for not letting children play outdoors. Due to the fear of strangers many children are no longer allowed to freely roam their neighborhoods or even their own yards unless they are accompanied by adults (Pyle, 2002; Herrington & Studtmann 1998; Moore & Wong 1997). Other fears such as fears of ultraviolet rays, insect-borne diseases and various forms of pollution also force adults to keep children indoors (Wilson 2000). Empirical investigations in the area of child care environments also suggest a reduction in time and emphasis on outdoor environments. Early childhood education literature has focused heavily on the indoor classroom environment and its quality, often neglecting the features of the outdoor environment for children. This emphasis on the indoor settings is also reflected in resources developed to prepare early childhood teachers. Henniger (1993) reviewed textbooks used to prepare preschool teachers (e.g., Brewer, 1992; Lay-Dopyera & Dopyera, 1990; Seefeldt & Barbour, 1990) and found that an average of only 5 pages was dedicated in these texts to discuss about the outdoor play area, as compared to an average of 21 pages to describe the indoor classroom setting. The time spent by teachers to plan the outdoor environment and outdoor activities for children is much lower than the time taken to plan the indoor activities, which form an important part of the early childhood curriculum. The above mentioned examples draw attention to the fact that outdoor play and environments have been largely neglected in early childhood literature.

It is therefore important to capitalize on what is available in the current literature on children's outdoor play and outdoor environment to better understand its significance in the lives of young children. The following section will focus on the limited existing research on outdoor environments.

Research on Outdoor Environments for Young Children

Playground Equipment and Design

In the early 20th century children's playgrounds were equipped with standardized structured such as swings, slides, and climbing structures often installed over asphalt (Frost, et al., 2001). Some early studies on outdoor environments have compared the effect of playground design on children's play behaviors. For example, Hayward, Rothenberg, and Beasley (1974) studied children's play preferences in public and accessible traditional, contemporary and adventure playgrounds. Traditional-equipment play areas, which were typically a part of schools, or neighborhood parks included some form of structure such as a swing, slide, climbing bars, etc. Contemporary playgrounds included multi-purpose and linked structures that provided various means for entry and exit, and areas or fixtures for dramatic play. Adventure or junk playgrounds incorporated various types of moveable materials and tools for children to use in constructing their own play structures, rather than having conventional play equipment. Using behavioral mapping they found that age of the children influenced the type of playground they visited. Contemporary and traditional playgrounds were most often visited by preschool children, while school-aged children made up a greater population of the adventure playgrounds. Each type of playground elicited different kinds or frequencies of behaviors.

On the traditional playground, children were most frequently observed on large swings; on the contemporary playground, children were most frequently observed in the sand areas; on the adventure playground, children were most frequently found playing in the clubhouse areas. One of the limitations of this study is that it primarily focused on school-aged children's play. However, the study recognizes that the age of the child can influence his/her play preferences outdoors, and therefore outdoor environments designed for young children need to be age and developmentally appropriate.

More recent research on children's outdoor play indicates that children prefer creative play spaces to traditional playgrounds with fixed structures. For example, Frost and Campbell (1985, in Walsh, 1993) studied play behaviors of 2nd graders during outdoor play. They found that children preferred action-oriented equipment over static equipment and multiple function equipment over single function structures. Similarly, Henniger, Strickland and Frost (1985, in Walsh, 1993) found that 4-to-6-year old children in their study showed a preference for equipment that was movable rather than static, and equipment that was complex and offered several play options. Bruya (1985, in Walsh, 1993) examined the type of equipment that promoted children's play, and found that structures that were linked by platforms assisted in the continuation of play since such linkages helped in providing extended choices and therefore more options for children's play. To further investigate the amount of time children spend on fixed equipment, Berry (1993 in Walsh, 1993) examined children's usage of fixed play items in playscapes in four child care centers and three preschools in Australia. She found that without any staff interaction or use of props and movable equipment each child used each structure on the

playground for no more than four minutes. Similarly in Frost and Campbell's (1985) study children spent 64% of their time in the action-oriented creative playground as compared to 23% of their time in traditional playgrounds, and only 13% of their time in fixed-multipurpose structures. Hyung-Jeong (1998) conducted a study on free play behaviors of six preschool boys and girls on a newly constructed playground in Austin, Texas. Her study revealed that preschool children preferred loose parts (pails, scoops, hats, tires, etc.) to permanently affixed equipment. Children mainly engaged with loose parts (29% of their time) in conjunction with sand surfacing (13%; e.g., shovels, rakes, buckets, etc.), compared to time on the superstructure (11%) and on the swings (6%).

Traditional playgrounds consisting of fixed equipment such as slides, swings, monkey-bars are found currently in many early childhood programs. This equipment does not offer many opportunities for children to play creatively (Walsh, 1993) and tend to promote competition rather than cooperation (Barbour, 1999). The predominance of fixed equipment in children's playgrounds and its associations with playground-related injuries has led to increased attention to the safety of children's outdoor play environments. The National Injury Surveillance Unit from eighteen hospitals in Australia between 1986 to 1990 (in Walsh, 1993) indicated that 55% of children's accident involved falls from equipment. They also found that a major cause of the injury was the hard surfaces on which children fell (often asphalt, concrete and other artificial surfaces). A similar study on playground-related injuries was conducted by the Consumer Product Safety Commission study in the U.S. (1991). Their findings also revealed that most of these injuries occurred because of falls from climbing equipment.

Safety standards and guidelines set by the USCPSC and ASTM have led to the decrease in the availability of playground overhead apparatus, sliding poles, climbers, etc., for 2-to-5-year olds on playgrounds. Consequently, many children become disinterested with the existing equipment and engage in play without equipment or use equipments in unintentional ways (Frost, et al., 2001). Frost (1985, in Striniste & Moore, 1989) noted that when children become bored, the chances of accidents increase and therefore an important safety factor is to provide children with plenty of options for play. Creative playgrounds that include modular coordinated play installations as well as unique architectural designs having natural materials and forms, have been found to be more attractive and preferred by children (Greenman, 2005).

Diversity Using Natural Features

A new domain of study in the field of children's outdoor play involves a closer look at natural features of the outdoor environment and their influence on children's play behaviors and activities. Greenman (2005) expresses concern that children at home and in child care centers are losing contact with the nature around them. He accentuates the need for early care and education programs to help bring nature back into children's lives by taking on the responsibility to incorporate the natural world into the design of their outdoors.

An increasing number of studies note the benefits of providing experiences in the natural environment for children. For example, Faber Taylor, Kuo, and Sullivan (2001) conducted a study on 7 to 12 year-old children diagnosed with Attention Deficit Disorder or Attention Deficit Hyperactivity Disorder in order to understand if nature supports

attentional functioning of children. Parental reports of children's attentional functioning after leisure activities in several settings, including exposure to nature was obtained.

Parents indicated that children functioned better than usual after activities in green settings and the "greener" a child's play area, the less severe was his/her attention deficit symptoms. Thus, contact with nature may support children's attention in activities.

Studies on playground intervention emphasize that introduction of natural elements to children's play environments are beneficial for children. Herrington and Studmann (1998) worked with outdoor play yards at a lab school in Iowa and studied the impact of adding natural features in the outdoor environment. They found that installing natural materials and other landscape elements led to changes in preschool children's spatial-cognitive awareness. Changes in the layout of the playground also challenged and increased children's physical competence and skills. They noted improvements in socialization and fantasy play which lasted for longer durations. Similarly, Moore and Wong (1997) collaborated with parents and children over a 10-year period to develop a school based ecosystem by reinventing a barren elementary school landscape. They shared valuable lessons from their experience and revealed that nature is an economic, social, scientific, and cultural resource. They also found that peace and coexistence was fostered among children with the absence of boredom and antisocial behavior.

Notwithstanding the considerable literature that confirms the unique value of children's interaction with nature during outdoor play, many adults and caregivers do not utilize the natural environment, nor recognize its significance in children's learning. For example, Davies (1996) interviewed 22 preschool teachers in Australia to understand their beliefs

about outdoor environments and outdoor play for children. She found that more than half of the teachers had limited views about natural features and perceived natural elements to improve the attractiveness of their outdoor environment rather than meet the educational needs of the children.

To conclude, children's lifestyles are undergoing a shift and their contact with nature is decreasing over time. The idea of connecting with nature and exposure to the natural world is being brought to the forefront, and is proving to be beneficial for children's development. Consequently, early childhood professionals need to be provided with resources that help establish children's contact with nature, and help them include natural elements as a part of the child's regular indoor and outdoor classroom learning environment.

Quality of Outdoor Environments

The impact of physical environment on the growth and development of young children is imperative. Bronfenbrenner (1999), in his Bioecological model emphasized the role of quality environments in the lives of children. He noted differences in children's developmental outcomes based on the quality of the physical environment and the interactions (proximal processes) carried out in such environments. Similarly, the NICHD (2000) study on the quality of out-of-home care for children indicates that children in higher quality child care settings show better cognitive, language and social outcomes compared to children in lower quality settings. Most investigations on child care quality environments have predicted child outcomes based on the indoor classroom environment. Although there is a dearth of research on quality of outdoor environments,

children's experiences in the outdoors can be varied with some types of outdoors environments supporting children's learning, growth and development more effectively than the others (Frost, 1992 in Barbour, 1999). Just as low quality indoor environments can have a negative impact on young children learning (National Research Council, 2001) programs with low quality outdoors may also be limiting children's development across multiple domains.

Existing research on outdoor play has looked at the impact of different features of the outdoor environment such as stationary equipment, natural elements, etc, on children's play and development. For example, Hartle (1996) found that features like the sandbox, slides, and large equipment facilitate children's group and peer play. Most studies, however, have not explored the overall quality of the outdoor environment and have overlooked the prospects of the outdoor quality having an influential role in children's play (Shim, Herwig, & Shelley, 2001).

Rivkin (2000) accentuated the idea expressed by Dewey (1938/1963) that the knowledge children gain by being outdoors is foundational to their learning and it is necessary to expose children to the wide experiential base that is provided by the outdoor environment. It is imperative to advocate for interactions during outdoor play to take place in high quality outdoor settings so that children can gain maximum benefits from these interactions. Many child care outdoor environments, even today, consist of isolated pieces of equipment in a mono-culture of grass (Herrington & Studmann, 1998). Fixed equipment leaves little room for children to play creatively, since there is generally a finite number of ways to use each aspect of the equipment (Brown & Burger, 1984;

Walsh, 1993). Such play spaces are neither developmentally appropriate nor economically sound (Frost et al., 2001). The need to study the quality of outdoor spaces in preschools and child care settings, therefore, becomes vital.

Limited research on outdoor quality is also associated with the lack of tools to assess the quality of outdoor play areas. Very few instruments have been developed to date to measure the overall quality of outdoor areas for children. For example, De Board, Hestenes, Moore, Cosco, and McGinnis (2005) developed the Preschool Outdoor Environment Measurement Scale (POEMS) to determine the quality of outdoor play environments for preschoolers. Their scale pays attention to not just the physical environment of the outdoor setting, but also to the interactions that take place among children, and between teachers and children. In addition, their scale evaluates the potential of the outdoor environment to promote learning in all the developmental areas, and also studies the variety of materials and equipment available to children outdoors. Finally, the scale looks at the role of the teacher/caregiver during outdoor play. In the process of developing the outdoor quality scale they found that in lower quality outdoor environments children engaged more in functional or repetitive play, while in higher quality outdoors children showed a tendency to display more constructive play than children in lower quality settings. Results from such studies are valuable and have important policy implications for children's outdoor play, however, the information on outdoor quality in preschools and childcare is not as readily available as information on indoor classroom quality.

To summarize, the concept of quality and the measurement of overall quality of outdoor environments is a relatively new area of research. Further studies examining issues related to outdoor quality can inform professionals in early childhood education and landscape design to transform developmentally inappropriate and boring play yards to exciting play spaces for children. In the following section, the value of outdoor play and its influence on children's overall development will be discussed.

Outdoor Play and Children's Development

Play is the most developmentally appropriate way for children to learn (Bredekamp & Copple, 1997). Play extends children's learning in different developmental areas such as physical, cognitive, social, language, etc., and may also reinforce what children have already learned (Fromberg, 1999). The outdoor environment has the potential to facilitate children's learning across all domains (Henniger, 1993). Frost and Wortham (1988) suggest that "the outdoor play environment should enhance every aspect of child development- motor, cognitive, social, emotional-and their correlates-creativity, problem solving and just plain fun" (pp. 24-25). In the sections to follow, the importance of outdoor play in physical, cognitive, language and socio-emotional development will be discussed.

Physical Development

Children's play most often includes a vigorous physical component. Gross locomotor or exercise play and rough and tumble play are the two types of physically active play in which preschool children usually engage (Pellegrini & Smith, 1998). Outdoor play and outdoor environments are typically associated with physical

movements and activities (Davies, 1996; Henniger, 1993). The unique features of the outdoors as compared to indoors include the potentially greater space and freedom of movement offered to children and the availability of equipment and materials that enable children to engage in large muscle activities as well as enhance fine motor development (Davies, 1996).

Playground design influences children's physical skills and motor coordination. For example, Barbour (1999) observed physical activity skill behavior of elementary school children with high and low physical competency on two types of playground. She noted that children's engagement with materials and equipment on the playgrounds affected their motor skill development and their physical competence. Children who were categorized as having low physical competency exercised their physical skills to a greater extent on the playground that had a variety of features including a large playstructure along with natural elements and many loose parts such as blocks, pails, assorted containers, etc. compared to the playground that had all exercise-oriented equipment. Children with high physical competency were able to choose more activity options suited to their abilities on both the playgrounds. Fjortoft (2001) investigated the impact of natural environment on 46 kindergarten children's motor fitness. He found that children who played regularly in natural environments demonstrated advanced motor fitness, including coordination, balance and agility. Playground designs also impact children's physical activity levels. Chakravarthi, Schilling, Hestenes & McOmber (2007) in their study of preschool children's physical activity in three different playgrounds found that children were more active (had significantly higher accelerometer values) on the grass

playground, which was an open enclosed grass area without any equipment, than on the complex playground which was larger and contained multiple elements and materials.

Studies on children's physical play also indicate gender differences in activity levels. Cullen (1993) in her study of preschool children's use and perceptions of outdoor play found that boys engaged in more physical play outdoors than girls. Some studies have also found that children are more active outdoor than indoors (Baranowski, Thompson, DuRant, Baranowski, & Puhl, 1993; McKenzie, Sallis, Nader, Broyles, & Nelson, 1992). Outdoor play is therefore, one of the natural and best ways for children to be physically active. Consequently, inadequate attention given to children's experiences outdoors can lead to various problems including lower levels of physical activity in young children and childhood obesity.

Physical Activity Levels among Preschool Children

Since the late 1970s, children have experienced a 25% drop in play and a 50% drop in unstructured outdoor activities (MacPherson, 2001). Studies examining the physical activity levels of preschool children have noted that on average children do not get adequate amounts of physical activity in child care and preschool settings, which consequently contributes to their inactive lifestyles. Poest, Williams, Witt and Atwood (1989) in their examination of physical activity patterns of preschool children revealed that children are not engaged in vigorous physical activity all year long.

The quality of the child care and preschool setting, as well as other decisions related to the regular activities may have an impact on children's physical activity levels. For example, Dowda, Pate, Stewart, Almeida and Sirard (2004) while examining

moderate to vigorous physical activity (MVPA) in 3-to-5 year olds found that when preschools offered more field trips and had more college educated teachers, the children participated in more MVPA. Children who attended lower quality preschools spent more time in sedentary activity. Higher levels of physical activity were associated with children belonging to preschools with policies and practices that promoted physical activity. In a similar vein, Pate, Pfeiffer, Trost, Zeigler, and Dowda (2004) demonstrated that the preschool attended by a child was a significant predictor of MVPA. The authors speculated that a child attending preschool for eight hours would be involved in about one hour of MVPA and would be unlikely to engage in another hour of MVPA outside the preschool setting. The aforementioned studies indicate that children are experiencing a sedentary lifestyle from a very young age. Such a lifestyle makes children vulnerable to the rising epidemic of overweight and obesity.

Childhood Obesity

Obesity and overweight status are typically described in terms of body mass index (BMI), and defined as weight in kilograms divided by height in meters squared (Anderson & Butcher, 2006). Some health professionals consider the use of BMI to assess overweight and obesity in children as controversial. However, William Dietz and Mary Bellizzi (1999) in a conference organized by the International Obesity Task Force, elucidated that BMI offers a reasonable measure with which one can assess fatness in children and adolescents. A BMI above the 85th percentile for a child's age and sex group is likely to be in agreement with the adult definition of overweight, and a BMI above the 95th percentile is consistent with the adult definition of obese. Children are thus

defined as being overweight or obese if they have a BMI above given age- and sex-specific percentile cutoffs.

The prevalence of childhood obesity has increased since the 1970s, and by 2002 nearly 15 percent of children in the country were considered obese (Anderson & Butcher, 2006). Most recent reports on the growth data from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development show that children who were overweight ($> 85^{\text{th}}$ percentile for BMI), one or more times at ages 24, 36, or 54 months during the preschool years were more than 5 times as likely to be overweight at age 12 years than those who were below the 85^{th} percentile at all 3 of the preschool ages. Sixty percent of children who were overweight at any time during preschool period and 80% of children who were overweight at any time during the elementary period were overweight at 12 years of age (Nader, O'Brien, Houts, Bradley, Belsky, Crosnoe, Friedman, Mei & Susman, 2007). From their study of obese children, Whitaker, Wright, Pepe, Seidel and Dietz (1997) revealed that 52% of children who were obese between the ages of three and six were obese at age 25 compared to only 12% of normal and underweight three- to six-year old children.

Childhood obesity rates are even higher in ethnic minority and low-income communities (Fitzgibbon, Stolley, Schiffer, Van Horn & Christoffel, 2005), especially children from Hispanic-Latino American and African American families (Laitinen, Power & Jarvelin, 2001). Childhood obesity places children at a higher risk of suffering from health problems commonly seen in obese adults (Must & Strauss, 1999). Daniels (2006) accentuated that many obesity-related health issues such as high blood pressure,

early symptoms of hardening of the arteries, type II diabetes, nonalcoholic fatty liver disease, polycystic ovary disorder, and disordered breathing during sleep, which were once thought to be relevant only to adults are now seen in children and with increasing frequency. Children who are overweight and obese may also have a low self esteem (Strauss, 2000) due to the negative comments they receive from parents and peers (Pierce & Wardle, 1993).

Dietary intake and physical activity have widely been identified as the two factors associated with childhood obesity. Most studies on childhood obesity have focused on the nutritional and dietary practices leading to obesity, neglecting the role of physical activity and play in children. In accordance, intervention studies designed to prevent obesity in children have mostly controlled for nutritional factors (for example, see Williams, et al., 2002) with few interventions considering both the nutrition and physical activity in children. With regards to preschool children and reducing childhood obesity, it is crucial to look at the current child care policies and regulations related to children's outdoor play and physical activity.

Current Policies and Guidelines on Physical Activity. Child care regulations and standards on physical activity requirements differ widely by state. Most states, however, specify that the child care program should enhance physical development and include large muscle and small muscle activity, and active and quiet indoor and outdoor activities. Thirty three states and the District of Columbia require programs to provide large muscle or gross motor activity in their daily schedule. Nine states require "vigorous" physical activity for children, while one state uses the term "moderate to vigorous physical

activity” (Delaware) in specifying their state regulation. Only two states, Alaska and Delaware, detail the amount of time for which children need to engage in physical activity each day. Both these states require at least 20 minutes of physical activity for every three (3) hours the child is in attendance between the hours of 7:00 am to 7:00 pm (National Resource Center for Health and Safety in Child Care and Early Education).

In an attempt to combat childhood obesity, the National Association for Sports and Physical Education (NASPE, 2002) released the “Active Start”, which provides guidelines for physical activity for children between ages birth to five years. The guidelines specify that preschool children should accumulate at least 60 minutes daily of structured physical activity, they should engage in at least 60 minutes and up to several hours of daily, unstructured physical activity and should not be sedentary for more than 60 minutes at a time except when sleeping. Additionally, preschoolers should develop competence in movement skills, and have indoor and outdoor areas that meet or exceed recommended safety standards for performing large muscle activities. Finally, individuals responsible for the well-being of children should be aware of the importance of physical activity and facilitate the child’s movement skills. The guidelines also attest that during the preschool years, children should be encouraged to practice movement skills in a variety of activities and settings. Instruction and positive reinforcement is critical during this time in order to ensure that children develop most of these skills before entering school.

It is clear from these guidelines that preschoolers should be physically active for at least two hours in a day, by engaging in structured and unstructured physical activity.

However, many preschool aged children today are clearly not meeting these requirements (Pate, Pfeiffer, Trost, Zeigler, & Dowda, 2004). Additionally, overall policies that govern physical activity and outdoor play time for children in child care widely differ from state to state (Story, et al., 2006). In North Carolina, for example, the child care regulations require children to spend two 30 minutes play periods outdoors. Although it is proven that children are physically more active outdoors, it is difficult for them to accumulate two hours worth physical activity per day, as recommended by NAPSE, by spending short periods of time outdoors. To make these conditions worse, no recommendations for teacher training related to promoting physical activity in young children have been found (Story et al., 2006). Teachers also receive limited education and training in setting up and facilitating children's outdoor play and learning. Such issues draw attention to the need for high quality settings and better pre-service and in-service training programs for teachers. Teachers need to be trained so that they are equipped with the resources to plan developmentally appropriate activities for young children that can enhance their physical activity and movement.

Cognitive Development

The relationship between play and cognitive development is well established (Isenberg & Quisenberry, 2002). Studies on children's play indicate an improvement in children's attention, planning and problem solving skills (McCune & Zanes, 2001; Smilansky & Shefatya, 1990; Sylva, Bruner, & Genova, 1976); creativity and divergent thinking (Holmes & Geiger, 2002; Sutton-Smith, 1997); memory (Jensen, 1999, 2000) and language development (Clawson, 2002; Creasey, Jarvis, & Berk, 1998). Outdoor play

experiences for young children also have similar benefits. Specifically, outdoor play is known to enhance children's pretend play experiences. For example, Shim, Herwig, and Shelly (2001), based on an observational study of three low quality programs, reported that preschool children were likely to engage in more complex forms of peer play (i.e., interactive dramatic play) outdoors than indoors. Shin and Frost (1995) conducted an extensive observation study on well equipped indoor and outdoor play settings, and found that the outdoor environment was more influential on symbolic play than the indoor environment for both boys and girls. Susa and Benedict (1994) investigated the effect of playground design on elementary school-aged children's pretend play and divergent thinking. Results indicated that creativity, which was related to the amount of pretend play, occurred more frequently on the contemporary playground as compared to the traditional playground. Their idea echoes Nicholson's (1971) view that inventiveness and creativity in children will be enhanced when they are exposed to more environmental variables during play.

Outdoor play also has the potential to promote language skills in children. A study done by Schilling, McOmber, Mabe, Beasley, Funkhouser, and Martinez (2006) indicated that physical play outdoors provides unique opportunities for learning, especially for children who are new to the English language. Furthermore, they noted that being active and moving during outdoor play promoted children's attention span and capitalized on verbal, visual, and kinesthetic learning. Consequently, children were more likely to retain concepts like colors, shapes, ABCs, movement terms, etc. Therefore,

experiences in the outdoor environment bring some unique benefits to children's cognitive and language skills.

Socioemotional Development

Socioemotional development in children is promoted through various types of play behaviors. Numerous studies (Creasey, Jarvis, & Berk, 1998; Erikson, 1963; Goleman, 1995; Piaget, 1962; Rubin & Howe, 1986; Rubin, Maioni, & Hormung, 1976; Rubin, Watson, & Jambor, 1978; Sutton-Smith, 1997; Vygotsky, 1978) indicate that when children play with others it gives them the opportunity to match their behavior with others and to take into account others' viewpoints that may differ from their own. Rough and tumble play promotes perspective-taking in children, allows children to express their emotions, enables them to differentiate between real and play emotions of others, and provides the opportunity to engage in emotional-regulation (Pellegrini & Smith, 1998).

Empirical studies highlighting the role of play on children's socioemotional development are abundant. However, similar studies focusing on children's outdoor play experiences are limited. Henniger (1985, in Davies, 1996) found differences in children's social play that occurred indoors and outdoors. More solitary activity was observed indoors while more parallel play was observed outdoors. Hartle (1994) observed the playground behavior and social interaction of 27 kindergarten children in a university laboratory school, focusing on the children's ability to successfully negotiate social interactions. She found that communication skills, ability to recognize and understand others' emotions and needs were enhanced during outdoor play. Various researchers have expressed their view on the importance of outdoor play on children's social and

emotional development. Davies (1996) elucidates that size of the construction material available in the outdoor setting and the amount of space available outdoors, can stimulate large projects which require cooperation and teamwork, as do the enactment of complex sociodramatic play themes during outdoor play. Spacious outdoor environments support a wide range of activities involving large groups of children, like group games with balls and parachutes (Naylor, 1985).

The space available outdoors also leads to fewer constraints of children's behaviors and enables them to find solitude away from other children and adults, engage in solitary activity or be in small, intimate groups. Such opportunities for solitary pursuits and experience of privacy are necessary for young children (Greenman, 1988). Jacobs (1980, in Davies 1996) observed that privacy helps in the development of personal autonomy as it gives the child an opportunity to come to terms with his own thoughts and feelings. Privacy also enables children to release their emotions and to gain respite from the pressures of social norms and expectations.

To summarize, the outdoor environments, if well planned, can provide a wide array of experiences than support all forms of play and learning which can contribute to all facets of a child's development: physical, cognitive, social and emotional. This in turn underscores the need for active participation of early childhood professionals, teachers and researchers in the planning of outdoor environment that can facilitate and enhance children's play. An important part of this study includes understanding teachers' beliefs about the outdoor play and environment, and examining their practices during

outdoor play. The next section will begin with an overview of the literature on teacher beliefs followed by research on teacher-child interactions.

Concept of Beliefs

Beliefs have been a subject of inquiry in diverse fields such as medicine, law, anthropology, education, sociology, political sciences, psychology, etc. where attitudes and values have long been a focus of social and personality research (Pajares, 1992). The idea of defining beliefs is a daunting undertaking. Terms such as dispositions (Raths, 2001), attitudes, values, judgments, opinions, perceptions, to name a few, are often used synonymously to explain an individual's beliefs.

Harvey (1986) elucidated that beliefs are an individual's representation of reality that has enough validity, truth or credibility to guide thought and behavior. Similarly, Richardson (1994) explained that beliefs are an individual's understandings about the world around him and the way it works or should work. Beliefs may be consciously or unconsciously held and guide one's actions. Additionally, Rokeach (1968) argued that all beliefs have a cognitive component representing knowledge, an affective component capable of arousing emotion, and a behavioral component activated when action is required. It is interesting to note that the abovementioned definitions, as well as definitions provided by many other researchers, have a common understanding that beliefs play an important role in influencing actions and behaviors.

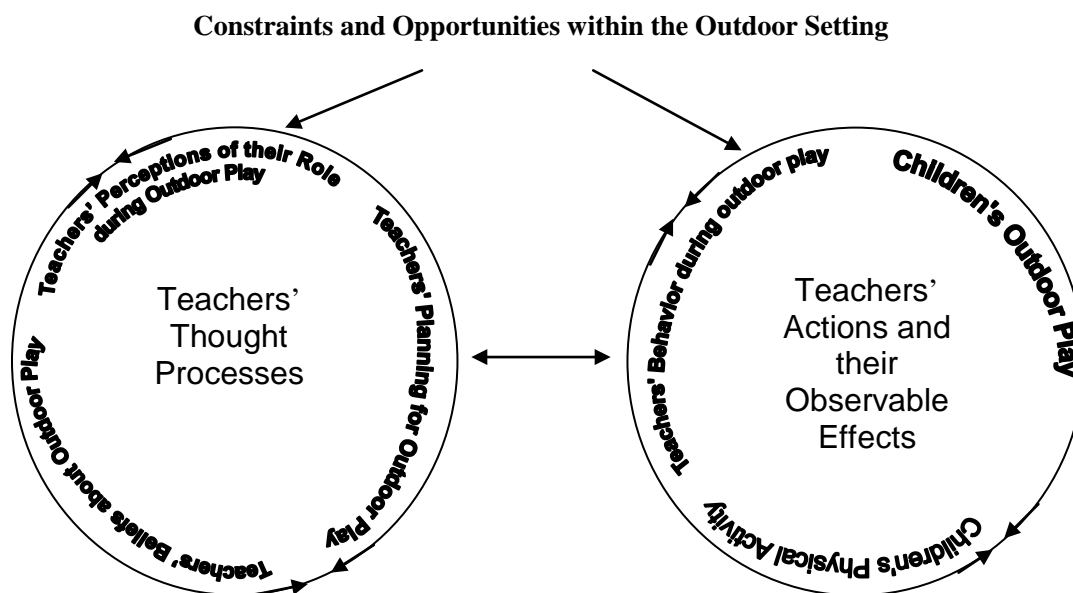
Teachers' Beliefs

Teacher belief is defined as "tacit, often unconsciously held assumption about students, classrooms and the academic material to be taught" (Kagan, 1992, p.65). Clark

(1988) referred to teachers' beliefs as implicit theories. Implicit theories are views about instruction that teachers construct from their personal experience and practical knowledge. These theories are different from the explicit theories that may be taught in teaching preparation courses, included in textbooks and professional literature (Charlesworth, Hart, Burts, Mosley, & Fleege, 1993). Clark and Peterson (1986) developed a heuristic model to help researchers understand the complex relationship between two main aspects, i.e., teachers' thought-processes and their actions. Although the model was developed with teachers' classroom beliefs and practices in mind, the components as well as the mechanisms involved in this model, can be applied to teachers' beliefs and practices in the outdoor environment too. The action component represents teachers' observable behaviors in the classroom, while the thought component accounts for the unobservable aspects that play an important role in teaching. Their model indicated a reciprocal relationship between teachers' thoughts and actions indicating that thoughts influence and are also being influenced by behaviors. They argued that "the process of teaching will be best understood only when these two domains are brought together and examined in relation to one another" (p.258). Their model also takes into account the opportunities and constraints that teachers encounter in their work, and recognize that attending to these factors are vital in understanding teachers' thoughts and behaviors. For example, teachers who work in programs with a small outdoor play area, or lack the resources to improve their existing playgrounds face certain constraints that can have an impact on their beliefs as well as their practices during outdoor play. To understand the guiding

theory behind decisions in planning and teaching, we need to understand what teachers believe to be important and what they believe is not to be important.

Figure 2: A Model of Thought and Action (Clark & Peterson, 1986, p.257): Teachers' Beliefs and Practices of Outdoor play



The literature on teacher training and development acknowledges that teachers bring with them informal knowledge of processes and concepts related to classroom teaching and learning. These beliefs about teaching and learning are known to provide teachers with the direction to teach (Biggs, 1999). Beliefs that teachers hold often influence their perceptions and judgments, which in turn, affect their behaviors in the classroom (Fenstermacher, 1979; Nepsor, 1987; Wilcox-Herzog, 2002). Most studies on teachers' beliefs have explored beliefs about classroom practices and curriculum and very few studies have examined teachers' beliefs about children's play and activities in the

outdoor environment. The current study attempts to understand teachers' beliefs about children's outdoor play and outdoor environment.

Linking Teachers' Beliefs and Practices

Recently, there has been an increased interest in understanding teachers' thoughts, implicit theories, and beliefs (Clark & Peterson, 1986; Isenberg, 1990; Pajares, 1992) and their influence on teachers' classroom practices (Charlesworth, et al., 1993; Kagan 1992). Clark and Peterson (1986) clarify that teachers' beliefs serve as a "contextual filter" through which teachers screen their classroom practices, interpret them, and adapt their subsequent classroom practices. The link between teachers' beliefs and practices were revealed in a study by Charlesworth, Hart, Burts, and Hernandez (1991) on 113 kindergarten teachers. They found that teachers' who held developmentally appropriate beliefs engaged in developmentally appropriate practices in the classroom. Furthermore, teachers who had developmentally inappropriate beliefs used developmentally inappropriate activities with children.

Although it is commonly believed that teachers' beliefs are related to their classroom practices, decisions, and interactions with children (Stipek & Byler, 1997), the evidence to date is inconclusive. Consistently, studies have found a discrepancy or a small correlation at best, between teachers' self-reported beliefs and actual practices used in the classroom (Bryant, Clifford & Peisner, 1991; Kemple, 1996). Studies reporting this discrepancy reveal a pattern, where teachers report beliefs that may be considered highly appropriate or developmentally appropriate, but are found to engage in less appropriate practices (McMullen, 1999). For example, Charlesworth and her colleagues (1993) found

a fairly strong association between teachers' inappropriate beliefs and practices, but often teachers who believed in the importance of developmentally appropriate activities did not actually include such activities in their classroom.

To elucidate the reason for such discrepancies, various scholars explain that the lack of clarity between the belief-practice relationship is often due to the failure to take into account factors that potentially influence the link between beliefs and actions (Wilcox-Herzog, 2002). Many factors including the lack of specificity in measuring beliefs and actual practices (Ajzen, 1996), the strength with which beliefs are held, the strong theoretical framework with which teachers are educated (Charlesworth et al., 1991), etc. may explain the incongruity between teachers' thoughts, beliefs and practices. Another important factor, which has been acknowledged but rarely investigated, is the impact of situational (Wilcox-Herzog (2002), environmental or work-related pressures where teachers complain of not receiving the support from their administrators, colleagues, and parents to implement what they believe (McMullen, 1999).

Once again, most of the studies examining teachers' beliefs and behaviors are confined to teachers' indoor classroom practices. Rarely have studies investigated teachers' beliefs about children's outdoor play and the outdoor classroom settings. Additionally, valid and reliable instruments to assess teachers' beliefs and behaviors about the outdoor setting are in their preliminary stages. The current study aims to explore the links between teachers' beliefs and behaviors during children's outdoor play. Consequently, the limited existing literature on teachers' beliefs and practices outdoors will be discussed in the following section.

Teachers' Beliefs and Practices during Outdoor Play

Many teachers view the outdoors as secondary to the learning which occurs indoors (Dighe, 1993; Henniger, 1993). Margaret Davies, an Australian researcher conducted a study to examine preschool teachers' curriculum conception and practices including children's outdoor experiences (Davies 1996). She interviewed teachers about the value and purpose of outdoor play and conducted observations of the outdoor environment in 22 preschools. Her study revealed that 68% of teachers reported the primary function of the outdoor setting was to promote physical development, while 50% referred to social development. A web survey conducted to test the psychometric properties of the 'Preschool Teacher Beliefs of Outdoor Play and Outdoor Environment' scale (Chakravarthi, Hatfield, & Hestenes, 2009), revealed that teachers associated physical and social development more often than cognitive development to children's outdoor play. Teachers' beliefs of outdoor play and environment loaded on 5 factors: science and nature experiences, social and language experience, calm/quiet experiences, physical and loud experiences and unstructured time.

Davies (1996) also elucidated that these beliefs about the outdoor environment, held by teachers, were reflected on the way the outdoor environment was set up. Teachers provided most opportunities for children's physical development in the form of climbing equipment and other equipment that promoted physical activity. In terms of diversity and natural materials in the outdoor environment, less than half of the 22 teachers mentioned elements like water, sand, dirt, mud, etc., as a part of the outdoor curriculum. Teachers who mentioned the addition of plants and garden in the outdoor environment (23%)

seemed to believe that these features would improve the playground attractiveness rather than further educational needs of the children. Teachers who provided sterile outdoor environments with limited play choices and opportunities were those who either did not understand or underestimated the potential of outdoors to stimulate various aspects of children's learning and growth (Jones 1989).

A limited view of the potential of outdoor settings extends to teachers' perceptions of their own role in promoting children's learning in outdoor settings. For example, Chakravarthi, Hatfield and Hestenes (2009) found that teachers primarily characterized their role during outdoor play as supervising and maintaining safety. Participating in play with the children was least characteristics of their role. Teachers' perceptions about their roles in the 'Preschool Teacher Beliefs of Outdoor Play and Outdoor Environment' scale loaded with a 3 factor structure: active involvement/interaction and set-up factor; safety, supervision, and children's needs factor; and unstructured, free play factor. Similarly, Davies (1997) examined teachers' perceptions and practices, in relation to their role during children's outdoor play. Interviews of eight preschool teachers revealed that most teachers shared the belief that children's play should be supervised, but children need freedom to engage in activities of their choice without unwanted intervention from teachers. Teachers also perceived that their role was to set the stage for play, monitor children play and direct children when they engaged in inappropriate behaviors or unsafe play. Very few teachers mentioned participating in children's play and only two teachers referred to extending play by asking questions, commenting or making suggestions. Teachers' perceptions of their role were supported

by their actual behaviors during children's outdoor play. Teachers were always present to supervise children's play but were observed interacting with children on few occasions. Chakravarthi, Hatfield and Hestenes (2009) also found that teachers placed more importance on having established locations to monitor children's safety, as compared to setting up math and literacy activities during outdoor play. Their scale also assessed the relationship between teachers' perceptions of their role and their reported practices during outdoor play. Correlations revealed that teachers' beliefs and behaviors concerning outdoor play are moderately correlated. The scale has limitations given that these are self-reports of teachers perceptions of their role and their practices of outdoor play. The current study takes a further step in observing teachers practices during outdoor play and exploring their beliefs through interviews. An important aspect of children's play experiences includes interactions with teachers. The following section will touch upon the concept of teacher-child interaction and its importance in children's learning and development.

Teacher-Child Interactions

Teacher-child interactions form a key component of child care quality. What teachers say and do to children, and how they go about it (Kontos & Wilcox-Herzog, 1997) is an area of study that is gaining importance. Proponents of teacher-child interactions debate on the issue of appropriate adult/teacher-child interactions, specifically trying to understand how much and what type of interactions are optimal for children's development. However, literature on teacher-child interactions during children's play is often not conclusive. Some researchers (for example, Miller, Fernie &

Kantor, 1992; Pellegrini & Galda, 1993) believe that it is better for teachers to stand back when children are involved in play, because teacher involvement could interfere with play's developmental benefits. On the other hand, researchers like Bredekamp and Rosegrant (1992) clarify that teachers may set up a stimulating environments for young children, but often stand back and fail to provide guidance, scaffolding or supportive, responsive interactions with children as they play. This idea is in accordance with Vygotsky's approach to educating young children. Vygotsky underscored the significance of adult-child interactions and proposed that adults must take an active (although not intrusive) role in children's play if its learning potential has to be maximized (Kontos, 1999). The National Association for Education of Young Children (NAEYC) has developed guidelines for developmentally appropriate teacher-child interactions and recommends practices that provide an optimal balance between adult-guided and child-guided experiences (Copple & Bredekamp, 2009). However, recent investigations elucidate that a continuum of directiveness is considered to be appropriate for children's development and learning (Bredekamp & Rosegrant, 1996). The following section will expand on these benefits of teacher- child interactions.

Benefits of Teacher- Child Interactions

The impact of teacher engagement in activities and teacher-child interactions on child outcomes is evident though many empirical investigations. For example, Pianta, La Paro, Payne, Cox and Bradley (2002) observed 223 largely public school kindergarten classrooms in three states and described classroom activities and child-teacher interactions involving one child per classroom. Their study revealed that children were

rated competent in math and displayed more on-task behavior when teachers interacted with them in a positive manner. Howes and Smith (1995) observed 10 to 70 month-old children from 150 centers in Florida and found that children's cognitive activity was enhanced in classrooms rich in creative play activities and staffed by teachers who engaged children in positive social interaction. Children's social competence and peer relations are also influenced by teacher interactions. Pianta et al., (2002) found that children were more socially competent in higher child-centered kindergarten classrooms. In first grade classrooms with more socially and emotionally supportive environments children were rated as having more positive peer interactions and fewer negative behaviors with teachers and peers (NICHD ECCRN, 2002). Focusing on emotional development, Hestenes, Kontos and Bryan (1993) studied 60 children from 30 preschool classrooms and found that low levels of classroom engagement by teachers predicted more intense negative affect among children while children whose teachers showed high levels of classroom engagement displayed more intense positive affect. The NICHD ECCRN (2003) study in which 864 children were followed since birth, revealed that children who received more emotional support from teachers displayed fewer internalizing behaviors (according to their mothers).

In addition to teacher interactions, teachers' affect (such as warmth, responsiveness, etc.) influences children's experiences. Studies indicate that warm, nurturing interactions between teachers and children play a key role in children's social behavior (Howes, et al., 1995, McCartney et al., 1997, Whitebook, et al., 1989). Raspa, McWilliam and Ridley (2001) in their study of children's engagement in high and low

quality child care centers found that teachers who were more interactive and affective tended to provide information to expand on children's engagement, introduced new activities, acknowledge and praise children, and engaged in fewer redirections. Children spent more time in unsophisticated behaviors such as looking around the room, non engaged in any activity, in low quality classrooms with fewer teacher-child interactions and less teacher affect.

While teacher-child interactions form the core of the child's educational experience, the abovementioned studies stress upon the role of teacher-child interactions that take place inside the classroom. Few studies are conducted on teacher-child interactions and their influence on children's experiences in the outdoor environment. A study investigating children's physical activity across three playgrounds indicated that when teachers introduced new activities and were physically responsive, children engaged in higher levels of physical activity (Chakravarthi, Schilling, Hestenes & McOmber, 2007). Schilling and McOmber (2006), in another study, trained public school pre-K teachers on a developmentally appropriate physical activity program, 'Tots in Action'. Teachers were trained to provide direct (large group) and center-based (activity and grouping choices) physical activity instruction for preschoolers during outdoor play. During large group activities teachers led children through a sequence of movement activities in which they stayed continually active, and emphasized on skills such as throwing or catching to help children uncover movements clues (like pointing toward the target or watching the ball). During center based activities teachers set up outdoor activity centers with a variety of challenges and equipment. The program was implemented for

11-weeks and physical activity levels in children were compared during large group and centre-based play to the regularly scheduled free play outdoors. It was found that children were most active in the centers followed by large groups and then free play. These studies indicate that teacher involvement during outdoor play has potential benefits for development.

Teacher-Child Interactions during Outdoor Play

The benefits of adult/teacher-child interactions in preschool classrooms are evident. However, researchers are expressing concern over the relative infrequency with which individual children come in contact with teachers in the classroom (Wilcox-Herzog & Kontos, 1998). A recent multi-state study of publicly funded pre-kindergarten programs revealed that children are not spending a lot of time interacting with teachers (2005). These infrequent interactions are even more typical of children's experience in the outdoor environment during outdoor play. For example, Brown and Burger (1984) studied preschool children in six playgrounds and found that in several sites the teachers rarely participated in children's activities outdoors and their interactions were limited to situations where there were disruptions in play. Davies (1997) in her study observed that preschool teachers were in close proximity to the target child only in 28.6% of observations. When teachers were observed near the target child, they did not interact with them in any way for almost half these instances. Of the remaining observations, teachers were observed making comments, conversing with children, managing children's behaviors, reminding them of rules, etc. Teachers were rarely observed playing with children or taking an active teaching role during outdoor play. Similarly, teachers in

Chakravarthi, Hatfield and Hestenes's (2009) study reported rarely playing with children or leading group activities for children during outdoor play.

To summarize, the role of play in child development has been well-researched and acknowledged. However, the area of preschool outdoor play and its impact in children's learning has been neglected in the early childhood literature. Many studies note that beliefs held by teachers affect their practices and interactions with children. Although studies on teacher beliefs and practices are abundant, few investigations have been conducted in the outdoor environment exploring teachers' beliefs about outdoor play and environment, and examining their practices during outdoor playtime. Similarly, researchers have consistently observed the benefits of teacher-child interactions and its potential to enhance learning and development. Further research that examines the impact of teacher-child interactions during outdoor play is required. The present study aims to close the gaps in the literature on outdoor play and outdoor environments for young children. The current study will investigate children's outdoor play behaviors, explore teacher beliefs of outdoor play and environment, and examine teachers' practices and teacher-child interactions during outdoor play using both qualitative and quantitative analyses.

Research Questions

Quantitative Research Questions

Child Physical Activity

Research Question 1. Do children's physical activity levels differ by teacher involvement?

Hypothesis 1. Children's physical activity levels will be higher as teachers demonstrate higher involvement in play.

Research Question 2. Do children's physical activity levels differ by teachers' physical activity levels?

Hypothesis 2. Children's physical activity levels will be higher as teachers engage in higher levels of physical activity.

Research Question 3: Do children's physical activity levels differ by the quality of the outdoor environment?

Hypothesis 3. Children's physical activity levels will be higher in high quality outdoor environments.

Child Level of Play

Research Question 4. Do children's play levels differ by teacher involvement?

Hypothesis 4. Children's level of play will be higher as teachers demonstrate higher involvement in play.

Research Question 5. Do children's play levels differ by the quality of the outdoor environment?

Hypothesis 4. Children's level of play will be higher in high quality outdoor environments.

Exploratory Research Questions

Exploratory Research Question 1. Which contextual factors are associated with children's physical activity levels during outdoor play?

The following contextual factors were examined: group size, teacher involvement, teacher's physical activity, location of play, and play materials.

Exploratory Research Question 2. Which contextual factors are associated with children's level of play in the outdoor environment?

The following contextual factors were examined: group size, social conversation, teacher involvement, teacher affect, location of play, and play materials.

Exploratory Research Question 3. Which individual factors are associated with teachers' level of involvement in children's outdoor play?

The following individual factors were examined: years of education, teachers' physical activity levels, and teacher affect.

Exploratory Research Question 4. Which contextual factors are associated with teachers' level of involvement in children's outdoor play?

The following contextual factors were examined: child gender, child age, child BMI, children's physical activity level, children's level of play, group size, social conversation, and location of play.

Qualitative Research Question

What are teachers' beliefs and practices related to preschool children's outdoor play and outdoor environments?

Analysis. Transcripts from teachers' interviews were coded to understand their beliefs about outdoor play. Teachers' behaviors from the videotapes were analyzed in detail to understand their practices during outdoor play. The constant comparative

method (Glasser & Stauss, 1967), a technique used in grounded theory, was used to identify broader themes and categories.

CHAPTER IV

METHODS

Participants

Data for the current study were obtained from the Preschool Outdoor Project II (POP II), a study developed to understand preschool children's outdoor play. Preschool children and teachers from child care centers in the city of Greensboro, North Carolina participated in the study. From a list of child care centers in the city three centers with high quality and three centers with low quality outdoor environments were selected using a purposive sampling technique, based on the criteria that the programs served middle income families but differed in their Star Rating. In North Carolina, the child care programs are rated from 1 to 5 stars based on program standards and staff education (NC Division of Child Development). Among the three high quality programs, two were 4 Star rated, and one was a 5 Star rated program. The three low quality programs had 1, 2 and 3 Stars respectively. Attempts were made to select programs that were comparable in cost and had children from diverse races. The cost of the high quality programs ranged from \$ 655- \$ 731 per month, and the cost of the low quality programs was approximately \$ 600 per month. The directors of the centers were contacted and the goals and objectives of the study were explained to them. One classroom from each center, with children between ages 3½ and 5 years old, was chosen to participate in the study. The consent forms included information about assessing children's language at the

beginning of the study, using accelerometers to collect data on children's physical activity, and videotaping them during outdoor playtime. Teachers were given a \$30 gift card, each director was given a \$10 gift card, and parents of the children chosen for the study were given a \$10 gift card to a local store for being a part of the study.

Data from 58 preschool children (26 girls and 32 boys) and 9 teachers (5 lead teachers, 2 co-teachers, and 2 teacher assistants) were used in the current study. The average age of the children was 53.26 months (range = 41-63 months; *SD* = 4.28). Seventy eight percent of the children were European American, 13.6% were African American, 3.4% were Hispanic, 3.4% were mixed race, and 1.7% was categorized as 'other'. Sixty six percent of the teachers were European American and 33.33% were African American. Table 1 shows the racial distribution of children and teachers in high and low quality classrooms. There were more African American children in the low quality programs, and more European American children in the high quality programs. One low quality classroom and one high quality classroom had all European American children, while the remaining programs were diverse. Teachers' education ranged from 'working on associate's degree' to 'master's degree in Early Childhood'. In the high quality programs, 1 teacher had an Associates degree, 1 teacher was working on her Bachelor's degree, 2 teachers had completed their Bachelors degree, and 1 teacher had a Master's degree in EC. In the low quality programs, 2 teachers were working on their Associate's degree, 1 teacher had completed her Associates degree, and 1 teacher was working on her Bachelor's degree.

Procedures

At the beginning of the study children's height and weight were gathered in order to compute their Body Mass Index (BMI). Data on preschool children's play behaviors and teachers' practices during outdoor play was captured by videotaping them during the morning session of outdoor play. Children's physical activity was measured using accelerometers (Actigraph uniaxial). Teachers' practices were observed during outdoor play using an adapted version of the 'Teaching Style Rating Scale' (McWilliam, Scarborough, Bagby, & Sweeney, 1998). The materials and equipment available to the children on each day during outdoor play was also recorded. Finally, the quality of the playground was assessed using the 'Preschool Outdoor Environment Measurement Scale' (POEMS; DeBord, Hestenes, Moore, Cosco, & McGinnis, 2005), and each playground was measured to compute its area in square feet. After collecting the observational data on the playground, teachers were interviewed to understand their views and perceptions about children's outdoor play and outdoor environments.

Quantitative Measures

Body Mass Index. Children's height and weight was measured to compute their Body Mass Index (BMI) at the beginning of the study. Average BMI of the children was 16.01 (range= 12.07-22.30; *SD*= 1.80) which falls in the range for a 'healthy child' for children in this age group. According to the Centers for Disease Control and Prevention's (2000) BMI cutoff to define childhood overweight and obesity in the United States, 6.8% of the children in data were underweight (BMI less than 14), 71.2% were healthy (BMI 14 to 16.8), 10.2% were overweight (BMI 16.8 to 18), and 11.9% were obese (BMI 18

and above). The BMI distribution for children in high and low quality classrooms is represented in Table 1.

Videotaping. On each day of data collection one child was selected as the target child and videotaped for 20 minutes. Each child was videotaped on two separate days. The outdoor playtime was divided into two sessions, the first session covering the first 30 minutes of play and the second session covering the next 30 minutes. Each child was videotaped during two different sessions on the two separate days whenever possible. At the beginning of each videotaping session, the target child was subtly reminded that it would be better if he/she did not touch the equipment that was put on him/her and that they should play the way they typically do. Children's natural outdoor play behaviors and interactions with peers and teachers were captured through the video. A microphone was clipped to the child's shirt/dress, which allowed the video to capture their verbalizations during play. The trained professionals videotaping children stood at a distance to avoid interrupting or influencing the children's play.

The videotapes were analyzed for quantitative as well as qualitative enquiry. Each videotape was coded for quantitative analysis using 'The Observer' (by Noldus Technology, Netherlands), a software program for observational studies. Videotapes were analyzed using a 15-second time sampling approach. Children's behaviors were analyzed based on their social involvement (not involved, solitary, parallel, interactive, etc.), their play behaviors (unoccupied, onlooking, functional, constructive, dramatic, child and teacher initiated game, etc.), their group arrangement, their activity (standing, running, walking, climbing, etc.), the location in which they played (grass, mulch, anchored

equipment, sandbox, etc.), their vocalization (talking, yelling, etc.), the materials they used (ball, shovel, tricycles, etc.), and their accelerometer values. The coding index was pre-developed for the POP II study to analyze children's play behaviors outdoors (see Appendix A). An inter-rater reliability of 86.72% was established at the beginning, and an average reliability of 88.49% was established at subsequent checks conducted at 25% intervals. For the purpose of answering the research questions, children's play behaviors were recoded into a new variable- 'child level of play', so that it would represent the 5 hierarchical levels of children's cognitive play on ordinal scale. Unoccupied and onlooking behaviors were coded as 'minimal level' of play. In unoccupied behavior the child appeared to be doing nothing, and in onlooking behavior the child was in close proximity to peers and watched others' activity. Functional/physically active play was the 2nd level of play. This type of play was defined as engaging in repetitive or active physical movements with or without an object (e.g., going up and down the slide, scooping and dumping). The 3rd level of play was constructive/exploratory play. In this type of play, a child was involved in creating or constructing something (e.g., sand castle), or exploring something (e.g., watching bugs). Dramatic play, in which the child performed fantasy actions and/or vocalized fantasy, was considered the 4th level of play. The highest (5th) level of play was games with rules. Children engaged in this type of play when there was a clear purpose and parameters to their activity. The game could be child-initiated or teacher-initiated. Other behaviors that children engaged in, such as transitions, conversations with teachers and peers, custodial care, and negative behaviors, were not included in the variable of child level of play because they could not be

meaningfully fit on a hierarchical scale. To answer the exploratory research questions, 'child level of play' was further divided into 3 levels (low, moderate and high).

Unoccupied and onlooking behaviors were recoded as low level of play, functional and constructive/exploratory play were recoded as moderate level, and dramatic play, child initiated games, and teacher initiated games were recoded as high level of play.

Since the aim of the current study was to observe teachers' practices and involvement, some additional codes that elaborated on teacher involvement outdoors was added to the existing coding index. Teachers were analyzed on the basis of whether they were 'present' in the vicinity of the target child and whether they 'focused on the target child' or not. To understand teachers' practices, teachers who were coded as 'present' within a 15 second interval (as opposed to teachers who appeared for a short duration in the 15 second interval in the videotape) were further observed and analyzed using the teacher codes set up as a part of the current study. Teachers' involvement with the target child was analyzed on a scale of 3 levels (low, moderate and high). Teachers were coded as being in low involvement when they were in close proximity to the target child and watched/monitored/supervised his/her activity. Their involvement was coded as 'moderate' when they used short statements to comment about the child's play, or asked short questions without elaborating or extending their play, or when they redirected children's play. Lastly, they were coded as being in high involvement when they elaborated on children's play, enhanced children's play through non-verbal responses, introduced a new activity, actively participated in the child's play, and/or taught the child a specific skill. Teachers' physical activity was coded on a scale of low, moderate, and

high activity. Teachers were coded as being low active when they stood in the same place, and they were coded as being moderately active when they walked from one location to the other or they walked a few yards. They were coded as being highly active when they engaged in vigorous movement like running, jumping, etc. Finally, teachers' position (lead teacher, assistant teacher, etc.) was also recorded. Prior to coding the videotapes for teacher involvement and activity, an inter-rater reliability of 81.81% agreement was established, and an average inter-rater reliability of 82.89% was established during subsequent checks. The coding index includes definitions/ explanations for the codes (See Appendix B).

Accelerometers. On each day of data collection, the target child was fitted with accelerometer (Actigraph uniaxial) on the right hip. Accelerometers are small devices worn on a belt around the waist to measure the occurrence and magnitude of movement for a predetermined epoch (e.g., 15 seconds, 1 minute). Through comparisons with energy expenditure and observation measures, studies indicate that accelerometry provides a valid estimation of preschoolers' physical activity (Finn & Specker, 2000; Puyau, Adolph, Vohra, Zakeri, & Butte, 2004; Puyau, Adolph, Vohra, & Butte, 2002; Reilly, Coyle, Kelly, Burke, Grant, & Paton, 2003). The target child wore the accelerometer for the 20 minutes period during which he/she was videotaped. After data collection each day the accelerometer data was downloaded to a computer which provided activity counts for each child in 15 second epochs. Physical activity as measured by accelerometer was coded on a scale of 1 to 22 (see Appendix B). The lowest level of physical activity (0 activity count) was coded as '1', activity counts of 1-

250 was coded as '2', and so on. Physical activity counts were categorized based on previous research by Puyau, Adolph, Vohra, & Butte (2002) using 1 minute epochs on children aged 6 to 16 years old. For the purposes of this study, the following categories were created to reflect 15 second epochs: 0-250 = sedentary, 251-750 = light, 751- 1500 = low-moderate and 1500 and up= moderate-high activity. Codes 1 and 2 (activity counts of 0 to 250) were considered as 'sedentary' activity, codes 3 and 4 (activity counts of 251 to 750) represented light activity, codes 5, 6 and 7 (activity counts of 751-1500) represented 'low-moderate' activity, and codes 8 and up (1501 and higher) were considered as 'moderate-high' activity. Overall, preschool children were not very active during outdoor play. Mean accelerometer value was 2.95 (representing activity counts approximately between 251 and 500; $SD= 1.52$).

Playground Demographic Information. In the current study, the fenced playground associated with the child care centers, i.e., the space where the children spend the majority of their time when outdoors was considered as the outdoor setting. During each day of data collection, information on the number of children, numbers of teachers and other adults, temperature, and weather conditions was recorded. On an average, there were 18 children (range= 6-33) and three adults (teachers and other adults included; range= 1-10) on the playground each day of data collection. The average temperature was 64.13 °F (range= 35-87.5 °F). Most of the data was collected when the temperature was typical to a Spring/Summer day (between 51°F to 81°F; 73.2%), followed by data collection on colder days (below 50°F; 19.6%), and fewer days when it was very hot (81°F and above; 8.1%). Children's physical activity levels were significantly lower on the days that were

very hot ($F= 25.033$, $df= 2/9010$, $p< .001$). Mean activity level was lowest on very hot days ($M=2.73$, $SD= 1.48$) compared to days when the temperature was below 50°F ($M=2.98$, $SD=1.5$), or days when the temperature was between 51°F to 81°F ($M=2.98$, $SD=1.53$). On the high quality outdoor settings, 8.6% of the data was collected when the temperature was below 50°F, 89.7% of the data was collected when the temperature was between 51°F to 81°F, and 1.7% of the data was collected when it was above 81°F. On the low quality outdoor settings, 28.6% of the data was collected when the temperature was below 50°F, 55.4% of the data was collected when temperature was between 51°F to 81°F, and about 16% of the data was collected when it was above 81°F. Data from one classroom among the high quality programs and one classroom among the low quality programs was collected in the winter (October, November and December).

Teaching Styles Rating Scale. Teachers' practices during outdoor play were observed using an adapted 24-item version of the 'Teaching Styles Rating Scale' (McWilliam, Scarborough, Bagby, & Sweeney, 1998). This scale captures interactive behaviors and affective characteristics of teachers using a 5-point rating scale with three anchors. Interactive behaviors are measured by 10 items and affective characteristics are measured by 14 items. Some of the items on the interactive behaviors are: 'Redirect' (which has been adapted and divided into two items- 'Redirects appropriately', 'Introduces'; 'Praises', etc. Additionally, two items on providing children verbal stimulation to enhance gross and fine motor activities were added to the interactive behaviors. Items under Affect include: 'Positive Expression', 'Consistency of Interactions', etc., and an additional item on the 'Amount of Communication' was

included in the existing scale (see Appendix C). Internal consistency for the Affect subscale has been reported as .85, indicating that the items measure one single construct (McWilliam, Zulli, & de Kruif, 1998). During outdoor play, each teacher was observed on 2 separate days for 15 minutes and rated on the scale. Observers were trained and an inter-rater reliability of 98% agreement was established and maintained. An average score for every item was calculated from teachers' ratings on the two separate observations. A single score for each subscale was then computed by adding the ratings on each item of the subscale. The mean score for the interactive subscale was 18.78 ($SD=6.23$, range= 9-26) and the mean score for the affect subscale was 44.56 ($SD=7.61$, range= 26.5-50.5).

Preschool Outdoor Environment Measurement Scale (POEMS). The Preschool Outdoor Environment Measurement Scale' (POEMS; DeBord, Hestenes, Moore, Cosco, & McGinnis, 2005) was completed by one of the scale authors to assess the quality of the outdoor environment. The POEMS consists of a checklist of 56 items and addresses the following five domains related to the outdoor environment: Physical Environment, Interaction, Play and Learning Settings, Program, and Teacher/ Caregiver Role. This scale involves a direct observation of the outdoor environment (approximately 30 minutes) followed by an interview with the teacher (approximately 15 minutes). POEMS has been shown to be a reliable and valid instrument. The internal consistency for the scale is strong (Cronbach's alpha = .87).

In the current study, the three programs with high quality outdoor environments received a mean score of 36.7 (66% items correct) and the three programs with low

quality environments received a mean score of 19 (34% items correct) on the total scale. Main differences in the high and low quality programs were observed in the ‘interaction’ ($p=.008$), ‘play and learning settings’ ($p=.006$), and the ‘program’ ($p=.023$) domain of the scale, with high quality programs receiving higher mean scores on all the domains. The average size of the high quality playgrounds was 7168.61 sq. feet, and the low quality playgrounds was 6291.55 sq. feet.

Materials/Equipment Checklist. A self-developed, extensive checklist of materials and equipment found in the outdoor environment for young children was developed for the purpose of the study (see Appendix D and E). The materials available to the children during each day of data collection were checked. After collecting data in each center, the information about the types of fixed equipment on the playground as well as the loose parts available to the children during play was summarized and used to describe the characteristics of the outdoor environments. All three high quality playgrounds included a variety of settings such as grass/natural area, mulch area, anchored equipment, a sandbox, a paved area/cement path and some type of enclosed setting (a play house, a dramatic play enclosure, etc.). Overall, low quality playgrounds included anchored equipment, and a large mulch area. Only one of the low quality programs had a sitting area and a cement path, while another one had some trees. Table 2 represents the various areas available to children in the three high and the three low quality outdoor settings.

On an average, children in the high quality programs had about 33 play materials made available to them each day. They had an about 7-8 locomotor toys (e.g., tricycles), 7 gross motor toys (e.g., balls, hula hoops), 13-14 fine motor toys (e.g., sand toys, trucks),

3 art related materials (e.g., crayons, brush) and 2 ‘other’ play materials to play with each day. Children in the low quality programs, on an average, had about 10 materials to play with each day. They had about 2-3 gross motor play materials, and 3 fine motor toys to play with each day. Only one low quality classroom had locomotor toys during outdoor play.

Qualitative Measures

Videotaping. Teachers’ practices were also analyzed qualitatively by observing videotapes of teachers’ behaviors. Detailed notes about their behaviors were developed and further analyzed to understand their practices during outdoor play. Further details on the qualitative analyses will be discussed in the results section.

Teacher Beliefs Interview. After videotaping preschool children and their teachers, an interview was conducted to understand preschool teachers’ views on children’s outdoor play and outdoor environments. An interview developed for the POP II study was used to understand descriptive and in-depth information about teachers’ beliefs and perceptions of their role during outdoor play. Teachers were asked questions related to their daily practices, such as how much time the children spent in outdoor play, whether they planned activities for their outdoor time, whether they brought indoor projects outside, etc. They were also asked questions that revealed their beliefs about an ideal outdoor environment for children, barriers to creating quality outdoor environments, barriers to performing their role, and so on (See Appendix F). These interviews were analyzed by identifying codes and themes that indicated teachers’ beliefs about children’s outdoor play and the preschool outdoor environment.

CHAPTER V

RESULTS

Quantitative Results

Preliminary Analyses for Quantitative Results

Prior to running any analysis, the variables in the data were checked for their range, skewness, kurtosis, outliers, and the normality of their distribution was examined. The data on child physical activity (as measured by accelerometer) were not normally distributed. Preschool children engaged in low activity levels during outdoor play, and this caused the values for children's physical activity to be positively skewed. Consequently, the data were transformed using logarithmic transformation in order to achieve a normal distribution (Howell, 2002). Children's group arrangement was originally categorized into 6 groups. Children were coded as playing alone, playing with one peer, playing in a small group (3-4 children), medium group (5-7 children), medium/large group (8-10), and playing in a large group (more than 10 children). However, since children did not play in medium/large group (0.5%) and large group (0.5%) frequently, they were combined with the 'medium' group and recoded as 'medium to large' group, to ensure that every level of group arrangement was well represented.

Teachers' physical activity was coded on a hierarchy of 3 levels (low, moderate and high activity). However, the sample size for teachers' engagement in high activity was very small (n=6), therefore, 'high activity' was combined with 'moderate activity'

and recoded as 'moderate-high activity'. Teachers' education was recoded into two levels: low and high education. Teachers who were working on their associates degree (n=2) and had completed their associates degree (n=2) were assigned to the low education group, while teachers who were working on the bachelor's degree (n=2), who had completed their bachelor's degree (n=2) and a master's degree (n=1) were assigned to the high education group. For the exploratory research questions involving 'location of play' and 'play materials', only the four most often used locations and the four most frequently used play materials during outdoor play were included as predictors. Since children played in a variety of locations and with a number of play materials, it was not feasible to use all the locations and play materials as separate variables. In other words, it was important to choose those that were most frequently used for the purpose of maintaining substantial power in the analysis.

Finally, an important aspect to remember about this data set is that it includes multiple observations of the same child. Specifically, each child was coded on fifteen variables at every 15 second interval. Since multiple observations are embedded within each child, this makes the data inherently dependent. Though multilevel modeling would be the ideal analysis to use on this data set, the number of classrooms on which data were collected (n=6) restricts the use of such analysis. However, to test for the homogeneity of variance, an intraclass correlation (ICC) was performed on the variable of child physical activity, since it is a continuous ratio level variable and one of the main dependent variables in the current study. ICC is a measure of homogeneity. It approaches 1.0 when any given row tends to have the same values for all columns (Garson, 2009). To calculate

ICC for the current data, each child represented a row, and the physical activity counts for every 15 seconds represented each column. ICC is 0 when within-group variance (in this case within-child variance in physical activity counts) equals between-group variance (in this case between-children variance), indicating that the grouping variable (in this case -the child) has no effect (Garson, 2009). For the current data the ICC was 0.28 indicating that 28% of the total variance in physical activity is explained by the activity counts at every 15 seconds within each child (within-child variance), while 72% of the total variance in physical activity is explained by the activity counts between the children (between-child variance). In other words, the variance in activity counts within each child accounted only for 28% of the total variance, indicating that grouping variable (each child) had a smaller effect on the total variance as compared to the variance accounted for by activity counts between children (72%). The issue of dependency in the data cannot be completely resolved, therefore, the results were cautiously interpreted. Additionally, a stringent p value ($p < .01$) has been used to report significance for all analyses.

Descriptive Information on Preschool Outdoor Play

Overall, preschool children were not very active during outdoor play. Mean accelerometer value was 2.95 (representing activity counts approximately between 251 to 500; $SD = 1.52$). Preschool children engaged in light activity (activity counts 251-750; codes 3 and 4) for almost half the time that they were observed (49.6%), and were frequently involved in sedentary activity (activity counts 0 to 250, codes 1 and 2; 35.5%). They occasionally engaged in low-moderate activity (activity counts 751 to 1500, codes 5, 6 and 7; 13.5%), and displayed very low amounts of moderate-high activity (activity

counts 1500 and up, codes 8 and above; 1.4%). They were mostly involved in functional play (24.6%), dramatic play (20.8%), and minimal play (unoccupied and onlooking behavior; 17.6%), and less frequently engaged in child-initiated game (5.5%) and constructive play (4.2%). Children were occasionally involved in teacher- initiated games (1.7%). Children frequently played alone (35.9%), followed by playing with one peer (29.3%), and then in a small group (3 to 4 children; 27.9%). Their involvement in a medium to large group (5 or more children) was the lowest (6.9%). Children engaged in social conversation a little more than half the intervals observed (57.8 %). The main locations in which children played included the mulch area (30.9%), the natural/grass area (21%) the paved area (19.8%), and the anchored equipment (12.2%). Overall, children did not play with any loose parts/materials for more than half the time observed (64.7%). When materials were used, they played most often with natural elements (sticks, sand, dirt, etc.; 7.2%), tricycles (7%), balls (6%) and hula hoops (2.7%). Table 3 represents the most frequently used play materials in high and low quality environments. Table 4 summarizes preschool children's play behaviors in high and low quality outdoor environments. A series of *t*-tests revealed that children in high quality outdoor settings engaged in a higher amount of sedentary activity and moderate-high activity as compared to children in low quality outdoors, while children in low quality outdoor environments engaged in a higher percentage of light activity and low-moderate activity (*t* values included in the table). Children in high quality environments were involved in higher amounts of functional play, dramatic play, and constructive play as compared to children in low quality environments, while children in low quality outdoor settings engaged in

more unoccupied and onlooking behaviors and games with rules than children in the high quality settings. Children in low quality programs played alone and with one peer more frequently than children in high quality programs, and children in high quality programs engaged more often in small groups and medium to large group play as compared to children in low quality programs.

During outdoor play, teachers from all the classrooms were present near the target child about a third of the entire time that they were observed (27%), and focused on the target child about 17% of the entire time. When present near the target child, teachers focused on the target child for more than half the time (62.4%). Overall, teachers engaged in low physical activity. When teachers were near the target child and were seen in the video, they engaged most often in low physical activity (standing still; 75.6%), then moderate activity (walking; 24%), and rarely in high activity (e.g., running; 0.4%). When focused on the target child, teachers were moderately involved (e.g., comments, redirecting) for about half the intervals observed (45.5%), followed by being low involved (monitoring; 28.4%), and high involved (e.g., participating in play; 17.9%). Additionally, teachers engaged in providing custodial care to children (tying shoe lace, providing water to drink, etc.) during outdoor play (8.1%). Table 5 describes teachers' practices in high and low quality outdoor environment. Results from *t*-tests indicated that teachers in high quality programs were more likely to be near the target child ($t= 10.26$, $p<.001$) and focused on the target child ($t= 7.80$, $p<.001$) than teachers from low quality programs. Teachers in high quality outdoor settings engaged in high involvement more

frequently than teachers in low quality environments ($t= 3.95, p<.001$). Teachers' activity levels in high and low quality outdoor settings did not differ.

Table 6 represents the preschool children's outdoor play depending on teacher focus (t values included in the table). Children engaged in higher amounts of minimal play and dramatic play when teachers did not focus on them; however, their involvement in constructive play and child-initiated games was higher when teachers focused on them. Children's engagement in social conversation was higher when the teachers focused on them compared to when they did not focus on them. Children played with one peer more frequently when teachers did not focus on them, and they played in a medium to large group more often when the teachers focused on them.

Results from the descriptive information section provide an overview of preschool children's behaviors and teachers' practices during outdoor play. The quantitative research questions and analyses will now be discussed in detail.

Child Physical Activity

Research Question 1

Do children's physical activity levels differ by teacher involvement?

It was hypothesized that children's physical activity levels would be higher as teachers demonstrate higher involvement in play. Teachers' involvement was coded on a scale of low, moderate and high involvement. This hypothesis was not supported. A one-way analysis of variance (ANOVA) indicated that children's physical activity significantly differed by teacher involvement ($F= 8.901, df=2/1420, p< .001, \eta^2 = .012$); however, children's mean physical activity was highest when teacher involvement was low ($M=$

3.16, $SD= 1.59$), followed by when teachers were moderately involved ($M= 3.03$, $SD= 1.60$), and lowest when teachers were highly involved ($M= 2.73$, $SD= 1.56$). To assess pairwise differences among the three levels of teacher involvement on children's physical activity, a post-hoc Bonferroni test ($p=.01$) was performed. Results indicated that children's activity level when teachers were highly involved differed significantly from activity levels when teachers were low in involvement or moderately involved. The difference in child activity levels when teachers were low and moderately involved was not significant.

Research Question 2

Do children's physical activity levels differ by teachers' physical activity levels? It was hypothesized that children's physical activity would be higher as teachers engaged in higher levels of physical activity. Teachers' physical activity was coded on a hierarchy of 3 levels (low, moderate and high activity); however, the sample size for teachers engaging in high activity was very small ($n=6$) indicating that teachers rarely engaged in high activity. Therefore 'high activity' was combined with 'moderate activity' and recoded as 'moderate-high activity'. This hypothesis was supported. Results from a one-way ANOVA indicated that children's physical activity significantly differed by teachers' activity ($F= 112.36$, $df=1/1501$, $p< .001$, $\eta^2 = .07$). Physical activity in children was higher when teachers engaged in moderate-high activity ($M= 3.69$, $SD= 1.62$) compared to when teachers were low in activity ($M= 2.77$, $SD=1.55$).

To determine whether teacher involvement or teacher physical activity was a more important influence on children's physical activity, an additional analysis was done combining teacher involvement and teacher activity into a single variable.

Child Physical Activity by Combination of Teacher Involvement and Teacher Activity. To test whether teachers' involvement or their physical activity level was more influential on children's physical activity, a new variable was computed by combining teachers' level of involvement and level of physical activity. A one-way ANOVA revealed that children's physical activity differed significantly by the combination of teacher involvement and activity ($F= 22.875$, $df= 6/1368$, $p< .001$, $\eta^2 = .091$). Figure 3 shows differences in children's physical activity by the specific combination of teachers' physical activity and involvement. The bar graph reveals that within each level of teacher involvement (low, moderate or high), mean accelerometer values were higher when teachers' activity levels were higher, indicating that teacher activity (compared to teacher involvement) appeared to be more influential for children's physical activity levels. Mean accelerometer values for child activity was highest when teachers engaged in 'high involvement and high activity'; however, the sample size for this combination was small ($n=5$) and thus this result should be interpreted with caution. Pairwise differences assessed by post-hoc Bonferroni test are indicated in the figure.

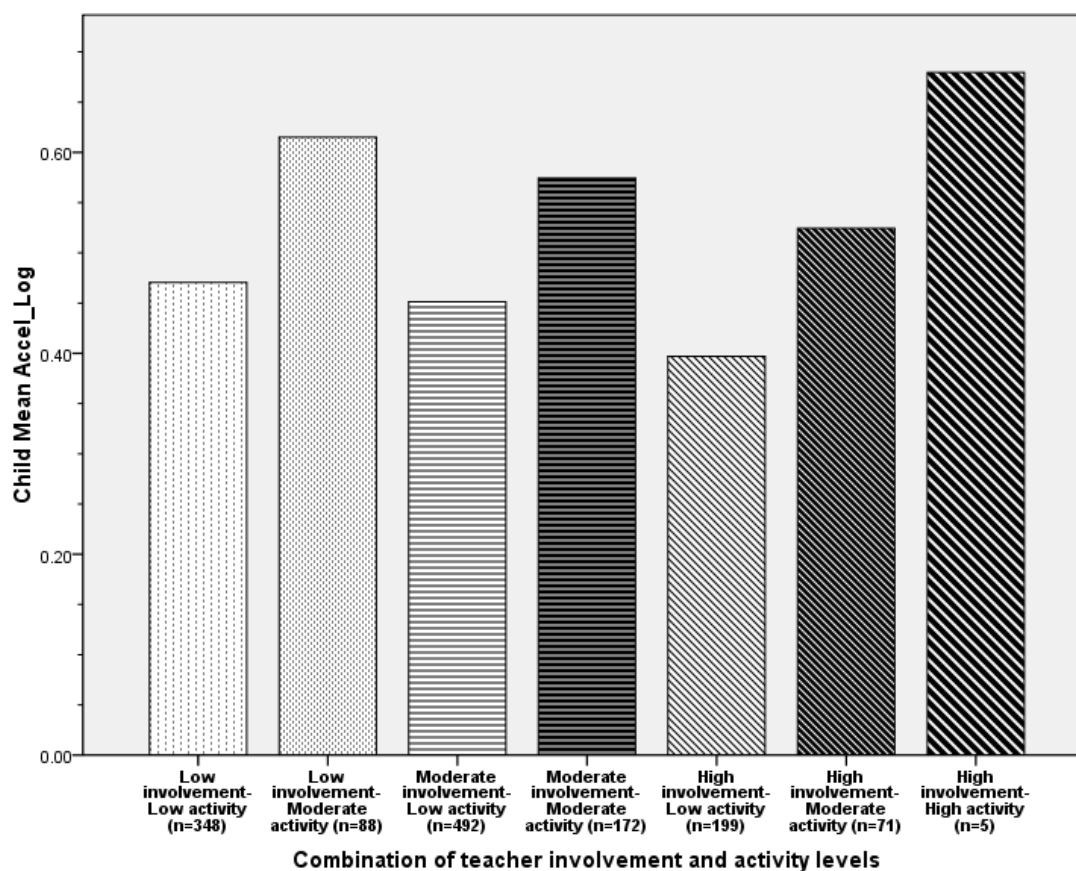
Research Question 3

Do children's physical activity levels differ by the quality of the outdoor environment?

It was hypothesized that children's physical activity levels would be higher in high quality outdoor environments. To assess if activity levels varied by outdoor quality, a one way ANOVA was conducted. This hypothesis was not supported. Although results indicated that children's physical activity significantly differed by outdoor quality, ($F=26.76$, $df= 1/9011$, $p< .001$, $\eta^2 = .003$), mean physical activity was higher in low quality

Figure 3

Child Physical Activity by Combination of Teacher Involvement and Teacher Activity



Groups/bars represented by the same alphabet are significantly different from each other

outdoor settings ($M= 3.01$, $SD= 1.47$) as compared to high quality outdoor settings ($M= 2.88$, $SD= 1.56$). However, the effect size for this relationship was very small.

Child Level of Play

Research Question 4

Do children's play levels differ by teacher involvement?

Children's play behaviors were recoded to create a new variable representing 5 hierarchical levels of children's cognitive play. Unoccupied and onlooking behaviors were coded as 'minimal level' of play. Functional/physically active play was the 2nd level of play, and constructive/exploratory play was the 3rd level. Dramatic play was considered the 4th level of play, and the highest level of play was games with rules (child and teacher initiated). It was hypothesized that children's level of play would be higher as teachers' demonstrated higher involvement in play. The hypothesis was supported. A Kruskal-Wallis analysis of variance was performed since the dependent variable (level of play) is on an ordinal scale, and the independent variable has more than 2 groups (low, moderate, and high involvement). Results revealed that children's play levels varied significantly across the three levels of teacher involvement, $\chi^2(2)= 101.95$, $p< .001$. Mean rank for children's level of play was higher as teachers engaged in higher levels of involvement (386.55 for low involvement; 406.91 for moderate involvement; 518.42 for high involvement). To test pairwise differences among the levels of teacher involvement on children's play levels, a Mann-Whitney U test was applied to each pair separately. Results indicated that the mean rank for children's play level was significantly higher for high teacher involvement when compared to moderate involvement ($z= -9.105$, $p< .001$),

and significantly higher for high involvement when compared to low involvement ($z = -8.937, p < .001$).

Research Question 5

Do children's play levels differ by the quality of the outdoor environment?

It was hypothesized that children's level of play would be higher in high quality outdoor environments. To assess if play levels differed by outdoor quality, a Mann-Whitney U test was performed. Children's play levels differed significantly by outdoor quality ($z = -4.072, p < .001$). The mean rank for children's play levels was significantly higher in high quality outdoor environments (3366.56) than in low quality outdoor environments (3183.68), indicating that outdoor environment influences children's cognitive play levels.

The next research questions to be addressed are the exploratory questions. These questions are related to predicting child physical activity, child level of play, and teacher involvement. There are no hypotheses associated with the exploratory questions; however, the list of predictor variables examined for each question has been specified.

Exploratory Research Question 1

Which contextual factors are associated with children's physical activity levels during outdoor play?

The following contextual factors were examined: group size, teacher involvement, teacher's physical activity, location of play, and play materials. Since children played in a variety of locations on the playground, the four most frequently used locations (anchored equipment, mulch area, natural area and paved area) were dummy coded and used in the analysis. Similarly, since children played with a variety of play materials during outdoor

play, this variable was recoded into a new variable- 'high activity affording play material', which was created by achieving a consensus on the materials that afford high activity during play. From a list of 19 play materials used by children, four play materials (ball, tricycle, trailer, and hula hoops) were included as affording high activity. A standard multiple regression analysis was conducted. Results revealed that the model significantly predicted child physical activity ($F= 18.641, p<.001$), and the examined contextual variables accounted for 27.3% of the variance (adjusted $R^2 = .258$) (See Table 7). The beta weights indicate that teachers' activity level ($\beta = .21, p<.001$), mulch area ($\beta = .29, p<.001$), and high activity affording materials ($\beta = .29, p<.001$), each significantly predicted child physical activity.

Exploratory Research Question 2

Which contextual factors are associated with children's level of play in the outdoor environment?

The following contextual factors were examined: group size, social conversation, teacher involvement, teacher affect, location of play, and play materials. Children's play behaviors were recoded into 3 levels of play (minimal, moderate, and high level play) to represent the levels on an ordinal scale. They were regrouped into 3 levels (instead of 5) to aid in the interpretation of the results obtained from the analysis. Unoccupied and onlooking behavior were recoded as 'minimal level', functional and constructive/ exploratory play were assigned to 'moderate level', and finally, dramatic play, child and teacher initiated games with rules were recoded as 'high level' play. To ensure substantial power in the analysis, instead of using all of the four most frequently used locations

(anchored equipment, mulch area, natural area, and paved area), and four most often used play materials (balls, tricycles, natural elements, and hula hoops), only the ones that were significantly associated with child level of play were used in the final analysis. All four play locations yielded significant differences in children's play levels; therefore, all four locations were included. Balls, tricycles, and natural elements, each yielded significant differences in children's play levels, but hula hoops did not. Therefore, three play materials were included in the analysis. Since the values of the dependent variable (level of play) are on an ordinal scale (low, moderate, and high), the decision to perform an ordinal regression was made. An important assumption in ordinal regression is that the parameters of the independent variables are equivalent across the levels of the dependent variable. In other words, the effect of the independent variable is the same for each level of the dependent variable. The 'test of parallel lines' tests this assumption. If the result of this test is non-significant ($p > .05$), it means that the relationship of the independent variable is the same for every level of the dependent variable. For the current data, ordinal regression analysis yielded a significant model. Results from the test of parallel lines indicated that the effect of the independent variables was not the same for each level of play ($p < .001$). It is suggested that if the test of parallel lines fails, categories may be combined until parallelism is achieved, or a multinomial logistic regression may be performed (Garson, 2009). For the dependent variable (level of play), the three levels could not be combined into theoretically meaningful categories; therefore, a multinomial logistic regression (for dependent variables with more than 2 groups) was employed to predict the participation of children in the different levels of play.

The final model was significant when tested against the intercept only model ($\chi^2 = 743.83, p < .001$). The overall model fit, as indicated by the 'Goodness-of-fit' table, showed that the model fit was adequate since the result of the test was not significant (deviance $\chi^2 = .950, p > .05$). The measure of effect size (indicated by the 'Pseudo R-Square' table) revealed that the effect size was adequate (McFadden $R^2 = .449$). The classification table, which is a preferable measure of the effect size, indicated that the model was correctly able to classify 74.2% participation in minimal level play, 81.4% participation in moderate level play, and 69.4% participation in high level play, for an overall success rate of 76.3%. Using 'minimal level play' as the reference category, children having social conversation (compared to children not having social conversation) were 8.9 times more likely to be in moderate level (functional and constructive) play than in minimal play ($p < .000$), and 179.27 times more likely to engage in high level play (child and teacher initiated games with rules) than minimal level play ($p < .001$) controlling for other variables in the model. The odds of being in moderate level play ($p < .000$), and high level play ($p < .001$) compared to minimal level play increased by a factor of 8.92 and 26.461 respectively when children played with one peer compared to when they played alone, controlling for other variables in the model. Children who played with a ball were 76.62 times more likely to be in high level play than in minimal level play ($p < .001$), controlling for the other variables in the model. Table 8 shows the multinomial logistic regression coefficients, Wald test, and odds ratio for each predictor of high level play, when moderate level play was set as the reference category. Children in medium to large group (as compared to children who were alone) were 25.9 times

more likely to be in high level play than in moderate level play. When teachers engaged in high involvement (compared to low involvement) children were 2.25 times more likely to be in high level play than in moderate level play.

Exploratory Research Question 3

Which individual factors are associated with teachers' level of involvement in children's outdoor play?

The following individual factors were examined: years of education, teachers' physical activity levels, and teacher affect. Teachers' education was recoded into two levels: low and high education. Teachers who were working on their associates degree (n=2) and had completed their associates degree (n=2) were assigned to the low education group, while teachers who were working on their bachelor's degree (n=2), who completed their bachelor's degree (n=2), and a master's degree (n=1) were assigned to the high education group. Since the values of the dependent variable (teacher involvement) are on an ordinal scale (low, moderate, and high), an ordinal regression was conducted. Results from the ordinal regression yielded a significant model; however, results from the test of parallel lines indicated that the effect of the independent variables was not the same for each level of involvement. Therefore, a multinomial logistic regression was employed to test the individual factors that predict the teacher involvement during outdoor play.

The model was significant when tested against the intercept only model ($\chi^2 = 80.585, p < .001$); however, the overall model fit was not adequate since the result of the Goodness-of-fit test was significant (deviance $\chi^2 = 92.23, p < .001$). The measure of effect

size (indicated by the ‘Pseudo R-Square’ table) revealed that the effect size was small (McFadden $R^2 = .044$). The classification table, an additional measure of the effect size indicated that the model was correctly able to classify 41.1% of low involvement, 75.6% of moderate involvement, and 0% of high involvement, for an overall success rate of 48.4%. Table 9 shows the results for significant predictors of teacher involvement. Results revealed that using low involvement as the reference category, teachers with high education are 2.28 times more likely to show moderate involvement, and 2.65 times more likely to be highly involved during outdoor play. As teachers’ affect scores increased, they were 1.13 times more likely to engage in high involvement than engage in low involvement. However affect score was not a significant predictor of moderate involvement when compared to low involvement. Teachers’ physical activity also did not predict their involvement. Since the model fit was not adequate, and teacher education was the only significant predictor, further analysis was conducted to test differences in teacher involvement based on their education. A Mann-Whitney u test was performed. Teacher involvement significantly differed by teacher education ($z = -5.213, p < .001$), with mean rank for involvement being higher for teachers with high education (492.76) compared to teachers with low education (408.41).

Additional Analysis with Teacher Education

Teacher Physical Activity. A 2X2 chi-square test was performed to test the significance of relationship between teachers’ education and their physical activity. Results revealed that the relationship was not significant ($\chi^2 = .038, p > .10$) indicating that education did not influence teachers’ activity levels.

Child Physical Activity and Child Level of Play. To test the significance of the relationship between teacher education and children's physical activity, a one way ANOVA was conducted. Child physical activity significantly differed by teacher education ($F= 24.16$, $df= 1/1010$, $p < .001$, $\eta^2 = .023$); however, the effect size was small. Mean physical activity in children was higher when teacher education was low ($M= 3.03$, $SD= .1485$) as compared to when teacher education was high ($M= 2.466$, $SD= 1.56$). To test the significance of the relationship between teacher education and child level of play, a Mann-Whitney u test was performed. Results revealed that child level of play did not differ significantly by teacher education ($z= -1.211$, $p > .10$).

Exploratory Research Question 4

Which contextual factors are associated with teachers' level of involvement in children's outdoor play?

The following contextual factors were examined: child gender, child age, child BMI, children's physical activity level, children's level of play, group size, social conversation, and location of play. To ensure substantial power in the analysis, instead of using all of the four most frequently used locations (anchored equipment, mulch area, natural area, and paved area) only the ones that were significantly associated with teacher involvement were used. Involvement level significantly differed by children's play on the anchored equipment, the mulch area, and the paved area. Therefore these three locations were included in the analysis. An ordinal regression was conducted to test which contextual variables predict teacher involvement. Results from the ordinal regression indicated that the model was significant; however, results from the test of parallel lines

indicated that the effect of the independent variables was not the same for each level of involvement. Therefore, a multinomial logistic regression was performed to predict the teacher involvement during outdoor play.

Results from the multinomial logistics regression analysis revealed that the final model was significant ($\chi^2 = 215.025, p < .001$). The overall model fit was marginally adequate since the result of the test was close to non-significance (deviance $\chi^2 = 1186.83, p < .05$). The 'Pseudo R-Square' table indicated that the effect size was small (McFadden $R^2 = .11$). The classification table, which is also a measure of the effect size, indicated that the model was correctly able to classify 56.4% of low involvement, 57.1% of moderate involvement, and 38.3% of high involvement, with an overall success rate of 52.7%.

Using moderate involvement as the reference group, results from multinomial regression revealed that as the age of the child increased, teachers were .90 times less likely to be highly involved in their play ($p < .001$). Similarly, as child physical activity level increased, teachers were .16 times less likely to engage in high involvement compared to being moderately involved in children's play ($p < .001$). Teachers were 5.9 times more likely to be in high involvement (as compared to being low involved; $p < .01$), and about 8 times more likely to be highly involved (than moderately involved; $p = .001$) when children engaged in high level of cognitive play (dramatic play, child and teacher initiated games with rules) than when they engaged in minimal level play (unoccupied and onlooking behaviors). Table 10 indicates the multinomial regression results for predicting moderate and high teacher involvement when the reference category is low involvement. Teachers were .47 times less likely to be moderately involved, and .32

times less likely to be in high involvement as compared to being low involved (monitoring, supervising) when children played on the anchored equipment. Teachers were 3.75 times more likely to be moderately involved (making comments, redirecting, etc.) in children's play, and 4.12 times more likely to be high involved (participating in play, facilitating play, etc.) as compared to being in low involvement when children engaged in social conversation compared to when they did not. Teachers were .88 times less likely to be highly involved (than low involved) as the age of the child increased. Similarly, as the child physical activity increased, teachers were .15 times less likely to be highly involved than low involved. Gender was not a significant predictor of teacher involvement.

Additional Analysis

Outdoor Quality and Teacher Involvement. To test the significance of the relationship between outdoor quality and teacher involvement, a Mann-Whitney u test was conducted. Teacher involvement significantly differed by outdoor quality ($z = -6.264$, $p < .001$). The mean rank for teacher involvement was higher in a high quality outdoor environment (Mean rank = 762.71) and lower in a low quality outdoor environment (Mean rank = 634.76) highlighting that the other contextual factors like the outdoor quality is related to teacher involvement.

Outdoor Quality and Teacher Physical Activity. A 2X2 chi-square test was performed to test the significance of relationship between teachers' physical activity and the outdoor quality. Results revealed that the relationship was marginally significant ($\chi^2 = 5.25$, $p < .05$). Teachers in low quality outdoor settings spent more time in low activity as

compared to teachers in high quality settings. Teachers in high quality settings engaged in moderate-high activity more frequently than teachers in low quality settings.

Qualitative Results

Data Analysis

The aim of the current study was to explore preschool teachers' beliefs of outdoor play and environment, and to examine their practices during outdoor play. Teachers were interviewed about their beliefs about an ideal outdoor environment for children, barriers to creating quality outdoor environments, and perceptions about their role during outdoor play. Through the interview teachers also revealed their everyday practices during outdoor play, for example, whether they planned activities for their outdoor time, whether they brought indoor projects outside, etc. Interviews were recorded on audio tapes and transcribed. Teachers' practices were examined using videotapes of teachers and children during outdoor play. Videos were watched and transcribed in detail to include teachers' actual behaviors, their interactions with children, contextual information, teachers' affect (facial expression, etc.) and attitudes. Additionally, the researcher's knowledge and feelings about the situation and teachers' practices were also recorded.

Transcripts from the interviews and the videotapes were coded to understand teachers' beliefs and practices. The constant comparative method, a technique employed in grounded theory, was used to code the data and generate categories (Charmaz, 2000; Glasser and Strauss, 1967). Codes were generated both deductively, informed by the existing literature and the research questions (both quantitative and qualitative), as well as inductively (from specific to broad). The constant comparative method helps in

generating and linking categories by comparing incidents in the data to other incidents, incidents to categories, and categories to other categories (Glasser, 1992). This technique is used with intent that the categories are ‘grounded’ in the data. ‘Saturation’ refers to the point where the researcher makes a subjective determination that new data will not provide any new information or insights for the developing categories (Creswell, 2005). Videotapes and interviews were analyzed until categories were saturated.

While analyzing the videotapes, it was ensured that the target teachers from every classroom (lead and assistant teachers) were observed to get an overall picture/idea of each teacher’s practices outdoors. If additional teachers (such as teachers from the other preschool classroom and student teachers) were present during outdoor play, their interaction with the target child was also captured. It was also ensured that videotapes of both high and low quality outdoor settings, boys as well as girls, and children with unique characteristics (such as inability to manage emotions, inability to control impulses, skills etc.) were coded. Every target child was videotaped for 20 minutes. However, to get a range of teachers’ practices on different days 10 minutes of each video (instead of 20 minutes) was coded. A minimum of 4 videos per classroom (2 boys and 2 girls), and a maximum of 7 videotapes from each classroom were coded for 10 minutes. It was determined that after 29 videos (14 from high quality programs and 15 from low quality programs) saturation levels were reached.

Validity

Qualitative researchers often debate over the issue of validity of the data. Maxwell (2005) elucidates that the term ‘validity’ does not imply the existence of any

'objective truth' to which the data can be compared. However, it is important to build trustworthiness in qualitative data (Lincoln & Guba, 1985) and address issues of subjectivity related to interpretations and explanations (Maxwell, 2005). In the current study triangulation was employed to address the issue of validity. The data were triangulated by collecting information about teachers using a variety of methods. Teachers were interviewed to understand the beliefs they hold and the practices they engage in during outdoor play. Their actual practices were captured using videotapes. This enabled the researcher to corroborate the themes identified from qualitative interviews with the data obtained from qualitative analysis of the video observations. The videotapes were analyzed quantitatively, and results from the quantitative analysis also helped in triangulation. Finally, information on teachers' interactive behaviors and affective characteristics using the Teaching Styles Rating Scale (TSRS) was also used to support the information about their practices from the video observations and interviews.

Researcher Bias

An important issue under validity in qualitative research includes the subjectivity on the part of the researcher in selecting data that fits the researcher's existing theory or preconceptions, and selecting data that 'stands out' to the researcher, commonly referred to as 'bias'. Maxwell (2005) explains that it is vital for researchers to specify their possible biases that may impact the conclusions, and how one will deal with these biases. He further clarifies that it is "impossible to deal with the issue of bias by eliminating the researcher's theories, beliefs and perceptual lens" (p. 108). Therefore it becomes important to understand how a particular researcher's values and expectations influence

the conclusion of the study. As Lather (1993) eloquently captures the issue of validity , “[i]t is not a matter of looking harder or more closely, but of seeing what frames our seeing—spaces of constructed visibility and incitements to see which constitute power/knowledge” (p. 675).

In the current study, I as the researcher, deal with the issue of bias by specifying the frame with which I understand the data, and the lens I wear to interpret teachers’ beliefs and practices during outdoor play. As an early childhood education professional, I have beliefs about or an understanding of what are ‘best’ or ‘appropriate’ teacher practices, teacher-child interactions, and teacher involvement during outdoor play. For example, I believe that teachers’ participation in children’s play is beneficial for children’s learning, and that teachers should maintain a balance of unstructured and structured, child initiated and teacher initiated activities during outdoor play. Such an understanding impacts the way I interpret teachers’ behaviors during outdoor play. Furthermore, I am interested in looking at children’s and teachers’ physical activity levels, and what nature/natural elements afford during outdoor play. Consequently, teachers’ practices that facilitate movement and activity in children, and teachers’ practices related to nature/natural elements (exploring bugs, expressing a negative attitude toward playing with dirt, etc.) “stood out” to me during data coding. By discussing and explaining the lens I use to understand that data about teachers and children, I inform the readers about the frame with which I interpret teachers’ beliefs and practices during outdoor play.

The results from the qualitative analysis will be presented next. The results will be divided into three sections: (a) results on teachers’ beliefs and self reported practices of

outdoor play and outdoor environment, (b) results on teachers' observed practices during outdoor play, and, (c) linking teachers' beliefs and practices.

*Teacher Beliefs and Self-Reported Practices of Outdoor Play
and Outdoor Environment*

Teachers' beliefs of outdoor play and outdoor environment were assessed by a detailed interview with the teachers. The themes that emerged from the interview are presented in the following format. For every broad topic the overall/general themes from both high and low quality programs are reported, followed by specific differences in themes that emerged between teachers' beliefs from high and low quality outdoor settings.

Ideal Outdoor Environment: Space and Movement and Variety

Teachers described an ideal outdoor environment for children as one that had an open space to move around, facilitated their physical development and physical skills, and had a variety of opportunities made available to children. For example, one teacher stated "I think ideally you want to have somewhat like what we have, where you have a really large space, where you have a lot of space for running...a lot of space where kids can develop their own ideas" (T-1¹; HQ-3²). A teacher from a low quality program also supported the idea of having an open space as she said "I also think that they need a lot of

¹ T-1 = Target Teacher-1, T-2 = Target Teacher 2, and T-3 = teacher from another classroom in the same program.

² HQ = High quality classroom and LQ =Low quality classroom. The number next to the program quality refers to the classroom id.

Names of all the teachers and children have been changed for purposes of anonymity.

room to run around” (T-1; LQ- 3). The ideas of facilitating physical development, and providing a variety of opportunities for children were supported by teachers in both high and low quality programs. For example, one teacher explained “There needs to be lots of opportunities to climb, to jump, and to run, lots of materials, jump ropes, hula hoops, and bicycles. Just lots of outdoor activities that are offered” (T-2; HQ-1). Another teacher illustrated:

I think it’s important to have an area where the kids can get out back climbing. I also think it’s important to bring a little bit of inside outside every once in a while, like have books or that kind of thing. Have a kitchen set where they use the bark to make food and have that type of material where they can manipulate and have pretend play outside, because just running around I found that the kids will pretend and they can run around but it’s important to have that integrated (T-1; LQ-1).

Teachers from the high and low quality programs also had some differing ideas on what constituted an ideal outdoor environment. Most teachers in high quality programs included nature or some type of natural elements in their description of an ideal outdoor setting. For example, a teacher explained “of course having a lot of natural elements, trees, plants, garden, any of that stuff that you can have is great too, and grass, though it’s hard to grow with kids playing on it” (T-1; HQ-3). Most teachers from the low quality programs did not talk about nature, but specified that the presence of equipment was important. For example, “I think they should have enough equipment that they can play outside.” (T-1; LQ-2), and “Some equipment that is appropriate for their age level” (T-2; LQ-3).

Barriers in Creating an Ideal Outdoor Setting. Almost all teachers agreed that lack of money was the main barrier to creating quality outdoor settings. As described by one of the teachers “I think, of course, the first barrier is usually money” (T-1: HQ 3).

Another teacher expressed,

Money, money. Unless you hook up with a good program like Smart Start or, you know, you are funded. I have a sister who owns her own day care and, you know, the things that she has on her playground is stuff that she picks up at yard sales. So, it is all because of money (T-2; LQ-3).

Most teachers from the low quality settings described barriers that were related to lack of playground space and availability of resources in the outdoor environment. One teacher expressed helplessness as she stated “We’re blocked in. We have space issues. This center is 17 years old. So back when we opened that space was adequate but the rules and stuff have changed” (T-1; LQ-1). Expressing concern about the lack of materials available to the children in the outdoor setting, one teacher said,

You should have toys to keep them, you have to keep them busy. Like if there is nothing on the playground they will just sleep. So you have to advocate. A center should be able to provide all of this stuff and without any of these things that I mentioned they go out there and sit around (T-1; LQ-2).

Many teachers in the high quality programs included teachers’ attitudes and lack of information as a barrier to creating ideal outdoor spaces. As acknowledged by one of the teachers,

I think the biggest one on my mind is teacher opinion. I guess not going outside enough because they have, in my opinion, that this will make people sick, or this will make their clothes dirty, so I think that is the biggest barrier in creating an ideal outdoor environment because then children end up not going out at all because of those teacher's opinions. They are worried about the weather. Fresh air never hurt anybody. We're not saying you have to be out for an hour. If the weather is pretty darn cold then we'll get some fresh air and then come in (T-2; HQ-2).

Focusing on the teachers' lack of information to create quality outdoor spaces, one teacher illustrated "the knowledge to kind of know what to offer. I don't think there are a lot of opportunities to really research in that kind of stuff to see what really works and what really doesn't" (T-1; HQ-1). Another teacher supported the idea as she noted "knowledge about the playground structure, what needs to go on the playground, knowledge about those types of things can be a barrier" (T-1: HQ-2). Lastly, one teacher touched upon the lack of innovative play equipment and safety issues as barriers to creating ideal outdoor settings for children. She expressed her frustration,

I feel like a lot of it is just boredom. I've gone up these steps and down this slide how many times? And so I really think it would be fun to climb the wall because I'm really tired of just going up the stairs and down the slide. It's hard because it's kind of more these days because of safety issues. Which is good, but if there was a way to really get one of those big jumpy things, the little things, things like that that are soft that they can just jump around and bounce and do this. We're always saying "Please keep your feet on the ground because you're going to get hurt". "If you do that again you might fall and get hurt". They get tired of hearing that (T-2; HQ-1).

Importance of Outdoor Play and Environment

Teachers from all classrooms acknowledged that the outdoor environment afforded specific or "different" opportunities for children as compared to the indoor environment. For example, one teacher stated,

[b]ecause indoors we have all of the different toys that provide the certain learning experiences, but outdoors the kids are able to kind of learn from all the different [things], I guess they can take the things that interest them more outside and kind of teach themselves outside. But there are tons of stuff that they can play with outside that they would never, it would be really hard to teach them about indoors (T-1; LQ-3).

Specifically, some teachers also focused on the social and emotional aspect of outdoor play and settings. A teacher from a high quality classroom (HQ-3) supported this idea as she said,

I think inside is definitely more structured, no doubt...But I think it's a different type of learning outside. I think it's a more social learning. It gives kids the opportunity to come up with their own ideas, so I think there is a more creative element to learning outside that kids get...[children] attend to a task for a long period of time. So, I think outside you kind of get a different kind of thing where they can work on something for a long period of time and get really involved, and nobody is really in their face, they have their own space to do it. I think it's a more social type learning out there (T-1).

Teachers also noted that concepts related to nature could be learned/taught better outside than inside the classroom. For example, one teacher explained,

I would say “different” because when you’re outside the kids can learn things about weather and nature and that kind of thing. They have a hands-on approach outside that they don’t necessarily have inside. I think outside puts it more into perspective as far as talking about clouds. When you’re inside you can’t really. It’s much better to go outside and have them lie down and look at the clouds as opposed to showing them the picture (T-1; LQ-1).

Some teachers in the high quality programs believed that both indoor and outdoor environments provide “equal” opportunities for children’s learning. For example, one teacher explained,

You can learn about anything, anywhere. I think as far as nature and science, I mean, I guess that is a little more easy to do outside. Although, you can do a lot of it inside as well. You know, even with, you know, letters and numbers and stuff, you can do things with sand and we still count and, there are all of those things that you can kind of. So I say it is kind of equal, I mean I think they are both very important (T-2; HQ-1).

As opposed to this idea, some teachers in the low quality classrooms believed that the indoor environment was better at providing more opportunities for children because of the resources available to them inside their classroom. As a teacher from a low quality classroom explained “I think indoors. Because they have more stuff to play, more centers, and different centers for different interests within the classroom” (T-1; LQ-2).

Similarly, another teacher from a low quality classroom stated “I would say inside. Because we have more resources, you know, inside” (T-2; LQ-3).

Perceptions of Teachers’ Role

When asked to describe a teacher’s role during outdoor play, most teachers believed that supervising children’s play was an important role of the teacher. For example, one teacher reported “supervision is the key” (T-1: HQ- 2). Another teacher said “they should be able to, you know, keep an eye out and make sure she can see everybody, whether they are hiding, or doing something they are not supposed to be doing” (T-1: LQ-2). Additionally, they believed that the role of the teacher was to help

children find a direction during outdoor play. As noted by one teacher, “if they [children] have a hard time finding something to do, we try to help them find stuff” (T-1; HQ-1).

Another teacher supported this idea as she said, “of course, if any of them need help, direction, finding something to do, then to help them out” (T-2; LQ-3).

Some teachers also reported that teachers should set up the materials for play, step back and let children play. As noted by one of the teachers,

I would say put things up for them, and then see where they are, so you know, lots of gross motor things. Oh gosh, the number of children that mastered climbing up the vertical ladder up to the top platform this year and that's not doing it for them, but being right there with them (T-2; HQ-2).

Furthermore, some teachers reported that interacting with children during outdoor play was important, but they did not specify the nature of this interaction. For example, T-1 from the LQ-2 classroom reported “and next, she should be interacting with them”.

Another teacher supported this idea by stating “supervision, interaction and safety, those are the three main components” (T-1; HQ-2). Only two teachers talked about being involved with children and facilitating play as the teacher's role. One teacher explained,

I think it's important for the teacher to be aware, be involved in some activities, you can tell which ones to be involved in, you know, if there's painting you probably need to be involved with that, sometimes sit down and play with them, and if they need a little help in an activity kind of get them jump started on something. But I, you know, sometimes I go back and forth on that one. Do I really need to get in there, or do I need to step back and let them do their own thing? (T-1; HQ-3).

Another teacher supported the idea of facilitating play by stating “But it’s also to facilitate what they are learning. If a child finds a bug or insect, to help them expand on their knowledge of it” (T-1: LQ-1).

Barriers that Prevent Teachers from Engaging in the Ideal Role. Most teachers acknowledged that teachers’ attitude of considering the outdoor time as a “free” time is typically the barrier to teachers engaging in the role that they should be performing. As illustrated by one teacher, “For some reason there is this one mind set that when you get outside it’s time to rest on the teacher’s part. For some reason there’s that mind set, I don’t know why that is” (T-2; HQ-2). Similarly, another teacher said,

We have like two playgrounds with teachers in them. If you are talking to them [teachers], you are not looking after the children. You cannot see what they are doing. If you are talking on your cell phone or if you are texting you are not paying attention (T-1; LQ-2).

Teacher attitudes about nature were also considered as barriers to performing their roles.

For example, one teacher stated,

I think outside, teachers, you know, the playground is different, it's dirty. Not that, in here most teachers don't care about getting dirty, but I think sometimes it's like "oh...I have to go out to dinner tonight" or, you're just thinking ahead and you may not want to get involved (T-1; HQ-3).

Some teachers also noted that teacher-child ratio and issues of safety can act as a barrier.

For example, as stated by one of the teachers “unless there is not enough teachers outside.

Unless there is too many kids for one teacher” (T-1; LQ-3). Another teacher supported this idea and explained,

You go to the park and there’s the monkey bars but you don’t let them do it because it’s so dangerous. And they are so dangerous, but that upper body strength in moving is such a good thing for them to learn how to do. But it’s just we only have what, two teachers. If it were my child I was there with my child I would say sure I’ll stand with you (T-2; HQ-1).

Lastly, one teacher talked about child-characteristics as sometimes being a barrier. She mentioned “If there is a specific child that they have to watch more closely, as far as them being more aggressive or more rough outside. That takes away from that” (T-1; LQ-1).

Teachers’ Self-Reported Practices during Outdoor Play

Planning Outdoor Activities. All teachers reported regularly conducting planned activities during outdoor play. Some teachers specified that they did a planned activity outside every day, some reported having planned activities on some days, while others explained that they planned for outdoor activities when the weather was good outside. Some of the planned activities were “child-planned”, some were “spontaneously planned” and some were planned according to the curriculum. For example, one teacher said,

It’s fifty-fifty. Sometimes it’s planned and sometimes it’s not. Some ideas are planned from the classroom that we are going to do outside, and then others we just think of while we’re out there, like “ooh, let’s get the bubbles out today”. Sometimes the children ask us to bring things outside, so in order to meet their needs, we do what they ask (T-1; HQ-2).

Another teacher who used a prescribed curriculum for planning described,

I know during our curriculum of “Your Earth”, that is the name of it “Your Earth” that is the theme, we went outside and planted sticks, we stick them in the mulch. Yeah, but all the time, all the time. And if it is not in the curriculum we are adding it, especially on the nice days. It gives us a reason to get outside (T-2; LQ-3).

Planned activities outside ranged from taking books, blocks, art materials, musical instruments, balls, etc. outside, but could mostly be categorized as messy activities (water and art activities) and motor activities. Examples of art activities included paint, sidewalk chalk and easels, and motor activities included hopscotch, relay race, volleyball, etc.

Teachers from high quality programs talked about a wide range of activities, and had many examples of the activities they planned, while teachers from low quality classrooms had fewer examples of the activities that they had planned. For example, a teacher from a high quality (HQ-3) setting elaborated,

I do usually plan some art activity. So we have the outdoor easels that are clear. We can do a lot of art out there and you don't have to have a lot of paper, and you can just paint right on there. And we do tons of water play. I mean, that's like a favorite, so yeah, we do a lot of water play...I take a lot of stuff from the classroom outside. I'll take blankets out and put certain toys, horses, you know, whatever they're interested in I'll put that outside. Sometimes we take cars out, sometimes we take blocks out so a lot of inside stuff goes outside (T-1).

A teacher from a low quality classroom described,

There is an outdoor activity planned usually everyday. Just this week we were outside playing volleyball, well a kid's version of volleyball. We play baseball, we play *Duck, Duck, Goose*, those type of running games, tag. It's great outside because it's all

child-initiated. If the child wants to do it they can participate but if they don't they have an open space where they can run and get that gross motor (T-1; LQ-1).

Rotating Materials, Taking Materials from Inside the Classroom Outside, and Extending Indoor Projects Outdoor. All teachers reported rotating materials for children during outdoor play, and taking materials from inside the classroom outside, or at least trying to do so. One teacher acknowledged that she didn't do it as often as she should be doing it. Teachers reported rotating materials once in three days to about once a week. Similar to the theme of planning activities outdoors, teachers from high quality classrooms described a variety of materials that they rotated for children's outdoor play and brought out from inside the classroom. Teachers from low quality programs were limited in their examples of the materials they rotated and brought outside. For example, a teacher from a high quality program illustrated,

Yes we do, especially in the summer when we have the playground a little bit more, we do take blocks, animals, they love the seashells when we were talking about the beach, hiding seashells in the sand. We hid dinosaurs bones because they were being paleontologists, we do those types of things. We try to bring the indoors outdoors especially when we have the opportunity to and the weather is really nice...we have a stage out there so we will do puppets and try to get them engaged. We might pretend we are the grocery store, take out some foods, dress up clothes, but if it is too hot you have to be really careful (T-1; HQ-1).

A teacher from a low quality program described "The only thing is the basketball and the frisbees" (T-1; LQ-2), and another teacher had a similar response "Yeah, we try to. Most of the time, like the parachutes and jump ropes, I have a few jump ropes inside, and we

have like a tug of war game” (T-1; LQ-3). Teachers also reported extending indoor projects outside. For example, a teacher from a high quality classroom illustrated,

Yes, we did a height chart. We do a height chart every other month in the classroom and so they wanted to see what other things weighed, and how tall things were, so we let them go outside with rulers, and they measured tables and the bridge and the climber, they measured the shed door... We do a lot of incorporating activities from inside the classroom... and we made s'mores, and showed them that you don't have to always use the microwave, you can also use the sunlight, you know, the chocolate and marshmallows (T-1; HQ-2).

Another teacher from a low quality classroom described the activities that she had extended from inside the classroom to outside.

Yes, especially when we're talking about things like nature and that kind of thing. For example, we would talk about trees and we would go on a tree walk and we would walk around the neighborhood and we collect leaves from the different trees or we collect different nature items, come back and then do an art project with the stuff we collected (T-1; LQ-1).

Some teachers also extended projects to the outdoor setting by letting children finish activities that were started inside the classroom. As stated by this teacher “Yes especially- we have some that are so involved in it or some that have come in late, if they are really interested in it we can take it outside so they can continue playing” (T-1; HQ-1). Overall, teachers from high quality classrooms reported extending multiple projects from inside the classroom outside, while teachers from all the low quality classrooms reported one or two examples of projects that they had extended from inside the classroom outside.

Outdoor Time as Discipline Strategy. All teachers reported that outdoor time was never used as a discipline time in their classroom. As stated by one of the teachers,

No, we don't use that at all. Most of our discipline techniques involve a lot of redirection and talking things out...you know, there are times when we're going to say, "you're going to lose a privilege" but the playground is not really a privilege, it's just another part of the day...I mean, it's just too much part of our routine, our regular day, and we would not use that as any kind of punishment (T-1; HQ-3).

Another teacher specified a different reason for why outdoor time was not used in disciplining children. She said "Absolutely not! No, no because if they are rambunctious inside then they need to get outside. So I'm not going to take that away from them at all. They need to get outside" (T-2; LQ-3). Many teachers, though they reported that outdoor time was not used as a disciplinary strategy, further revealed that children did experience a "quiet time" when they were outside if they engaged in inappropriate behaviors. A teacher from a high quality classroom explained, "if we do have a child that needs to sit out for maybe they hit a child or something we might have them sit down in quiet time, we don't call it "time out", we call it "quiet time" (T-1; HQ-1). Two of the three low quality centers reported using this technique. As reported by one of the teachers,

when they get outside they would sit out for like five minutes, but sometimes we make it like two or three minutes. When they see other people playing they want to, and they'll like, this is the reason why you not do it. "Ok, Mrs. S. I'm sorry I promise I will not do it again (T-1; LQ-2).

The results presented reveal teachers' beliefs of outdoor play and the environment, and their self-reported practices during outdoor play. Figure 4 on the following page,

represents the broad categories and the underlying themes of teachers' beliefs and perceptions of their role during outdoor play. In the following section, teachers' observed practices during outdoor play will be discussed.

Teachers' Observed Practices during Outdoor Play

Observing/Monitoring/Supervising Children

Teachers from all classrooms were observed watching/monitoring children during play. In an interaction observed between a teacher and a child, the teacher expressed that observing children was her role. T-1 (LQ-1) was seen standing near the anchored equipment and looking at the children playing on the equipment. As Natasha walked down the steps, she saw T-1 looking at her.

Natasha (to T-1): What?

T-1 (smiles): I didn't say a thing

Natasha: Why are you looking at me?

T-1: Because I am watching you. Isn't that my job?

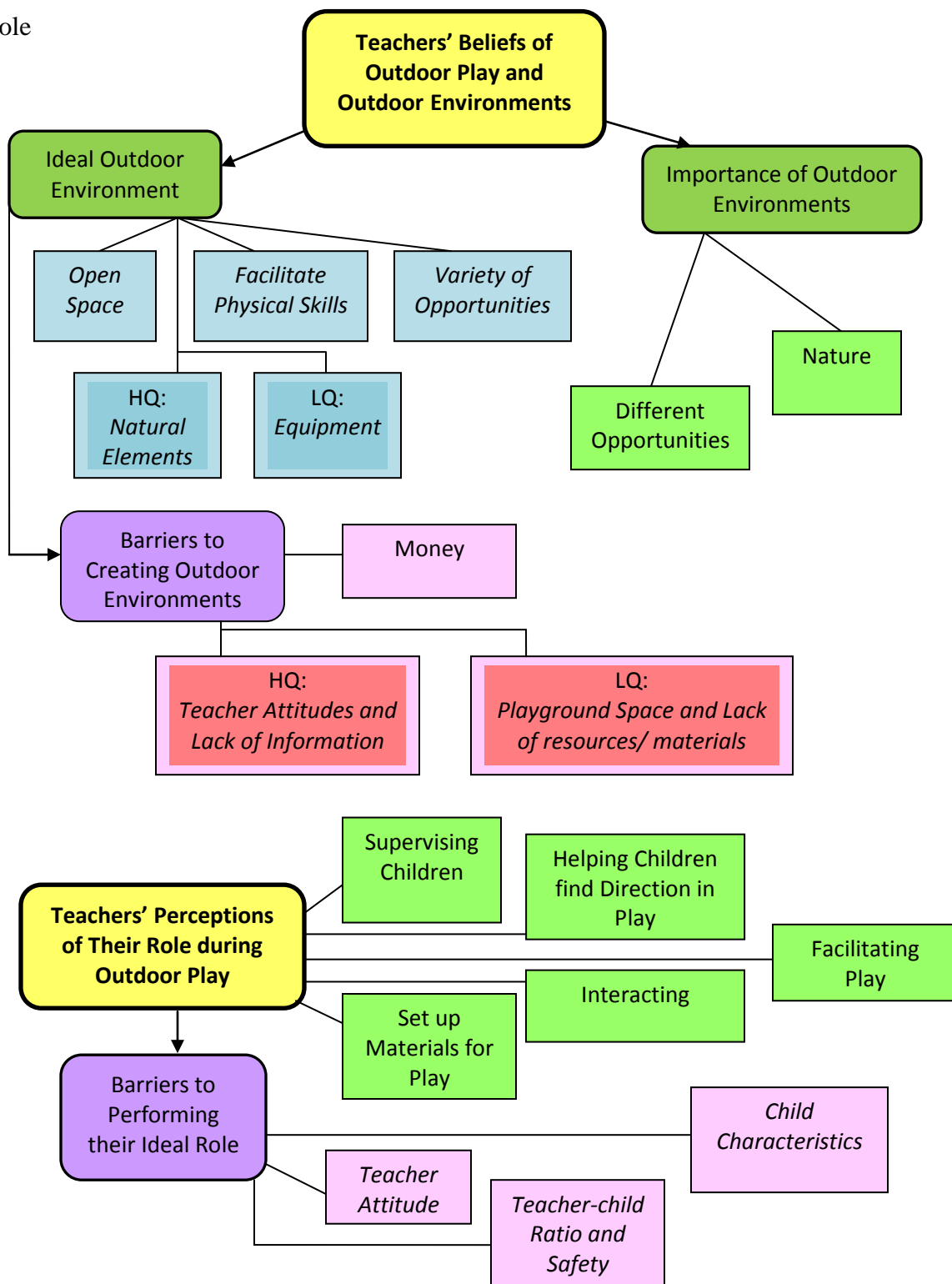
Variations were observed in teachers' practice of monitoring/supervising children.

Teachers were frequently observed *scanning or looking around* the playground without focusing on any child/children specifically. However, they were observed *focusing* on a particular child/group of children when they stood near that child/group, or because of the nature of the activity that children engaged in. For example,

T-1 (LQ-3) watched three children climbing on the slide from the bottom to the top (in the opposite direction). The slide was covered with ice in some parts, and the children were having fun climbing up the slippery surface and then sliding down. T-1 stood close to the slide and watched the children as they attempted to go up and down

Figure 4

Themes from Qualitative Interview of Teachers' Beliefs and Perceptions of their Role



the cold and slippery surface. Occasionally, if a child found it difficult to climb up, or was slipping down, she would offer help by holding their hand as they climbed up.

Teachers were also observed watching children, which seemed *out of curiosity or interest* in knowing what children were playing. For example, when Chrissie, Adele and Cooper were pretend playing on the anchored equipment, T-2 (HQ-1) walked toward them. Chrissie told T-2 that they were playing ‘mommy and baby’.

T-2: who’s the mommy or the daddy?

Chrissie: I’m the mamma

Cooper: I’m the daddy

The children continued to pretend play, while T-2 stood near the anchored equipment and observe them closely. She frequently nodded and smiled as she watched them, indicating that she was paying attention to what the children were doing.

Teachers from both high and low quality programs were observed monitoring/supervising children frequently.

Redirecting Children

Teachers were often observed redirecting children, asking them not to engage in behaviors they considered inappropriate and asking them to do something they thought was appropriate. For example, T-2 (HQ-2) said to a child who didn’t complete the task he was previously engaged in, “hey buddy, there’s all the paper on the floor, you forgot to pick it up.” Teachers typically redirected children to *ensure safety*. For example, T-1 (LQ-1) responded when she saw children engaging in play that she considered unsafe. A few boys pretended to be Power Rangers. They pushed each other, and one boy kicked

the other. T-1 (who was not seen in the video, but probably saw the boys from where she was standing) walked to the corner of the paved area to talk to them.

T-1: Boys, boys, Bryan, Sam, let's not play this game. Please make safe choices. The children stopped playing the game. Sam walked closer to T-1

Sam: I was the nice one, a nice Power Ranger.

T-1: A nice Power Ranger? But Power Rangers fight and I don't like that.

Sam walked to the tunnel, climbed on it and continued to play on the tunnel.

Similarly, T-2 (HQ-1) was standing at the edge of the mulch area enclosing the anchored equipment. A large group of children (around 4 boys and 4 girls) who were playing on the anchored equipment started to go up and down the slide very fast. Children laughed and enjoyed their play. Sometimes two children went down the slide at a time. They also lay flat on their stomach as they went down, occasionally engaging in rough and tumble play as they went down the slide. T-2 who watched them in their activity walked toward the anchored equipment.

T-2: On your bottoms, and one at a time. Michelle, Michelle, one at a time please.

The children slowed down and went down one at a time. After a few minutes she observed that the children went down the slide and sat at the end of the slide for a few seconds, blocking the way for their friends (which the other children seemed to enjoy).

T-2: When you go down the slide, you need to go up. If you don't go down the slide the right way then you're going to get off the climber.

Chris: Okay!

T-2: When you go down you get up. On your bottom.

Teachers were also observed redirecting children to *settle arguments and disputes among them*. For example, two boys, Kevin and Joseph in LQ-2 classroom played kickball with

a basketball. In the middle of their play, Kevin took the ball and walked away with it. Joseph followed Kevin and requested him to share the ball with him, but Kevin ignored his plea and walked around the playground with the ball in his hand. This made Joseph upset, who began to cry. After a minute or so, Joseph walked to T-1 and T-2 who were sitting on the edge of the playhouse talking to each other.

Joseph (still crying): T-2, Kevin won't share the ball
 T-2: Come here. Who had the ball first?
 Joseph: Me.
 T-2: Who did?
 Joseph: Me (pointing to himself).
 T-2: OK, ask Kevin to please come here.
 Joseph ran to the part of the playground where Kevin was sitting on the basket ball.
 Joseph: Kevin, go to T-2, go to T-2.
 Kevin and Joseph walked to where T-1 and T-2 sat.
 T-2: Hey, who had the ball first?
 Both children: Me.
 Kevin: No, I had it.
 Joseph: No, I had it first.
 T-2 (to Joseph): OK, can Kevin play for a couple of minutes and then you can have a turn?
 Kevin: Hey Joseph, Joseph, I kick it to you and you kick it to me.
 T-2: So Joseph, can Kevin have a turn and then you can have a turn?
 Kevin: No, we playing kick.
 T-1: Oh, ya'll can play together?
 Kevin: yeah.
 T-1: OK, don't argue OK. Play nicely.

Similarly, in HQ-3 program, T-1 was aware that some girls in her classroom (including Ella and Anna) were forming a clique and excluding other children from playing with them. Joan walked into the playhouse where Ella and Anna were sweeping with the broom. When Joan entered, Ella and Anna didn't seem to be happy.

Anna: No Joan

Ella (yells): No Joan

Anna: You didn't ask us first

Joan quietly stood in the corner of the house and looked at Ella and Anna. T-1 who was standing near the playhouse, listened to the children's conversation and walked closer.

T-1 (calmly explained): Anna, she can play in this house. She doesn't have to ask. This place is for everyone. Okay?

Joan picked up a broom and the girls continued to sweep. T-2 walked to the other side of the playhouse and remained near the girls watching them.

Overall, redirections were observed more often in low quality programs than in high quality programs. Redirections related to safety occurred more frequently in the low quality programs than in high quality programs.

Providing Custodial Care

Teachers were frequently engaged in providing custodial care for children. These included activities like 'bringing water for the children to drink', 'providing paper towels/tissues for a child to wipe his/her nose', 'assisting children in going to the bathroom', 'helping children who fell down or hurt themselves', 'providing food (like crackers) to children', 'tying a child's shoe lace', 'helping children zip up their coats', etc. Teachers from both high and low quality programs were observed providing custodial care to children in their classroom.

Providing Comments

Teachers made short comments and asked children short questions about their play. These comments did not provide children the opportunity to extend their play. Often, comments made by teachers were *responses to child-initiated interactions*. For example, T-1 (LQ-1) commented on a child's exploration of a bee.

T-1 was walking around the playground when Betty called out to her.
 Betty (not seen in the video): T-1
 T-1: What?
 T-1 walked toward Betty.
 Betty: I see a bee.
 T-1: Leave it alone, leave it alone.
 T-1: What are you doing?
 Betty: It's a bumble bee.
 Ms. J: You know it's a bumble bee?
 Betty: Yes.
 T-1 stands near Betty and looks at her for a few seconds and then walks away to the other side of the anchored equipment.

Another example of a teacher's comment to a child-initiated interaction was observed in a high quality classroom. T-1 (from HQ-1 classroom) stood near the sandbox watching the children play in the sandbox.

Jordan (to T-1): We're making a cake. We're gonna make a cake
 T-1: What kind of cake are you making Jordan?
 Ashley (another child playing in the sandbox): We're making it for our mom because she's having a baby.
 T-1: How many babies?
 Lindsey: Six.
 T-1: Six? Oooo wow!! (She looked surprised and had a big smile on her face).
 Jordan: We're going to have a strawberry shortcake cake.
 T-1 looked around the playground. She then dusted the sand off the boundary/edge of the sandbox and sat down. She did not ask the children anything more about their play.

Some comments on children's play were *initiated by teachers*. An example of a teacher-initiated comment was observed in the HQ-2 classroom when Allan took the broom and was sweeping the leaves on the paved area. T-2 was walking around the playground. Allan, as he was sweeping, went near T-2. She looked at Allan and said "Wooo! Sweeping, sweeping, sweeping"!! She continued walking around the playground and

Allen kept sweeping. In another example from a low quality program, Sara slid down from the pole on the anchored equipment. T-1 (LQ-3) was standing near the classroom door and watching her. Sara started to run slowly, and T-1 walked toward Sara. She touched Sara's head.

T-1: Hi Sara.

Sara looked at T-1.

T-1: What are you doing?

Sara smiled at T-1 and continued to run. T-1 continued to look at the other children on the playground.

Instances of child-initiated and teacher-initiated comments were observed both in the high and low quality classrooms.

Introducing Materials and Play

Teachers introduced activities and/or materials to children often when they observed that a child/ group of children were not engaged in play. Some activities were *spontaneously introduced* by teachers, while other activities were *planned*. An example of a spontaneous introduction was observed in HQ-2 outdoor setting when Harry walked around the playground without engaging in any activity. After a few minutes of walking around, he ran to the garden area. Elizabeth and her friend were playing in the dirt. Harry talked to them for a few seconds and started to walk again. Right then, T-1 came and sat on the steps of the anchored equipment. She called Harry.

T-1: Harry, what are you doing?

Harry: Hmm, just playing. It's hot out here.

T-1: It's hot out here. Do you want to collect some things in the shade?

Harry walked away from her.

T-1: Harry, come here.

Harry went to T-1.

T-1: You can collect some things too, like leaves, rocks, mulch, and there are lot of things you can collect.

Harry: But it makes me feel very very sad when I get hot.

T-1: You can pull your sleeves up on your shirt, if that's what you want to do.

Harry: That's why I like being cold.

T-1 smiles.

T-1: Alright Harry.

Harry walks away from T-1. He stands on the edge of the sandbox and looks around for a few seconds.

Another example of a spontaneously introduced teacher activity was seen in the LQ-1 classroom when Roger and Amanda stood behind the project table and looked around the playground. T-1 who was walking around the playground went to the back to the project area. She saw Roger and Amanda standing there.

T-1 (to Amanda): Alright Amanda (Amanda and Roger started walking toward T-1). You wanna get Roger? Go get Roger. Run Roger!

Roger ran behind the anchored equipment and Amanda chased him. T-1 watched them as they ran. Roger ran back to the project area where T-1 and T-2 were standing. T-1 laughed as she saw Roger and Amanda running. Amanda chased Roger and was able to get him.

T-1: Alright, alright, go get Amanda. Go run Amanda.

Before Amanda could start running, Roger caught her and held her by her hand.

The two children then walked away and engaged in play separately.

Other activities introduced by teachers were *planned* or *teacher-directed*. For example, in the HQ-3 classroom, T-1 brought out the art work done by children inside the classroom, and wanted them to display it in the play house on the playground.

She cut small strips of the sticking tape and stuck them to the edge of the play house window. Initially a few children came to the playhouse and T-1 demonstrated how to attach the tape to the paper and stick it to the playhouse wall. She allowed the children to stick the sheet of paper to any part of the playhouse. After a few minutes, she left the playhouse and walked to another part of the playground. A couple of girls were observed sticking the sheets at the beginning of the activity, but after a few minutes more children went to the playhouse and were all observed sticking their art work and other sheets of plain paper to the walls of the play house. The activity went on for about 15 to 20 minutes until one of the parents brought a turtle and children's attention was drawn to the turtle.

In LQ-1 classroom, T-2 planned an art activity (making maracas) and introduced it during outdoor time. She had the art materials (cups, beads, tape, scissor, etc) on the project table, and groups of 3 or 4 children sat on the bench and were given directions to make their maracas, while the rest of the children were allowed to play as they usually did. As the children finished making their maracas, they were asked to take their maracas and continue playing, while the next group of children got a turn. When most of the children were done making their maracas, T-2 called out to all the children.

T-2: Shake your maraca. Let me hear the noise they make.

The children shook their maracas.

After around 10 minutes when the last group of children was done making their maracas, T-2 called out to the children again.

T-2: Hey guys, let me show you. Four and five year olds, let me show you the best way to hold your maracas.

All the children stopped playing and stood in front of T-2 holding their maracas.

T-2: Hold it like this and shake it. (She held the maraca horizontally and shook it).

That's how you get all the noise.

All the children imitated her and shook their maracas.

T-2: If you hold it like this and shake it (she held it vertically and shook it) how much noise do you hear?

Child 3: Little.

Child 4: None.

T-2 once again, held her maraca horizontally and shook it.

T-2: That's how you make all the noise.

Overall, teachers introduced materials/play to children more frequently in high quality programs compared to low quality programs. While spontaneously planned activities occurred both in high and low quality classrooms, fewer instances of teacher-planned activities were seen in the low quality programs compared to the high quality programs.

Facilitating Children's Play

Teachers were occasionally observed making verbal comments, asking open ended questions and/or engaging in non-verbal behaviors that facilitated children's play and took their play to the next level. Overall, instances of facilitation did not occur as frequently as monitoring children, redirecting children and making comments on their play. When observed in facilitation of play, teachers enhanced different types of play, including children's dramatic play, physical play and movement, and their knowledge about nature. While teachers from high quality programs were observed facilitating children's pretend play and exploring nature/natural elements, these practices were rarely observed in teachers from low quality programs. T-1(HQ-1) was observed *facilitating dramatic play* in which Jacob and Joe were involved. They were selling cars and bikes. T-1 stood near the paved area and looked around the playground.

Jacob: Cars for sale. Bikes for sale.

T-1: Jacob, how much are you selling them for?

Jacob: For people that want some.

T-1 (sat on the bench near the paved area): How much do they cost? How much money?

Joe: Fourteen dollars.

T-1: Ten dollars?

Jacob: Fourteen dollars.

T-1: Oh, 14 dollars?

Joe: 100 dollars.

T-1: Are they all the same price? Some of them are a hundred?
 Joe: Some of them are thirteen, and some of them are for sale so you don't have to pay.
 T-1: Oh, they are not for sale?
 Joe: They are.
 T-1: If they are for sale then you have to pay money. If they're not for sale then you don't have to pay money.
 Joe: They are not for sale.
 T-1: Oh!

None of the teachers from the low quality programs were observed facilitating children's dramatic play. Additionally, T-1 (LQ-1) was the only teacher from the low quality programs who was observed *facilitating learning related to nature*. Roger was walking around the project area. T-1 stood under the shade of the tree and looked at the tree above her. Trisha (another child) stood beside T-1.

T-1: Hey Roger, check out this spider web. Do you see it? (She pointed to the spider web on the tree).
 Trisha: Yes.
 Roger: I can't see it.
 T-1 (smiling): How cool is that? There's one there and there's one there .
 Roger: Awesome.
 T-1 (looking up at the tree): Do you see the spider?
 Roger: I do not.
 All three of them look up at the tree to find the spider.
 T-1: I don't see the spider.
 Trisha: It must have went bye bye.
 T-1: You see any bugs in the spider web that it's getting ready to eat (she made a funny eating sound pretending to eat Trisha)
 Trisha (smiles): No.
 Roger: I see a little dot.
 T-1: You do?
 Roger: Yeah.
 T-1: There's a little fly right there. He got stuck.
 Trisha: Eeewwww.
 Roger (sounding amused): He got stuck. That spider drank his blood.
 T-1 (laughing): He did?

Roger then ran to the anchored equipment. T-1 and Trisha stood there for a few seconds looking at the tree, and then T-1 started to look around the playground.

Similarly, T-3 (a teacher from the next classroom) from HQ-2 program enhanced children's learning about crickets. A group of 6 children sat on the mulch looking at a cricket. T-3 stood near the children and asked them to be careful with the bug.

T-3: Hands off guys, you can look at him but not touch him. Let him walk if he wants to walk, OK... from now on let's leave him alone. You can look at him. Ella you can look at him, OK. Don't touch.

Ella: I wonder what he's going to do.

T-3: He's just crawling around looks like it. He's not jumping because he's probably hurt.

Tanya: May be he is hurt.

T-3: I think he is hurt because crickets usually hop and when they are walking around and he's not hopping. I think there's something really wrong with them. Should we go put him in the garden?

Children: Yeah!

T-3: You know what, I don't want him to get smashed.

She picked up a small bucket to put the cricket in. The children keenly watched her pick up the bug and put him in the bucket.

T-3: I'm going to put him in something. Like I said I don't want him to get smashed. See, look at him.

Amy: Don't let him go in there.

T-3: Yeah, that's OK.

Dennis: If he wants to rest in the garden then that's OK.

T-3: It is ok if he rests in the garden. Let's take him to the garden.

All the children ran to the garden area and the teacher followed them with the bucket in her hand.

Dennis: Put him in this pot (he points out to a pot in the garden).

T-3: OK, I'll put him in there, you leave him alone, OK.

Amy: I want to look at him.

T-3: Oh, he didn't come out yet.

Dennis (points to the ground/dirt): Put him over here.

T-3: I'll put him in a pot. That was a good idea. That way he can go find another home in case he's not feeling so happy.

Carrie: I can't see.

Ella: He's very little.

T-3: OK, back up, give him space. He's probably scared because all his friends are looking at him and all over him.

All the children look into the pot to see the cricket.

T-3: OK, tell him bye bye.

Dennis: OK, bye bye.

Amy (singing): Rock a bye baby...

T-2: And we'll come check later and see how he's doing, OK?

All children dispersed and engaged in other activities.

Teachers in high and low quality programs were observed *facilitating physical play and movement*. For example, T-1 (HQ-1) picked up a ball lying in the corner of the deck.

Adele and Katie who were playing tag ran toward the deck when they saw T-1 with the ball. T-1 asked the children to back up and said that she was going to bounce the ball to them, and they had to bounce it back to her. After a few minutes of engaging in this teacher-initiated activity Adele decided she wanted to play another game.

Adele: Hey, I know what we can play. We do like what we do when you go like (she sat on the deck making the action of rolling the ball on the floor)

T-1: Like you do in a race?

Adele: No, like when you try to knock those pin things down.

T-1: Oh, bowling. Shall we bowl? You know how to bowl?

T-1 went behind the children to give them space to roll the balls on the deck.

T-1: You can pretend like the tree is the pin and you are trying to hit the tree.

(Adele and Katie rolled the ball to hit the tree straight in front of them, and then ran to get the ball back. They laughed while rolling the ball and when they ran to get it back.

T-1 walked away from the deck but stood close by watching them.)

T-1: Knock them down. Good Job!

Similarly, T-2 from LQ-3 classroom was seen facilitating movement among three girls who held the soccer ball in their hand but pretend played with it as if they won a trophy.

T-2 went to them and asked one of them to give her the ball.

T-2: Give me the ball Megan

T-2 took the ball and rolled it on the floor. The three girls immediately ran behind the ball and Megan kicked it.

Megan: I think I'm going to score. I scored!!

Sara (kicks the ball): Me too. We both scored!

Megan: So we're going to get the necklace!

T-2 continued to watch the girls as they played soccer. The children played for another minute and then stopped. They put the ball on the ground close to where they stood and talked to each other. T-2 went close to them, slowly sneaked in and kicked the ball away from them.

Megan (looking at the ball): Hey, let's go faster.

The girls once again ran behind the ball to kick it. This time T-2 ran with the girls. The children and T-2 laughed as they ran behind the ball trying to kick it. Jamie ran faster, kicked the ball and hit the fence with the ball.

Jamie: I scored!

Jamie picked up the ball.

T-2: Don't touch the ball, don't touch the ball Jamie.

Jamie put the ball down, kicked it and they all ran behind it. T-2 stopped running and let the girls continue. The children continued playing soccer for the next 3 to 4 minutes.

Although teachers' facilitation of play was occasionally observed during outdoor play, facilitation of physical play and movement was observed more frequently as compared to facilitation of play of any other type. Additionally, teachers were observed, though rarely, *teaching specific skills* during outdoor play. For example, in HQ-2 classroom, T-1 facilitated Dennis's skill in tying his shoe lace. Dennis had mastered tying the initial knot and the teacher was aware of this. She helped him practice his skills by letting him tie the knot and then demonstrated how to tie the bow. In LQ-3 classroom, T-1 and T-2 introduced jump ropes and taught children how to play the game. They asked the children to stand in a row. They were told that each child would get a turn and they had to stand in the center and jump when the rope was spun.

Mary crossed over and stood in front of the rope.

T-2: Ready Mary? One, two, three, jump.

T-2 said the word “jump” exactly when the rope was ready to touch the ground.

Mary was able to jump right once without touching her legs to the rope.

T1 and T2: Good job Mary!

The activity continued and each child was given two or three turns to jump at one time. T-1 and T-2 would modify their speed depending on how the child was able to jump. They spun the rope slower when a child did not get it right the first time.

Almost all children were able to experience success at least one time, and T-1 and T-2 praised them with statements like: “Go Nick”! and “Good job Lia”! When every child had his/her turn they slowly dispersed into other activities. Few children stood in a row indicating that they wanted to jump again. T-1 asked two children to hold the rope and spin it for the other friends.

Overall, teachers from high quality programs were observed facilitating children’s play (in multiple domains of development) more frequently compared to teachers from low quality programs. Teaching children specific skills occurred very rarely in both types of programs.

Participating in Play

Occasionally, teachers were observed participating in children’s play, where they played with the children and were physically involved in play. Participation in play was categorized into two types. Teachers ‘*actively*’ participated (which includes active social engagement, but may or may not include being physically active with children) in children’s play, where they played with children and also provided facilitative comments and nonverbal gestures to enhance play. An example of active participation occurred in HQ-2 classroom where T-2 was standing with Liz in front of a row of carton boxes placed one behind the other to represent a pretend train. T-2 walked around the boxes looking to see if she could find a spot for herself and Liz on the train.

T-2: We don't have, there's no room on the train.
 Liz: There's one (she pointed out to an empty box).
 T-2: Oh, there's one (they walked to the empty box).
 T-2: You think we can both fit in?
 Liz: umm hmm.
 T-2 put Liz inside the box, and she put one leg inside the box, while the other leg was outside the box.
 Liz: You can put it in here (pointing to the little space inside the box).
 T-2 (smiling): There's no room for my other foot.
 Liz: I'll move.
 By then one child got up from the box and left.
 T-2: Oh oh oh, one just opened up.
 She got out of Liz's box and sat into the box that was empty. She sat on the side wall of the box. Harry sat in the box right in the front (the engine).
 Harry: All aboard.
 T-2: Yea!!! Where are we going Harry?
 T-2 sat facing Liz. She stretched out her hands indicating that she wanted Liz to give her a high five. Liz gave T-2 a high five. They continued to sit inside the box for a few more minutes and talked about a feather they found. Finally, Liz got up and went to play on the bridge.

Another occasion during which the teachers in LQ-3 classroom were actively (socially and physically active) involved in children's play was when they introduced and participated in the game of tug of war with the children. The teachers brought a rope out during play and organized the children into two teams. T1 and T-2 asked the children to choose the team they wanted to be on. One team was T-1's team, and the other was T-2's team. There were 3 children in T-1's team, while the other team consisted of 6 boys and 1 girl. When the teams were organized T-1 gave them instructions on how to play the game.

T-1: Wait, don't pull yet.
 T-1: OK, if you get the yellow tape over this line then T-1's team wins. If we get the yellow tape over our line then our team wins. So you got to pull as hard as you can, OK?
 The children in T-1's team start pulling.

T-1: Wait, Wait.

T-2: Ready, set, pull!

T-2 and the children from her team started to pull, while the children from T-1's team pulled from the other side. T-1 didn't participate in pulling the rope. Rather, she stood close to the deciding line to see which team was winning.

T-2: Pull, pull!

T-1's team pulled the rope harder and won.

T-2: OK, OK, OK you win.

T-1: We win!

Children from T-1's team: Yea!!!! (They start jumping in excitement)

T-1: Go T-1's team!!

T-2: Anybody wants to come to my team?

The children played the tug of war with the teachers one more time. The teachers then asked the children if they wished to play by themselves. T-1 helped them make an even team. The teachers enjoyed watching the children play. They laughed and encouraged the children with statements such as "Pull, pull" and "Go William"! T-1 monitored as the children played, while T-2 occasionally participated by joining children in one group and helped them pull the rope.

On the other hand, some teachers seemed to be more '*passive*' in their participation (passive social and physical engagement) in play. They played with children but did not facilitate play. Rather, they made short comments and seemed to follow the child's lead, participating as the child/children required them to participate. For example, T-2 (from HQ-1 classroom) sat on the edge of the sandbox and a group of boys were making pretend pizza inside the sandbox.

T-2 (to Katie): You want to come over? We're making Pizza

Katie: OK

T-2: What kind of pizza would you like to make? Hey guys listen, Katie is going to come make Pizza with us.

Katie joins them and starts to make pizza. T-2 stays outside and watches them.

T-2 (to the group of boys in the sandbox): We need to use the bucket to put the sand in.

She watched the children play in the sandbox. One child gave her a handful of sand and she pretended to eat it. She sat on the edge of the sandbox for a few more minutes

(without making any verbal comments or asking any questions) and finally stood up and walked away from the sandbox.

In LQ-1 classroom, T-1 was observed playing throw/catch ball with Derrick. He stood at one end of the paved area, while T-1 stood a few feet away from him, facing him.

Derrick threw the ball to T-1, she caught it and threw it back to him. Another child (not seen in the video) standing in the mulch area also threw a ball to T-1. T-1 took turns to throw the ball to Derrick and to the other child. At one point, both the children threw the ball to T-1 at the same time and she was unable to catch both of them.

T-1: I have only two hands. One at a time guys.

They continued throwing and catching the balls. Though T-1 played with the children, she was not very active. She stood in the same place and the children ran to get the ball when it was dropped. The children continued playing throw/catch ball for a few more minutes before the assistant director entered the playground, and T-1 stopped playing and left to speak to her.

Teachers' active and passive participation were observed both in high and low quality classroom. However, overall instances of participation in play were very limited. Figure 5 represents themes from the observation of teachers' practices during outdoor play.

Factors Influencing Teacher's Practices during Outdoor Play

Videotapes of teachers' behaviors during outdoor play indicated that teachers from both high and low quality programs engaged in a wide range of practices presented in the previous section. Teachers' practices during outdoor play seemed to be influenced by factors such as their individual characteristics (e.g., affect, attitudes toward nature, education, etc.), and contextual factors like child characteristics (e.g., challenging behaviors of children), and the resources/materials available to them in their outdoor setting. The following section includes detailed descriptions of these factors.

Teacher Characteristics

Teachers' involvement in children's play was influenced by their affective characteristics and their attitudes toward certain aspects of outdoor play.

Affective Characteristics. Affective traits include characteristics such as positive expressions, physical and emotional responsiveness, tone, being expressive in their communication, etc. Teachers who displayed many of these affective characteristics seemed to interact more often with children, and were more involved in their interactions in children's play as compared to teachers who displayed less affect. For example, T-2 from HQ-2 displayed many affective characteristics. She was expressive in her interactions, often hugged children, spoke to them on their eye level, and was warm and affectionate toward them. T-1 was frequently observed interacting with children, facilitating play and participating in play. For example, T-1 wanted to play soccer with Kevin, Dennis and Ron. However, Kevin decided that Dennis would be the goalie, while he and Ron would kick the ball.

Kevin (to T-1): He's on, because we both have numbers on our T-shirts we get to play. You cheer for me.

T-1: Wait a minute, so I don't get to play soccer. I'm just the cheer person?

Kevin: Yeah.

T-1 stayed there and watched the boys kick the ball.

T-1: Woooo, block that ball, wooo!! (she clapped her hands).

T-1: So, I'm cheering for both you guys?

Kevin: No, you're cheering for me.

T-1: Alright, block that ball Kevin. B-L-O-C-K, block that ball. Wooo!! (she clapped her hands again).

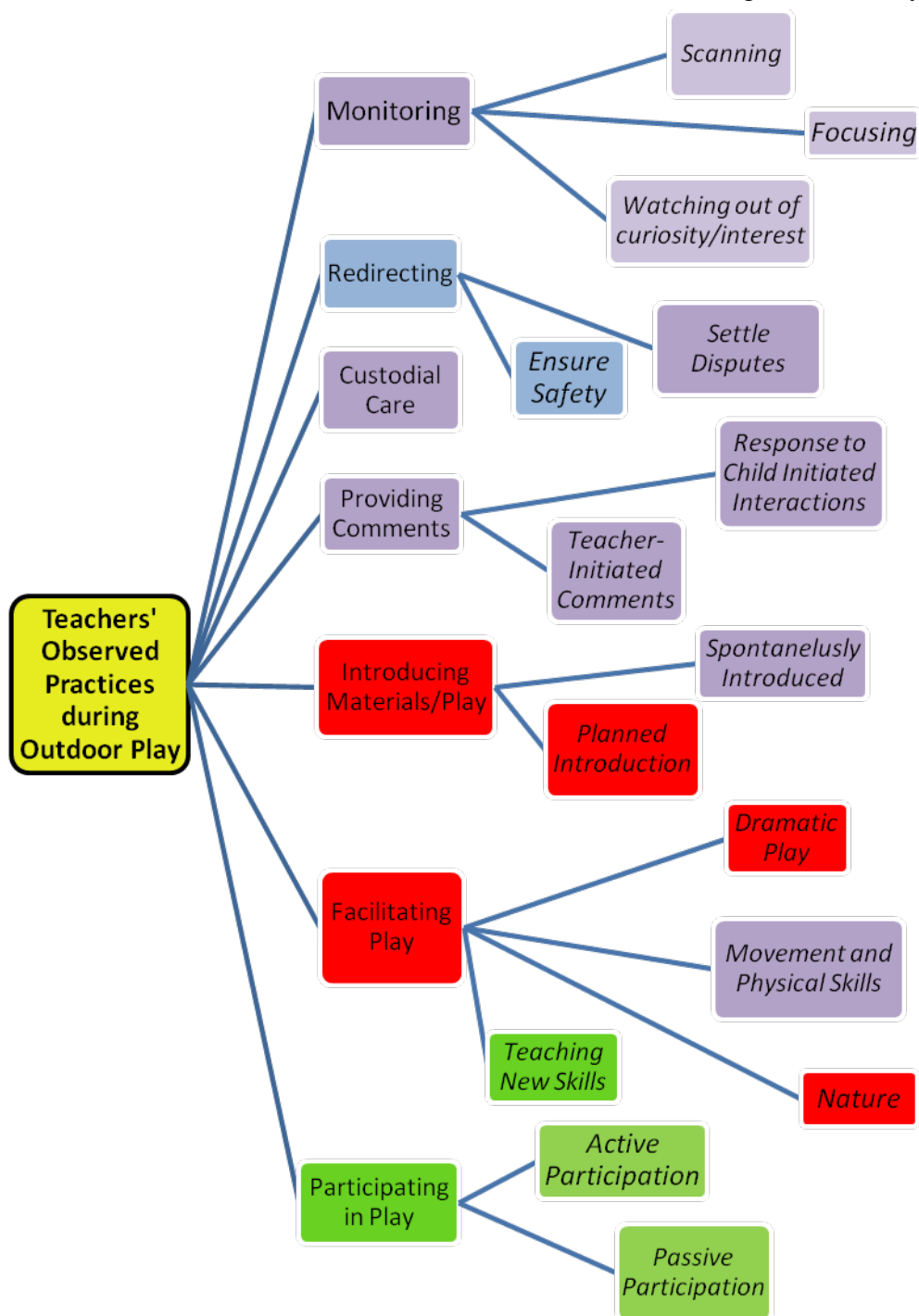
Kevin kicked the ball hard and it went to the other side.

Kevin: It's goal, its goal, its goal.

T-1 (singing, jumping and clapping): It's goal, it's goal, it's goal. Wooo!!

Figure 5

Themes from Qualitative Observation of Teachers' Practices during Outdoor Play



Purple= Occurred in both HQ and LQ classrooms

Red= Predominate in HQ classrooms

Blue= Predominate in LQ classrooms

Green= Rarely occurred in both HQ and LQ classrooms

T-1 continued to cheer for Kevin, and she clapped, danced and jumped when he blocks the ball, or made a goal. Kevin and Ron continued to play soccer for a few more minutes. T-1 was very active and excited. Kevin and Ron ran to the other end of the paved area kicking the ball. T-1 ran with them. Ron picked up the ball with his hands.

Gavin got upset about it.

Kevin (to T-1): He's using his hands.

T-1(puts her arms around his shoulder): Honey, sometimes when you are playing real soccer at school, it's not going to go the way you want it to go. Like I said, not everyone is playing soccer yet like you.

Similarly, in LQ-3 classroom, T-2 showed many of the affective characteristics. Overall, she interacted frequently with children, and was very expressive during her interactions. For example, when she played games like tug of war with the children and jump rope, she was observed smiling, clapping, and praising the children. She also actively participated with the children in their play more often than many teachers in the high and low quality programs.

Teacher Attitudes about Nature. It is challenging to interpret teachers' attitudes purely based on observations of their practices; however, teachers' reactions to certain situations revealed some of their attitudes toward specific aspects of outdoor play. For example, some teachers responded to children playing with dirt and exploring bugs negatively, indicating their attitude toward/preference for children playing with certain natural materials, which may influence children's learning opportunity with natural elements. For example, T-1 in LQ-2 responded to Alexia play with the mulch in a negative way and inappropriately redirected her to engage in something else. Alexia was playing in the corner of the playground in the mulch for a few minutes. She played all by herself, singing to herself, seeming content in her activity. She sat on the mulch picking

up the mulch with her fingers and putting it down. T-1 sat at the entrance of the playhouse and saw Alexia. She called Alexia.

T-1: Alexia, come here

Alexia walked half way through and stopped.

T-1 (with no expressions on her face): What are you doing?

Alexia (very softly): Doing something.

T-1: What are you doing?

Alexia: Playing.

T-1: Come here.

Alexia went closer to T-1.

Ms. T: What are you doing?

Alexia mumbled a few words.

T-1: Huh???

Alexia: Playing.

T-1: You're playing?

Alexia nodded.

T-1: You're playing with the mulch?

Alexia nodded.

T-1: You're all dirty and stuff. Alright, go play.

Alexia started to walk back.

T-1: Go play with Rachelle.

Alexia stopped on her way to the mulch area and went to Rachelle to check if she could play with her on the anchored equipment.

Similarly, in HQ- 1 classroom, T-2 did not prefer that the children explored a worm that they found. A group of three boys stood beside the plant area near the fence. One of them had a worm in his hand.

Sam: Let me just touch it, can I touch it?

Joseph: Can I touch it?

Ronin: It rolled up in my hand.

Joseph: I want to make him roll up. Let me see it. I'm just gonna touch it.

They all looked at the worm. Sam touched it.

Sam: Yeah it is a rolly polly!!

Sam was excited and was laughing.

T-2 walked toward the children.

T-2: What is it?

All the children (unanimously): A roly polly.

T-1 saw the worm in Sam's hand.

T-1: Eeeewww. He did roll up. Why don't you go put him over here so he can go back and dig under the ground again, so we can let him live, OK?

She watched the child putting the worm in the dirt.

Sam: OK, I did it.

T-1: You did? OK. Go play somewhere else now and let the roly polly live, alright. The children run to another part of the playground.

Other teachers who showed a favorable attitude toward nature were able to engage with natural elements and make it a learning experience for children. For example, T-3 in HQ- picked up the cricket with the shovel with ease, made sure the bug was safe, also engaged with the children in their learning about the crickets. Teacher attitudes about various aspects of play can impact their practice. Particular to outdoor play, their attitudes about nature emerged as a prevalent theme.

Teacher Education. Most teachers with high education (working on a bachelor's degree, completed a bachelor's degree and had a master's degree) were observed facilitating children's play more frequently than teachers with low education (working on an associate's degree and completed an associate's degree). For example, T-1 from HQ-2 classroom had a bachelor's degree, and T-2 from HQ-2 completed a master's degree. Overall, high quality interactions were observed in this classroom as compared to any other classroom in the study. Most teachers with high education also seemed to be more attentive to the children during outdoor play. When teachers were attentive they seemed to notice children were not engaged in any kind of play, and were observed introducing play more often. For example, T-1 from HQ-1 classroom seemed to be more attentive

than T-2 (with low education). T-1 introduced play more often and was observed engaging in facilitative behaviors more frequently. Teachers' education can influence their knowledge of appropriate interactions with children, and other cognitively oriented behaviors such as skill in being attentive.

Child Characteristics

Teachers' practices and interactions with children seemed to be influenced by certain intrinsic characteristics of children and how these characteristics were manifested during outdoor play.

Challenging Behaviors. Children's ability to control and manage their emotions seemed to influence teachers' practices. For example, in HQ-1 classroom, Ronin frequently seemed to have challenges managing his emotions and controlling his impulses. He often 'got into trouble' and was frequently observed being redirected by the teachers as compared to other children in the classroom. On one such occasion, when Ronin was playing with the tricycles, T-2 stayed near Ronin, observed him and redirected him constantly after she noticed that he got upset easily, and was having a difficult time sharing the tricycles with other friends. Ronin was pretending to sell cars (tricycles), and therefore collected all the tricycles and trailers from the paved area and arranged them near the project area. Since Ronin was interested in selling tricycles, he expressed frustration when other children who wanted to ride the bike just took the tricycle away from his "store." He was having difficulty sharing the tricycles with others. T-2 initially facilitated pretend play by asking him questions about his cars, but later was observed monitoring and redirecting him as he expressed his anger.

Ronin: Now I have to test out how this bike works.
 T-2: You want to test out how it works?
 Joshua (who was riding another bike) went to the project area and pulled a trailer to attach it to his bike. Ronin did not want him to take the trailer.
 Ronin (protested): I have to test out. I have to test out. Aey.
 Ronin pulled the trailer from Joshua's hand but Joshua did not let go.
 Ronin: I need it.
 T-2 watched this interaction between Ronin and Joshua. She intervened.
 T-2: Joshua.
 Listening to T-2, Joshua left the trailer and went back to his bike. He was upset that he didn't get the trailer. He sat on his bike with his hands folded and mumbled with an unhappy expression.
 Ronin pulled the trailer and attached it to his tricycle.
 Joshua got up from his bike and ran toward T-2.
 Joshua: I'll get on. Let me get on.
 Ronin: No, I have to test it around.
 T-2: He's going to test it. He is going to take it for a test drive.
 Joshua (stood in front of the bike holding the handle): I'm gonna hold it
 T-2: Wait Joshua let him fix it.
 T-2 stood watching Ronin as he fixed the trailer to the tricycle. Even though Joshua held the tricycle handle to keep the tricycle steady, the handle moved and it caused the tricycle to move away from the trailer. Ronin assumed that Joshua moved the tricycle, and was annoyed.
 Ronin (screamed out loud): No Joshuaaaaaa.
 T-2: Ronin, he's trying to help you buddy.
 T-2 moved away and watched as the children attached the trailer to the tricycle.
 Ronin attached the trailer to the bike and sat on the bike to test drive it. Joshua ran to sit on the back seat. Brandon also sat inside the trailer.
 Ronin (loudly): No, test drives don't have any more people. I just need to test it. I'm gonna park it back.
 T-2 (who was watching Ronin and Joshua) walked closer to Ronin.
 T-2: You have three spots there, you can have three friends.
 Ronin started riding the tricycle. He rode it for a few seconds and stopped near the storage area. T-2 continued to stay near Ronin and watched him for some time until most of the children had moved away from the project area and Ronin and another child were the only ones near the bike.

Similarly, in LQ-3 classroom Matt got upset easily when things didn't go his way during play. He often disengaged himself from play or walked away when his friends did not do what he wanted to do, or would tell on other children. T-1 and T-2 were frequently

observed redirecting Matt, asking him to “let go” and “go back and play”. While different child-characteristics could potentially influence teachers’ practices, the qualitative analysis of the videotapes revealed that challenging behaviors of children seemed to impact teachers’ interactions during outdoor play.

Resources/Materials Available in the Outdoor Environment

Teachers’ practices and involvement with children were influenced by the number/amount and variety of materials available to the children in the outdoor environment. Most of these materials were already available to children in the outdoor setting, although some teachers brought out some materials from inside the classroom. In all the high quality programs, teachers’ facilitation and participation in play was *supported* by the availability of a variety of materials for children during outdoor play. For example, the availability of tricycles, sandbox, sand toys, balls, etc. in HQ-1 classroom supported the teachers in facilitating children’s pretend play and physical play. Similarly in HQ-3 classroom, the availability of buckets, paint brushes, water, etc. supported the teacher in organizing an art activity. In the low quality classrooms LQ-1 and LQ-3, when the teachers occasionally brought out materials from inside the classroom, (e.g., a few balls, a few ropes), it supported them in their participation with children in play. LQ-2 classroom only had one ball, a bucket and a shovel in their outdoor setting. No materials were ever brought out from inside the classroom. The teacher in this classroom was least involved and interacted least with the children, as compared to all the teachers in the study.

Furthermore, certain *disruptive practices* that interrupted children's play were observed in the classrooms with very few materials in the outdoor setting. For example, in LQ-2 classroom, the teachers did not bring in the materials that accidentally went out of the fence while children were playing with them. When William and Ken played kick ball, William accidentally kicked the ball outside the fence. When he told T-1 about it, she refused to get it back, and she did not bring it inside for many days. She also did not offer other materials to Ken and William, mostly because they didn't have any materials on their playground. However, she did not bring other materials from inside the class either to substitute for the ones that were gone. On one occasion T-1 went outside the fence to bring a child's hat that accidentally fell outside. All the children gathered at the fence and observed her.

Rachelle: Can I have the milky bottle?

T-1: No, that's dirty Rachelle.

Phil: T-1, can you get that ball?

T-1: No (she starts walking back).

William: T-1, get that yellow magnet.

T-1: What?

William: That yellow magnet.

T-1: I cannot go deep in there (there were many trees and a lot of dirt outside the fence).

T-1 picked up an object/toy which had fallen outside and threw it inside the fence. A few children ran to pick it up.

Pierce pointed to another object fallen on the ground outside the fence and asked T-1 to get it.

T-1: If I get that inside you guys are going to be fighting about it. Then I'm going to put it outside.

All the children: No.

T-1: You guys are going to be fighting about it.

She walks into the gate and closes the door.

The children walk away and engage in the activity they were previously involved in.

Another example of a disruptive practice was seen in LQ-3 classroom where a large group of children were all playing with a rope. A few boys sat at the top of the slide and held one end of the rope, while four girls held the other end of the rope at the bottom of the slide. The children from both ends pulled the rope. They seemed to enjoy this game since they all laughed and seemed excited rather than feeling upset that one of them was not letting go of the rope. The teachers had played tug of war with the children a few days back and the children were probably trying a new variation of the same game. T-2, who was walking around the playground, went near the slide. She saw the boys at the top of the slide pulling the rope.

T-2 (to the boys): Let it go, let it go.

She yelled at the boys: "Let it go."

The boys at the top of the slide immediately left the rope. She took the rope and gave it to the girls. She continued walking around the playground. She had interrupted their play without providing another any other materials for the boys to play with, mostly because they didn't have anything else to offer the children.

Interruptive/disruptive behaviors related to making materials available to children were not observed in the high quality programs and frequently occurred in the low quality classrooms with limited materials outside.

The previous section and the current section focused on teachers' beliefs and self-reported practices of outdoor play and environment, and teachers' observed practices during outdoor play. In the next section, the link between teachers' beliefs, self-reported practices, and their observed practices will be presented.

*Linking Teachers Reported Beliefs, Self-Reported Practices
and Observed Practices*

Teachers' beliefs regarding outdoor play and environments, perceptions of their roles, and self-reported practices during outdoor play from their interview were linked with teachers' practices observed through videotapes. Overall beliefs of teachers in high quality programs matched with most of the overall practices observed in high quality outdoor settings. Similarly, overall beliefs of teachers in low programs matched with most of the observed practices in low quality outdoor settings. Within the high and the low quality programs some teachers' beliefs and their self-reported practices matched their observed practices, while for other teachers they did not match.

Teachers' Reported Beliefs and Observed Practices

Supervising and Redirecting Play. Most teachers from the high and low quality programs reported that supervising children was one of their roles. This belief was supported by their observed practices. Teachers in all classrooms were observed supervising/monitoring children for long periods of time. Related to their practice of supervision, teachers reported the issue of safety as one of the barriers to engaging in their ideal role. In alignment with this belief, teachers in both high and low quality classrooms were observed redirecting children to ensure safety, though this practice was more frequently observed in the low quality outdoor settings. Teachers were also observed redirecting children to help them settle disputes. This practice was also supported, as a teacher noted that her role was to "make sure they (children) are cooperating with one another or encouraging those [behaviors]" (T-1, HQ-1).

Introducing, Facilitating, and Participating in Play. Teachers reported that one of their roles was to help children find something to do when they were having a hard time finding something to engage in. As observed in the videotapes, teachers often attempted to provide different choices or introduced activities and materials to children who were not engaged in any activity. Few teachers considered facilitating children's play to be one of their roles, and only one teacher reported that playing with children was her role. For example, T-1 (HQ-3) specified, "it's important [to] be involved in some activities, you can tell which ones to be involved in, you know, if there's painting you probably need to be involved with that, sometimes sit down and play with them." Teachers were observed providing short comments and asking short questions on children's play; however, they occasionally enhanced and facilitated play. Overall, facilitation of play was observed more frequently in high quality programs compared to low quality programs. Among the facilitation of different types of play, facilitation of movement and physical play was observed in both high and low quality classroom. This practice was supported by most teachers' belief that the outdoor play and outdoor environment was important for development of physical skills.

Teacher Characteristics Influencing Practice

Teachers believed that a number of factors served as barriers to their involvement in their ideal roles. For example, teachers talked about others teachers' attitude of considering the outdoor time as a "free" time as a barrier to performing their role. However, when it came to teachers own behaviors during time outdoor time, this belief did not match their practices. Teachers from all classrooms were observed 'taking a

break', sitting on the bench and talking to each other about issues not related to the classroom or the students. This practice was seen more frequently in two of the three low quality classrooms where teachers talked to each other for extended periods of time, and interacted with children less frequently as compared to teachers in the other classrooms. Teacher attitudes about nature were also recognized as barriers to engaging in their ideal role. As stated by T-2 (from HQ-2 classroom), beliefs like "[outdoors] will make people sick, or this will make their clothes dirty" can prevent teachers from creating learning opportunities for children during outdoor play. These attitudes were observed among a few teachers when they asked children to "leave the bug alone and go play with something else," or when they considered playing in the mulch as dirty.

Teacher Education. Overall beliefs and reported practices of outdoor play matched with their observed practices for most teachers with high education, as compared to teachers with low education. Most teachers with high education reported beliefs of interacting with children during play, and one teacher reported facilitation of play as their role. Teachers with high education were observed interacting and facilitating play more often than teachers with low education. Most teachers with low education reported planning activities, rotating materials and bringing materials outside, but these were not generally observed in practice.

Child- Characteristics Influencing Practice

Some teachers talked about certain characteristics in children as influencing their practice. For example, T-1 from LQ-1 classroom noted, "If there is a specific child that they have to watch more closely, as far as them being more aggressive or more rough

outside. That takes away from that.” Challenging behaviors of children (e.g., their inability to control impulses, inability to manage their emotions) seemed to impact teachers’ practices as observed in the videotapes. Teachers were observed supervising and redirecting children who were more likely to be in “trouble” for behaviors such as difficulty in controlling their anger, often not getting along with other children, challenges with sharing materials, etc. more frequently as compared to other children.

Resources/Materials Available in the Outdoor Setting

Most teachers from low quality programs expressed frustration about the lack of space and availability of materials in the outdoor setting as one of the hurdles to creating an ideal outdoor space for children. Observations of teachers’ practices in high and low quality settings revealed that teachers’ interactions with children in high quality programs were often supported by the availability of variety of materials and resources to children. The few occasions on which teachers from the low quality program brought out material from inside the classroom, they were observed as being involved with children in play, and may have created learning opportunities and pleasurable experiences for children.

Teachers’ Self-Reported Practices and Observed Practices

Teachers reported practices related to planning activities for outdoor play, rotating materials during outdoor play, bringing materials from inside the classroom, and extending indoor projects outside. Teachers’ observed practices were matched with their self-reported practices to see if there was congruence between them. It is important to acknowledge that teachers and children were not videotaped on every single day of the week. Additionally, all classrooms typically went outside twice a day, once in the

morning and once in the afternoon. All the data for the project, however, were collected during the morning session of outdoor play. Therefore, teachers may have conducted the reported activities on days or times when data were not being collected. However, an average of three weeks was spent in each program's outdoor setting, and data was collected on at least a few days every week. Furthermore, after all the children were videotaped, the earliest available date was set for interviewing the teachers, to check if the practices reported by teachers were observed during outdoor play in the previous weeks.

Planning Activities. Most teachers reported conducting planned activities during outdoor play either regularly, or occasionally. These planned activities were observed in some classrooms, however, they were not observed in other classrooms. For example, T-1 from HQ-3 classroom specified some activities that she had planned, "I do usually plan some art activity. We have the outdoor easels that are clear and you can just paint right on there, and we do tons of water play." These activities were observed in her outdoor setting on some days of data collection. On the other hand, teachers from the HQ-1 classroom reported that they took "materials out and art projects" (T-1), and "blocks and dramatic play stuff" (T-2) outside. However, none of these materials were brought out or seen outside on the days when data were collected. Similarly, T-1 from LQ-1 reported "there is an outdoor activity planned usually every day. Just this week we were outside playing volleyball, well a kid's version of volleyball." Planned activities were not observed on every day of data collection in this classroom, rather, they were observed only on one day of data collection in about three weeks when T-2 (a substitute for their

assistant teacher) led an art activity of making maracas. Planned activities were not observed in the other two low quality classrooms either. Teachers from LQ-3 classroom reported doing an activity with kites; however data were not collected on the day they reported conducting the activity. The teacher from LQ-2 classroom reported doing a planned activity with water and sponge “in the Summer.” Though data were collected in the Summer in this classroom, the activity was not observed.

Overall, teachers from high quality classrooms (all except one) reported planning multiple activities and were observed conducting some of these activities during outdoor play. Most of the low quality classrooms reported fewer planned activities for outdoor play, and only one of those activities from one classroom was observed.

Rotating Materials, Taking Materials from Inside the Classroom Outside and Extending Indoor Projects Outside. All teachers stated that they regularly rotated materials for children during outdoor play, and took materials from inside the classroom outside. For example, teachers in the HQ-2 classroom reported that they rotated materials such as beanbags, cones, trikes, scooters, hats, jump ropes, hula hoops from what was available in their storage area outside. They also reported bringing materials like chalk, musical instruments, etc. from inside the classroom. Most of the materials rotated from their storage area, and some of the materials brought from inside the classroom were observed in the outdoor setting on different days of data collection. Similarly, teachers from LQ-2 classroom reported rotating materials like the parachute and jump ropes. They also reported taking some dolls and blocks from inside the classroom. On some days of data collection, the jump rope was observed in the outdoor setting, but the blocks, dolls

and parachutes were not. Teachers from HQ-1 classroom also reported that they rotated art materials, books, and manipulative toys, and they took blocks, animals, seashells, etc. from inside the classroom. None of the reported materials were observed in their outdoor setting on the days of data collection.

Similar to the other reported practices, some of the reported projects extended from inside the classroom were observed in some classrooms on the days of data collection, while some reported projects were not observed. For example, T-2 from HQ-2 classroom talked about extending the “waterfall” project from inside the classroom during outdoor time. This project was observed on multiple days of data collection in this classroom. On the other hand, teachers from HQ-1 classroom reported that they often let children continue playing with the materials they were playing with inside the classroom, if the children showed interest in taking it outside. However, these activities and materials were not observed during outdoor play on the days when data were collected. None of the projects reported by the teachers in the low quality classrooms were observed during outdoor play. For example both teachers from LQ-3 classroom reported that they had made kites inside the classroom, “so they made kites today and probably tomorrow they will get to go outside and fly their kite” (T-2). In LQ-1 classroom, T-1 reported extending indoor projects outside when they went out for walks around the neighborhood and collected items from nature, and did projects inside the classroom with those materials. Since these walks did not take place during outdoor play, these projects were not observed. In LQ-2 classroom, T-1 reported one activity that was brought outside (more so because a part of it required using mud which could be brought inside the

classroom) in the past. This project was also not observed. Overall, self-reported practices and observed practices of teachers matched for most classrooms in the high quality programs as compared to the low quality programs.

Linking Quantitative and Qualitative Results

Teacher Involvement

Quantitative analysis of teachers' involvement levels indicated that when focused on the target child, overall, teachers were moderately involved (i.e., they redirected children, provided short comments, and asked short questions during play) for about half the intervals observed. Overall, teachers in high quality programs were seen interacting with children (which included interactions related to children's play or general conversations with children) more often than teachers in low quality programs. Teachers in high quality programs engaged in moderate involvement more frequently than teachers in low quality classrooms. Specifically, qualitative analysis of teachers' practices revealed that teachers in the low quality programs (when moderately involved) redirected children more frequently as compared to providing comments or asking questions about play. Quantitative analysis of teacher involvement indicated that teachers frequently monitored/supervised play; however, teachers in low quality programs supervised play more often than teachers in high quality programs. As reported by most teachers in the interview, supervising children was one of their roles, and issues of safety emerged as one of the themes. Teachers in both high and low quality programs were observed redirecting children to ensure safety; however, this practice was more often observed in the low quality classrooms as compared to the high quality classrooms.

Results from the quantitative analysis also revealed that overall, teachers were least engaged in high involvement (which included introducing play, facilitating play, and participating in play). This was supported by teachers' beliefs about their role, where very few teachers reported facilitation of play as their role, and only one teacher talked about participating in children's play as her role. Quantitative results also indicated that teachers in high quality classrooms displayed high involvement more often than teachers in low quality program. Qualitative analysis of videotapes supported this finding and revealed that teachers, specifically classrooms 1 and 2 of the low quality programs spent most of their time supervising children and did not interact with them very often. Instead, they were observed talking to other teachers in the outdoor setting very frequently. They interacted with children the least as compared to other teachers in the study. Supporting the results on teacher involvement from the high quality classrooms, teachers from high quality programs reported conducting activities that can be considered as requiring high involvement on the part of the teacher. They reported planning a wide range of activities for children outdoors, while teachers from low quality classrooms had fewer examples of the activities that they had planned for outdoor play. Additionally, teachers from high quality classrooms reported extending multiple projects from inside the classroom outside, while teachers from all the low quality classrooms reported only one or two examples of projects that they had extended from inside the classroom outside.

Teacher Characteristics. Results from the quantitative analysis indicated that teachers with high education engaged in high involvement more often than teachers with low education. Qualitative analysis of the videos supported this and further revealed that

teachers with high education facilitated play more often than teachers with low education, but overall, teachers with high and low education participated in children's play rarely. Furthermore, teachers with high education were more attentive to children, which may have led them to introduce activities to children more often than teachers with low education. Quantitative analysis of teacher characteristics predicting their involvement also revealed that teacher affect scores predicted high teacher involvement (when compared to low involvement). Qualitative analysis of the videotapes further indicated that teachers who displayed high affect seemed to interact more often with children, and were more involved in children's play compared to teachers who displayed less affect.

Child Characteristics. Quantitative analysis of contextual factors predicting teacher involvement revealed that child age and children's physical activity predicted teacher involvement. As child age and child physical activity increased, teachers were less likely to engage in high involvement. Qualitative analysis of the videos further revealed that other child characteristics like 'challenging behaviors' influenced teachers' practices. Teachers who had children with challenging behaviors in their classroom seemed to monitor and redirect these children more frequently as compared to other children.

Location of Play. Quantitative analysis of contextual factors predicting teachers' involvement indicated that teachers were less likely to be moderately involved and less likely to be in high involvement as compared to being low involved (monitoring, supervising) when children played on the anchored equipment. This was further clarified by the qualitative analysis of children's play on the anchored equipment. Teachers mostly

supervised children when they played on the anchored equipment. Teachers' interactions with children on the anchored equipment were limited to redirecting them, such as "be on your bottom" or "you cannot come up the slide, you do down the slide" or making short comments, such as "I like your sparkly red shoes." Very rarely did teachers facilitate play when children were on the anchored equipment, and they were never observed actually playing with children on the anchored equipment.

Teacher Physical Activity

Results from the quantitative as well as qualitative results revealed that teachers mostly engaged in low activity levels, where they either stood or sat in one place for long durations (75% of the time when they focused on the target child). Teachers also walked around the playground occasionally (24%); however, they rarely engaged in activities like running, jumping, etc., that were categorized as high activity levels (0.4%). Overall, activity levels among teachers in high and low quality programs were low, and no significant differences were found among the different activity levels (low, moderate and high) for teachers in high and low quality programs.

Child Physical Activity

Quantitative analysis of physical activity levels revealed that children's physical activity significantly differed by teachers' activity, and physical activity in children was higher when teachers engaged in moderate-high activity compared to when teachers were in low activity. Qualitative analysis of teachers' practices revealed that the few instances in which teachers were highly active, they were observed participating in children's play and simultaneously encouraging children to be active. For example, a teacher from a high

quality classroom who pretended to be a cheerleader in a soccer game, jumped and danced, and simultaneously encouraged the two children playing soccer to “kick the ball” and “block the ball.” Similarly, the teacher from the low quality classroom who participated in the tug of war game encouraged children to pull the rope as hard as they could and praised them as they engaged in the game.

Quantitative analysis of children’s physical activity also revealed that children in low quality classrooms were more active than children in high quality classrooms. Qualitative analysis of videotapes indicated that there were fewer instances of stationary play (where children sat in one place) in the low quality programs as compared to high quality programs. Children in the high quality programs were observed in stationary/non active play in areas like the sandbox, the art/project area, swing, etc. most of which were not present in the low quality programs. The low quality programs mostly had a mulch area and anchored equipment. Most of the low quality programs also had fewer materials/toys like sand toys, trucks, natural elements, art materials, etc. for children to engage with.

Summary of Quantitative and Qualitative Results

Quantitative analysis of the data helped in understanding the relationship mainly between teacher variables (activity and involvement) and child variables (activity and level of play) in high and low quality outdoor settings. Findings related to children’s physical activity levels revealed that children engaged in low levels of activity during outdoor play. The mean physical activity for children, as measured by accelerometers, was higher in low quality outdoor settings as compared to high quality settings (though

the effect size was small); however, instances of moderate-high activity in children occurred more frequently in high quality settings. Mean activity in children was higher when teachers engaged in moderate-high activity as compared to when they were low active, while their mean activity was highest when teachers' involvement was low, i.e., when teachers monitored and supervised their play. When teachers' activity and involvement levels were combined, their activity as compared to their involvement most influenced children's activity levels. Physical activity in children was predicted by teacher activity level, playing in the mulch area, and high activity affording materials.

Results related to child level of play indicated that children's play levels were higher when teachers engaged in higher levels of involvement, and their play levels were higher in high quality outdoor environments. Children's participation in high level play was predicted by their engagement in social conversation, their group arrangement, high involvement by teachers, and playing with balls.

Results on teachers' activity revealed that teachers also engaged in low levels of activity during children's outdoor play. Teachers' physical activity did not differ by outdoor quality or by their education. Results on teacher involvement indicated that teachers with high education engaged in higher levels of involvement, and teachers' involvement was higher in high quality outdoor settings. Teacher education level, child age, child physical activity, child level of play, and play on the anchored equipment predicted teacher involvement.

Qualitative analysis of teachers' interviews revealed that open space, facilitation of physical play, and availability of a variety of opportunities constituted teachers'

description of an ideal outdoor setting for children. Teachers from high and low quality settings differed in their description of an ideal outdoor environment. Funding was unanimously reported as the biggest barrier to creating ideal outdoor spaces for children. Teachers mostly believed that concepts related to nature could be better learned/taught outside. Teachers believed their role was to supervise children, help children find a direction in their play, set up materials, and interact with children. Very few teachers reported facilitation of play, and playing with children as their role. Teacher attitudes and issues of safety emerged as barriers to teachers performing their role during outdoor play. Teachers reported regularly planning outdoor activities for children, rotating materials in the outdoor environment, taking materials from inside the classroom outside, and extending indoor projects outdoors. Teachers' self-reported practices differed by high and low quality classrooms, mostly due to the differences in the materials and resources available. Teachers' self-reported practices were in accordance with their beliefs and observed practices for all but one teacher with high education compared to teachers with low education.

Qualitative analysis of videotapes of teachers' practices during outdoor play indicated that teachers most often monitored or supervised children's play, and redirected children to ensure safety and to settle disputes among children. Teachers provided brief short comments on children's play and introduced play mostly when they observed that children were not engaged in any play. They occasionally facilitated play, and very rarely participated with children in play. Overall, teachers' practices in high and low quality outdoor settings differed. Redirection was more frequently observed in low quality

outdoor environments, while facilitation was observed more often in high quality outdoor environments. Teacher characteristics such as affect, attitudes toward nature and education, challenging behaviors of children, and resources/materials available in the outdoor environment influenced teachers' practices during outdoor play in high and low quality environments.

CHAPTER VI

DISCUSSION

The results of the current study clearly highlight the value of studying outdoor environments for young children and illustrate the complexity of setting up environments which maximize the potential for learning and physical activity for young children. The following discussion will focus on the linkages between the results of the study and previous work in the areas of teacher beliefs and practices, children's activity levels, levels of play, environmental quality, and teacher education. Limitations and final conclusions will be presented at the end.

Teacher Beliefs and Practices

Clark and Peterson (1986; in their model of teachers' beliefs and practices) explain that the process of teaching can be effectively understood when teachers' beliefs and practices are brought under the same light, and examined in relation to each other. The current study explored teachers' beliefs and self-reported practices of outdoor play and the outdoor environment, and examined teachers' observed practices during preschool outdoor play in high and low quality outdoor settings associated with child care centers. Teachers in the current study reported that an ideal outdoor environment for children was one that facilitated their physical development and skills, that outdoor settings were important in enhancing social and emotional development, and that concepts related to nature could be better taught/learned outdoors. These results were

supported by the research by Chakravarthi, Hatfield and Hestenes (2009) that found that teachers associated physical and social development more often than cognitive development to children's outdoor play. 'Science and Nature experiences' was also one of the factors on which items related to teachers' beliefs of outdoor play and environment loaded. Similarly, Davies' (1996) interview with preschool teachers in Australia revealed that 68% of teachers reported the prime function of the outdoor setting was to promote physical development, while 50% referred to development of social skills. Although outdoor play has been associated with children's physical development from its inception, outdoor environments hold the potential to enhance children's development in all domains. Teachers' beliefs of what outdoor environments should afford for young children may limit the opportunities that teachers provide for children outdoors. Many teachers are unable to think of the outdoor environment as an extension of the indoor classroom, eventually limiting experiences for children's learning during outdoor play.

Teachers in the present study believed that their role was to supervise children, help children find a direction in play, and set up materials during outdoor play. These results are also in accordance with previous research by Chakravarthi, Hatfield and Hestenes (2009) and Davies (1997). They found that teachers mainly reported their role during outdoor play as supervising and maintaining safety. Teachers in Davies' study also perceived that their role was to set the stage for play, and direct children when they engaged in inappropriate or unsafe behaviors. In the current study as well as in the previous studies, very few teachers reported facilitating and extending play, or participating with children in play as their role.

Teachers' perceptions of their role translated into their practices with children during outdoor play. Observation of teachers' practices revealed that teachers were present near the target child for only about a third of the total observation time, and when near the target child they engaged in meaningful interactions (introduced play, facilitated play and participated in play) only for about 20% of the time. Davies (1997) found similar results in her observation of preschool teachers. Teachers in her study were in close proximity to the target child only in 28.6% of observations, and when observed near the target child, they did not interact with the children in any way for almost half these instances. In the present study, when focused on the target child, teachers frequently supervised children's play. They were having an argument with another child. They frequently asked short questions or comments, but were only occasionally observed facilitating play, and rarely observed playing with children. Teachers in Davies' study were also observed making comments, conversing with children, managing children's behaviors and reminding them of rules. Teachers were rarely observed playing with children or taking an active teaching role during outdoor play. Similarly, teachers in Chakravarthi, Hatfield and Hestenes' (2008) study reported rarely playing with children or leading group activities for children during outdoor play. The similarities in teachers' beliefs and practices during outdoor play from Davies' study a decade ago and the current study indicates the gravity of the issue. While the field of child development and early childhood education has made great strides in informing teachers about appropriate beliefs and practices with young children, not much has been done with regards to changing teachers' beliefs and practices in relation to children's outdoor play. Limited

perceptions of their role, low levels of teacher-child interactions, and lack meaningful involvement in children's play highlights the idea that teachers frequently miss the opportunity to scaffold and support children's learning in outdoor settings.

*Discrepancy in Teachers' Beliefs, Self-reported Practices
and Observed Practices*

It is commonly believed that teachers' beliefs are related to their practices and interactions with children (Stipek & Byler, 1997). However, the evidence to this link is questionable to date. Studies on teachers' beliefs and practices have consistently found a discrepancy or a small correlation at best, between teachers' self-reported beliefs and actual practices (Bryant, Clifford & Peisner, 1991; Kemple, 1996). In the current study, overall beliefs of teachers in high and low quality programs matched overall practices in these environments; however, within each type of environment there were certain discrepancies in teachers' beliefs and observed practices. Studies reporting discrepancies have noted that mostly teachers report beliefs that may be considered developmentally appropriate, but are found to engage in less appropriate practices (McMullen, 1999). In accordance, the two teachers in the current study who reported facilitation of play as their role were rarely observed facilitating children's play. As compared to teachers from high quality classrooms, most teachers from low quality classrooms were not observed engaging in the activities they reported as having planned nor were they observed extending indoor projects outdoors. Teachers in low quality classrooms did not have a lot of materials to rotate while outdoors and were mostly not observed bringing materials outside from inside the classroom. Teachers from low quality classrooms seemed to be at

a disadvantage for not having the materials that were available to teachers in high quality programs. Additionally, three out of four teachers in the low quality classrooms had lower education as compared to high quality classrooms where four out of five teachers had higher education. Teachers from low quality classrooms expressed frustration over not having an appropriate outdoor environment with diverse features and, a lack of funding, which prevented them from creating ideal outdoor spaces for children. While factors like the strength with which beliefs are held and limited recognition of theoretical or philosophical orientations (Charlesworth et al., 1991) may explain the incongruity between teachers' beliefs and practices, the impact of environmental design, work-related pressures, and limited support (McMullen, 1999) also likely contribute to the inconsistency between teachers' beliefs and practices in the low quality settings.

Child Activity

The current study revealed that overall, children engaged in very low activity levels during outdoor play. Previously, many parents and early childhood educators assumed that preschool children are very active and engage in adequate activity (Benham-Deal, 1993). However, recent studies using direct observations of children's physical activity and accelerometry have revealed that the young children mostly engage in sedentary behaviors while in preschool and center-based programs. For example, Pate, McIver, Dowda, Brown, and Addy (2008) found that children engaged in moderate to vigorous physical activity (MVPA) for only 3.4% of the entire preschool day, excluding nap time. Children are considered to be naturally more active outside than inside (Baranowski, Thompson, DuRant, Baranowski, & Puhl, 1993; Mckenzie, Sallis, Nader,

Broyles, & Nelson, 1992), and a recent study by Brown et al. (2009) confirmed that children were observed in many more intervals of nonsedentary physical activity during outdoor activity contexts than inside contexts (such as large group play, manipulatives, snack time, etc.). However, current findings on children's low activity levels during outdoor play are supported by past and recent investigations that have found similar results (Sallis, Patterson, McKenzie, & Nader, 1988). Brown et al. (2009) found that even during outdoor play, children's activities were primarily sedentary (i.e., 56% sedentary vs. 27% light vs. 17% MVPA). The NASPE (2002) guidelines specify that preschool children should accumulate at least 60 minutes daily of structured physical activity, and engage in at least 60 minutes and up to several hours of daily, unstructured physical activity. Many preschool aged children today are clearly not meeting these requirements (Pate, Pfeiffer, Trost, Zeigler, & Dowda, 2004).

Studies that express concern over children's physical activity levels in preschool and child care settings recommend involvement by early childhood educators to facilitate activity in children (Bower et al., 2008; Cashmore & Jones, 2008). Some recent, though limited, studies have revealed that teacher involvement in children's play has potential benefits for their activity levels. For example, Brown et al. (2009) found that although teacher-arranged physical activities were observed for only 2.6% of the total observations, it resulted in 16% of the intervals coded as MVPA. When teachers introduced new movement and activity based games (race, treasure hunt, etc.) and were physically responsive, children engaged in higher levels of physical activity (Chakravarthi, Schilling, Hestenes & McOmber, 2007). Similarly, when trained teachers implemented a structured

outdoor based developmentally appropriate physical activity program for preschoolers, children were more active during the structured activity program compared to when they were in free play outside (Schilling & McOmber, 2006). However, teacher attitudes about children's physical activity can influence their involvement in planning and implementing structured physical activity programs. For example, Temple and O'Conner (2003) explored attitudes of child care providers toward physical activity in child care centers in Australia. They found that among other factors, the amount of outdoor space, availability of equipment for physical activity, and the confidence and skills of staff to implement structured activities to support children's activity influenced the child care center's capacity to provide physical activity opportunities for young children. Similarly, Cashmore and Jones (2008) held focus group interviews with child care teachers in Australia to explore their attitudes about providing physical activity opportunities to children in child care centers. They found that teachers preferred child-directed physical activity play/free play over structured forms of physical activity, and felt that children may not be interested, and therefore less likely to participate in structured physical activity sessions.

The current study expands on the existing literature on teacher involvement by providing information about teachers' activity levels during outdoor play. Results from the current study revealed that mean activity levels in children were higher when teachers were moderate-high in their activity compared to when they were low in activity (i.e., they stood in one place). However, teachers were low in activity for almost 75% of the entire period during outdoor play, and were only occasionally observed facilitating

children's activity and movement (although facilitation of physical play was observed more frequently as compared to facilitating play of any other type). Furthermore, teachers were rarely observed introducing or participating in structured activities with the intention of increasing children's physical activity. Interestingly, when teachers engaged in higher levels of involvement, children's physical activity was lower. This highlights the complex relationship between teacher involvement and teacher activity in relation to enhancing children's activity levels. Since higher levels of teacher activity as compared to their involvement during outdoor time contributed to children's activity levels, teachers may need to go beyond what they usually practice and engage in higher activity levels to help children be active. In Cashmore and Jones's (2008) study, participants noted that providing children information and advice about how to implement a movement skill, supporting children in a sport or a game proposed by the children, and increasing the difficulty of an existing game or activity could be ways in which child care teachers could support physical play. Some participants also suggested that offering some structured physical activity sessions can be valuable in providing children with the skills and the knowledge to enhance their free play. To ensure that daily physical activity recommendations for preschoolers are met, experts propose incorporating planned physical activity into the daily preschool schedule (Dowda, Pate, Stewart, Almeida & Sirard, 2004). Structured physical activity sessions should be short, about fifteen to twenty minutes, should include a wide variety of different movements (NASPE, 2000), and should be developmentally appropriate. The guidelines also specify that during the preschool years, children should be encouraged to practice movement skills in a variety

of activities and settings. To facilitate movement and activity in children, teachers may need to plan structured activities that are developmentally appropriate and based on children's interests for a part of the outdoor time, introduce active play, encourage and motivate children to be active, and model an active lifestyle by actively participating with children in play.

Child Level of Play

The current study revealed that children engaged in higher levels of play when teachers were involved in highest level of involvement (introducing play, facilitating play and participating in play). Although, research exploring the influence of teacher involvement on the different levels of cognitive play outside is limited, the well-documented benefits of teacher-child interactions in early childhood classrooms can be used to support this finding. However, teachers frequently stayed back and supervised children, redirected children, or asked short questions/provided short comments, and occasionally engaged in high involvement. Literature on the appropriate amount of teacher intervention and direction during children's play is still not conclusive; however, the recent NAEYC guidelines for developmentally appropriate practices (Copple & Bredekamp, 2009) recommends that teachers maintain an optimal balance between adult-guided and child-guided experiences. The key to meaningful interaction and involvement in children's play is to be attentive to children's interests and needs, and introduce and facilitate activities accordingly.

Outdoor Environment

The quality of the outdoor environment influenced children's play and teachers' practices. Children engaged in higher levels of play in high quality outdoor settings. The diverse settings and loose parts available to children in high quality programs seemed to support higher levels of play. Nicholson (1971) explains that when children have a variety of environmental variables made available to them during play, their inventiveness and creativity is enhanced. Hyung-Jeong's (1998) study also revealed that preschool children preferred loose parts (tricycles, balls, scoops, etc.) to permanently fixed equipment. It was unfortunate that all the low quality classrooms in the current study had minimal number of loose parts (one ball, one rope, few hoops, etc.) and only one low quality classroom had tricycles. This disparity highlights the differences in children's experiences in high and low quality outdoor environments. Teachers in high quality classrooms also engaged in higher levels of involvement. Qualitative analysis of teachers' practices revealed that when teachers facilitated play and participated in play, it was almost always supported by materials/loose parts, even in low quality classrooms. Teachers from low quality classrooms also expressed frustration over the lack of available resources and materials that pose barriers to creating ideal outdoor environments, and were occasionally observed in disruptive practices related to scarcity of materials available for play.

Children's activity levels also differed by outdoor quality; however, children in low quality outdoor settings were more active than children in high quality settings. Examination of the high and low quality outdoor environments indicated that low quality

outdoor settings had very few areas that afforded stationary play (such as sandbox, a garden, etc.), or loose parts (sand toys, trucks, blocks, etc.) with which they could engage in non-active play. Though children in low quality settings engaged in slightly higher activity levels, they did not engage in higher levels of cognitive play. This also sheds light on the issue that even though children's cognitive play was supported by high quality settings, facilitation of physical activity probably requires additional components that some high quality programs may have lacked. For example, Bower et al. (2008) found that portable play equipment (equipment that can be transported to different locations, and loose parts such as balls, tricycles, hula hoops, etc.) and anchored play equipment predicted physical activity in preschoolers. In the current study too, high activity affording materials predicted physical activity in children. Although the high quality programs had many loose parts, the effectiveness of these materials may have been reduced either because all these materials were brought out each day (without being rotated), in which case children probably became bored playing with the same materials, or the materials that were rotated were not specifically targeted toward physically active play. Further attention needs to be given to identify environmental components that enhance and facilitate physically active play in high and low quality outdoor settings.

Education Level

Lastly, qualitative analysis of teachers' practices indicated that for most teachers with higher education, as compared to teachers with lower education, self-reported practices matched with observed practices. Quantitative analysis of teachers' practices revealed that teachers with higher education engaged in higher levels of involvement.

Teachers with higher education were observed facilitating children's play more often than teachers' with lower education. This reveals that teacher education may be an important contributor to teachers' interactions and involvement with children. Though most teachers do not receive specific training in maximizing the potential of their outdoor environment or appropriate interactions with children during outdoor play, teachers with high education are probably better able to apply what they have learned in their early childhood classes to multiple contexts, whether inside or outside. However, to help teachers understand the value of outdoor play and the outdoor environment, teachers need to know how to set up the outdoor space and facilitate children's play to maximize learning opportunities. Teachers' beliefs about structured and unstructured outdoor play, planning activities for outside, and participating in children's play, need to be challenged using appropriate educational tools/techniques that could eventually improve their practice.

Moving Forward

This study has implications for what the nation is currently witnessing in terms of outdoor play and outdoor experiences for children, as well as the steady shift in understanding and recognizing the value of nature in enriching the lives of young children. Until recently, the role of outdoor play and the outdoor environment in the lives of young children was viewed as secondary to the learning that takes place inside the classroom. It is clear from previous research that outdoor environments play an important role in the lives of young children. The notion that children today spend less time outdoors as compared to children in the past generations highlights the need to both

promote outdoor experiences and to study the outdoor environments that children are experiencing. Bronfenbrenner's Bioecological system's theory (1998) supports the idea that practices prevalent at both the macrosystem level as well as the microsystem level affect individuals' opportunities and experiences outdoors. Macrosystemic issues such as the No Child Left Behind legislation, increasing fears of spending time outdoors, the popularity of video games and computers, etc., have aggravated the situation and increased the gap between children and nature, depriving them of the advantages and the opportunities that natural environments bring along with them. However, recent studies have established the link between the outdoor environment and its beneficial impact on children's health such as preventing childhood obesity (e.g., Dowda, Pate, Stewart, Almeida, & Sirard, 2004). In fact, outdoor play environments for children may be going through a paradigmatic shift at the macrosystem as well as the microsystem level.

Nationwide efforts to bring nature back into children's lives, and significant contributions from professionals in interdisciplinary fields have led to the recent No Child Left Inside Act, passed in 2008. This act supports local and statewide efforts to expand and improve environmental education for K-12 public schools. The legislation also supports states in developing a scientifically sound curriculum, training teachers, and ensuring that students are environmentally literate upon high school graduation (Children and Nature Network, 2008). Other national initiatives such as the Children and Nature Network, 'Take a child outside' week, and statewide collaboratives such as the Outdoor Learning Alliance initiated by the North Carolina Office of School Readiness and the North Carolina

Partnership for Children, are also advocating to reconnect children with nature, and making high quality outdoor environments accessible to all children.

At the microsystemic levels, playgrounds and outdoor recreational areas for children are undergoing changes. Contemporary playgrounds with manufactured equipment, primarily designed to meet the health and safety standards, are now being reevaluated. These playgrounds have robbed children of the creativity and challenge that was once an inherent part of outdoor play experiences. To deal with this trend, naturalization of playgrounds is suggested as an effective strategy. Naturalization refers to the integration of natural elements with playground equipment, to stimulate, motivate and encourage children's play, and to increase the attraction of playgrounds for children and caregivers. Naturalized playgrounds add diversity to children's play in multiple areas of development (dramatic, physical play, constructive play, etc.), and also enhance the aesthetic appeal of outdoor spaces (Moore et al., 2009). These steady but significant changes taking place at the societal as well as the local community level are efforts that focus on the overall development of children, and consequently on building a healthier nation. The legislative and policy initiatives along with grassroots movements stemming from community interest and involvement provide hope for beneficial changes in the future.

Limitations of the Study

Each of the results presented and discussed in this research project must be framed within the confines and limitations of this study. Child and teacher data were collected from a small number of child care centers for the current study. Only 6 centers

were recruited, and since these centers were further divided by high and low quality outdoor environments, only 3 centers were included in each type of outdoor quality. Furthermore, the number of children (58) and teachers (9) in the overall study also constitutes a small sample size. Issues of sample size limited the types of statistical analyses that could be used, and also affected the power in the analyses. The small sample size also restricted the diversity in the sample. While each classroom did have children from different racial/ethnic backgrounds, most children in the high quality classrooms were European Americans. Fewer classrooms also restricted the range in the education levels of teachers. Most teachers (4 out of 5) in the high quality classrooms had were categorized as having high education, while 3 out of 4 teachers in the low quality classrooms were categorized as having low education. Future studies need to collect information on children's outdoor play and teachers' practices with a larger and more diverse sample.

The biggest limitation of this study comes from the way in which the data were collected and coded. Since the data for this study were obtained from the Preschool Outdoor Project II, a study developed to understand preschool children's outdoor play, the child was the focus of the study, not the teacher. This means that the videotapes were centered around a target child on each day of data collection. Whenever teachers were captured in the video, their behaviors were coded. The quantitative coding scheme was developed to code teachers' involvement only when they focused on the target child (or the group including the target child). Teachers did not appear in the video for long periods in certain classrooms, and therefore their detailed/minute-to-minute practices

during outdoor play could not be captured. The qualitative analysis of the videotapes took care of a part of this limitation by analyzing teachers' practices as long as they were in the video (regardless on whom they focused on). Multiple videos of the same teacher were qualitatively analyzed to understand each teacher's behaviors on different days, and their interactions with multiple children, in an attempt to get a complete picture of their practices. Future studies on teachers' practices should be designed with the aim of capturing teachers' behaviors during the entire duration of the outdoor play.

Finally, the data on children and teachers were not collected on every single day during the period of data collection. Due to scheduling conflicts, challenges with the weather, and target children's absences, data could not be collected on every single day. This means that one cannot make claims about whether or not teachers actually implemented the activities/practices they reported in their interviews. However, efforts were made to collect data on at least a few days in every week until all the data were gathered. Teachers were also interviewed within a few days of the completion of data collection in the outdoor environment to check if the practices reported by teachers were observed during outdoor play in the previous weeks.

Conclusions

Bronfenbrenner's Bioecological systems theory (1998) can be used to frame the different factors that influence children's outdoor play experiences, and Vygotsky's Sociocultural theory frames the significance of teacher child interactions during outdoor play. According to Bronfenbrenner's theory, at the level of the microsystem (the outdoor environment), the quality of the setting, the materials and resources available in the

setting, and interactions with the teachers in the outdoor setting can influence the child's outdoor play. Within the microsystem, child characteristics (e.g., child age, challenging behaviors exhibited by children, etc.) as well as teacher characteristics (e.g., teacher affect, teacher education) can influence children's play experiences. As discussed by Vygotsky, teachers can play an important role in scaffolding children's learning during outdoor play, and maximize the opportunities available to children outside. The limited opportunities between teachers and children during outdoor time suggest that many opportunities for scaffolding learning were missed in these settings. At the level of the exosystem, the funds allotted by the child care centers for resources/materials to be made available in the outdoor area, to improve the conditions of the outdoor space, etc. impacts children's play as well as teachers' ability to support interactions with children. Finally at the macrosystem level, nationwide and statewide initiatives to connect children with nature, to revive outdoor spaces for children, to educate teachers to support children's learning outdoors, etc. can prove beneficial to children of all ages. The relationships between the different levels of the environments reflect a complex interaction, consequently affecting children's opportunities during outdoor play. For example, centers with adequate funds can spend money on improving the quality of their outdoor spaces, attract teachers with higher education, provide resources for continual training and education through professional development opportunities and consequently, are able to provide a high quality environment and high quality teacher-child interactions that afford learning in all areas of development. Attention to each level of the system will bring systemic change and ultimately benefits for children both now and in the future.

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Appendix A

Tables

Table 1

Racial and BMI Distribution in High and Low Quality Outdoor Environments

	High Quality Environment	Low Quality Environment
Race		
Child (n=58)		
European American	86.2%	69%
African American	3.4%	24.1%
Hispanic	3.4%	3.4%
Mixed	3.4%	3.4%
Other	3.4%	0%
Teacher (n=9)		
European American	80%	50%
African American	20%	50%
Child BMI (n=58)		
Underweight (BMI less than 14)	13.8%	0%
Healthy (BMI 14 to 16.8)	75.9%	65.5%
Overweight (BMI 16.8 to 18)	6.9%	12.8%
Obese (BMI 18 and above)	3.4%	20.7%

Table 2

Types of Areas Available in High and Low Quality Outdoor Settings

	Grass/ Natural Area	Mulch Area	Anchored Equipment	Paved Area	Sandbox	Waterplay Area	Enclosed Settings*
HQ- 1	√	√	√	√	√	√	√
HQ-2	√	√	√	√	√	√	
HQ-3	√	√	√	√	√	√	√
LQ-1		√	√	√			
LQ-2		√	√				
LQ-3	√	√	√				

HQ= High quality outdoor setting

LQ= Low quality outdoor setting

*Enclosed Setting: e.g., play house, dramatic play enclosure, etc.

Table 3

Frequently used Locations and Play Materials in High and Low Quality Outdoors

	High Quality Outdoors (Percentage)	Low Quality Outdoors (Percentage)
Locations		
Anchored equipment	10.5	14
Mulch area	9	53.2
Natural area	32	9.8
Paved area	24.3	15.2
Sitting area	2.6	2.1
Play House	3.5	1.9
Play Materials		
Natural Elements	7.9	6.5
Ball	5.9	6.1
Tricycle	8.9	5.1
Hula hoops	0.4	5

Table 4

Playground Behaviors of Children in High and Low Quality Outdoor Settings

Children (n=58)	High Quality Outdoors (Percentage)	Low Quality Outdoors (Percentage)	t Value
Child Physical Activity			
Sedentary	39.9	31.1**	8.77
Light	45.2	54.1**	-8.42
Low-Moderate	12.5	14.5*	-2.88
Moderate-High	2.4	0.3**	8.75
Child Play Behaviors			
Unoccupied and Onlooking	14.6	20.7**	-7.58
Functional	26.6	22.6**	4.41
Constructive/Exploratory	5.7	2.7**	4.18
Dramatic	22.6	19.0**	7.01
Child and Teacher Initiated Games	6.5	12.8**	-8.76
Group Arrangement			
Target Child Alone	33	38.9**	-5.88
One Peer	27.4	31.2**	-3.88
Small Group	32.4	23.4**	9.53
Medium to Large Group	7.2	6.5	

*p<.01

**p<.001

Table 5

Teacher Practices in High and Low Quality Outdoor Settings

Teachers (n=9)	High Quality Outdoors (Percentage)	Low Quality Outdoors (Percentage)
Present near Target Child	32	22.4**
Focus on Target Child	20.2	14**
Involvement Level		
Low	23.2	36.3**
Moderate	48.7	40.8*
High	21.1	13.1**
Custodial Care	7	9.8
Physical Activity		
Low	73.6	78.8
Moderate	26.2	20.5
High	0.2	0.7

*p<.01

**p<.001

Table 6

Descriptive Information on Preschool Outdoor Play Based on Teacher Focus

	Focused on Target Child	Not Focused on Target Child	<i>t</i> Value
Physical Activity (mean)	2.97	2.94	
Play Behavior			
Minimal level	6.2%	20% **	18.02
Functional play	22.9%	24.9%	
Constructive/exploratory	7%	3.6% **	-4.94
Dramatic	6.9%	23.7% **	20.62
Child-initiated game	6.9%	5.2% *	-2.5
Social Conversation	81%	53% **	24.30
Group Arrangement			
Target child alone	35.3%	36.1%	
One peer	23.9%	30.4% **	5.35
Small Group	29%	27.7%	
Medium to large group	11.7%	5.9% **	-6.79

* $p < .01$ *** $p < .001$

Table 7

Regression Results for Contextual Variables Predicting Child Physical Activity (N=406)

Variable	B	SE B	β
Group Arrangement	.003	.008	.02
Teacher Involvement	-.01	.01	-.04
Teacher activity	.08	.02	.21*
Anchored Equipment	.14	.09	.07
Mulch Area	.11	.03	.29*
Natural Area	.05	.03	.09
Paved Area	.02	.02	.05
High Activity Affording Play Materials	.10	.02	.29*

*p<.001

Table 8

Multinomial Regression Predicting Children's Level of Play (N=881)

Predictor	β	Wald χ^2	Odds ratio
High Level Play			
Social conversation	.692	6.542	1.99
Group Arrangement			
Medium to large group	3.26	61.42	25.92**
Small group	1.03	9.24	2.80*
One peer	1.09	9.84	2.97*
Target child alone (ref. group)			
Teacher Involvement			
High involvement	.809	9.267	2.246*
Moderate involvement	-.496	4.883	.609
Low involvement (ref. group)			
Location			
Anchored Equipment	.49	1.944	1.63
Mulch area	2.01	48.135	7.436**
Natural area	1.85	32.01	6.354**
Paved area	.627	3.78	1.87
Play Materials			
Natural play material	-4.97	37.82	.01**

Predictor	β	Wald χ^2	Odds ratio
Tricycle	.70	2.67	2.02
Ball	1.15	17.20	3.15**
Minimal Level Play			
Social conversation	-4.50	34.605	.011**
Group Arrangement			
Medium to large group	-1.35	4.19	.26
Small group	-1.12	7.21	.33*
One peer	-2.188	15.98	.11**
Target child alone (ref. group)			
Teacher Involvement			
High involvement	-5.29	.663	.589
Moderate involvement	.09	.064	1.10
Low involvement (ref. group)			
Location			
Anchored Equipment	-1.08	2.77	.34
Mulch area	.49	.89	1.63
Natural area	-.38	.28	.68
Paved area	.34	.43	1.40
Play Materials			
Natural play material	-21.229		

Predictor	β	Wald χ^2	Odds ratio
Tricycle	-20.906		
Ball	-3.192	8.80	.04*

Reference category: Moderate level play

*p < .01

** p < .001

Table 9

Multinomial Regression: Individual Factors Predicting Teacher Involvement (N=876)

Predictor	β	Wald χ^2	Odds ratio
Moderate Involvement			
Affect	-.04	5.132	.96
Teacher Physical Activity			
Moderate to High Activity	.30	2.26	1.35
Low Activity (ref. group)			
Teacher Education			
High Education	.826	24.10	2.284*
Low Education (ref. group)			
High Involvement			
Affect	.12	13.31	1.132*
Teacher Physical Activity			
Moderate to High Activity	.563	5.83	1.75
Low Activity (ref. group)			
Teacher Education			
High Education	.97	18.50	2.65*
Low Education (ref. group)			
Reference category: Low involvement			

* $p < .001$

Table 10

Multinomial Regression: Contextual Factors Predicting Teacher Involvement (N=881)

Predictor	β	Wald χ^2	Odds ratio
High Involvement			
Age	-.13	34.610	.88**
BMI	-.14	5.65	.87
Child Physical Activity	-1.90	13.74	.15**
Gender	.237	1.07	1.27
Play level			
High level	1.78	8.90	5.90*
Moderate level	1.06	3.34	2.89
Low level (ref. group)			
Social conversation	1.42	20.89	4.12**
Group arrangement			
Moderate to large group	-.10	.07	.91
Small group	-.40	1.34	.67
One peer	-.616	2.91	.54
Target child alone (ref. group)			
Location			
Anchored equipment	-1.14	6.87	.32*
Mulch area	.32	1.36	1.37

Predictor	β	Wald χ^2	Odds ratio
Paved area	.476	2.75	1.61
Moderate Involvement			
Age	-.03	1.89	.97
BMI	-.06	1.87	.94
Child Physical Activity	-.08	.05	.92
Gender	.13	.50	1.14
Play level			
High level	-.33	.79	.72
Moderate level	.25	.58	1.29
Low level (ref. group)			
Social conversation	1.322	30.87	3.75**
Group arrangement			
Moderate to large group	.02	.002	1.01
Small group	-.30	1.26	.74
One peer	-.44	2.44	.64
Target child alone (ref. group)			
Location			
Anchored equipment	-.75	7.31	.47*
Mulch area	-.14	.39	.87
Paved area	.12	.25	1.13

Reference category: Low involvement level

* $p < .01$, ** $p < .001$

Appendix B

Preschool Outdoor Project Categories of Child and Teacher Engagement

I	Category Child Involvement	Definition of Category
1	Not Involved	Child is not engaged in an activity or with another peer/adult.
2	Solitary	Child is engaged in an activity by himself or herself; no conversation; or in transition.
3	Parallel	2 or more children in the same group are engaged in the same, similar or different activity in close proximity to peer(s), no attempt to play with others; playing independently (e.g., cutting and pasting near peers who are also cutting and pasting, building a road near peers playing trucks, swinging next to others on the swing set).
4	Target Child + One Teacher	Teacher and target child interacting with each other verbally or nonverbally.
5	Interactive	2 or more children interacting verbally or nonverbally with others (e.g., talking, hugging, arguing, laughing, playing formal games, sports, building together, dramatic play). Target child actively listening.
II	Child Behavior (Code Highest Level in Hierarchy for 1-6)	
1	Unoccupied	Child appears to be doing nothing (e.g., staring off into space, wandering aimlessly).
2	On looking	Child is in close proximity to peers, and watching others' activity (e.g., observing, but not joining, peers). Always solitary if onlooking
3	Functional/Physical Activity	When player engages in repetitive or active physical movement with or without an object (e.g., scooping and dumping).

4	Constructive/ Exploratory	When player creates or constructs something else; a means to an end; Exploration (watching bug, clouds, shadow); Hypothesizing
5	Dramatic	When the player performs fantasy actions and/or vocalizes fantasy.
6	Child Initiated Game	When the player(s) engages in activity with clear purpose and parameters; child-directed; child sets rules
7	Transition	Child is intentionally moving from one activity or place to another (not wandering). Includes setting up equipment for study.
8	Teacher Initiated Game	
9	Direct Conversation	Child engages in conversation with other peers or teachers. Not involved in any specific play.
10	Other	Child is engaged in interactive or non-interactive behaviors that are not defined by the above categories (e.g., routine caregiving without verbal or non-verbal expansion, custodial care by child(ren) or adult.)
		<i>MODIFIERS for Child Behavior</i>
1	Social Conversation yes/no	Children engage in conversation. TC is either speaking or actively listening. <u>Note: If only SC, don't code any other child behavior. If TC is clearly ignoring speaker, then code "no" for SC. Don't code if child is talking to self.</u>
2	Negative Behavior yes/no	Child is engaged in unorganized antagonistic activity with others (e.g., taking a toy or object, fights or mock-fights, pushing, shoving). Child is engaged in hostile talk or communication with others (e.g., insults, threats, contentious remarks).
		Note: If Unoccupied then code Not Involved and TC If On looking then code Solitary and TC
III	Group Arrangement	Must be connected by activity/conversation. Could be in parallel play or interactive

1	Target Child Alone	Child is alone
2	One Peer	Target Child + One Peer (children only)
3	Small Group	3-4 Children (children only)
4	Medium Group	5-7 Children (children only)
5	medium/large Group	8-10 (children only)
6	Large Group	10 or more children
<i>MODIFIERS for Group Arrangement</i>		
1	Teacher/Adult Presence	Circle yes or no if teacher/adult present. Teacher/Adult must be within vicinity of the target child or the group that includes the target child
2	Group Composition	
	All Males	All males in the group of children
	All Females	All females in the group of children
	Majority Males	Majority males in the group of children
	Majority Females	Majority females in the group of children
	Even	Equal number of girls and boys in the group of children
IV	Adult Behavior	
1	Focused on Target Child	Yes: If teacher is interacting with Target Child or observing group that includes child. No: Teacher is interacting with another child. If no, no other code is necessary.
2	Not focused on target Child	

		MODIFIERS for Focused on Target Child
a	Level of Involvement (Code Highest in Hierarchy for 1-3)	
1	Low involvement	Adult is in close proximity to students and watches/monitors/supervises the activity (e.g., onlooking or observing, but not joining, children at play)
2	Moderate involvement	Adult uses neutral relatively short statement or questions about the child's activity without providing comments to elaborate or extend the play. Adult engages in managing/redirecting children's play (e.g., stop running, don't do that).
3	High Involvement	Adult encourages and enhances child's behavior through verbal or non-verbal responses. Adult elaborates (informs and/or expands) on the child's play and/or adult actively participate in children's play. Adult introduced new activity to the child.
4	Custodial Care	Adult is providing custodial care to child or children (e.g., tying shoe, wiping nose, etc.).
5	Other/Can't Tell	Adult is engaged in interactive or non-interactive behaviors that are not defined by the above categories; may be physically close.
b	Adult Classification	
1	Lead Teacher	
2	Assistant	
3	Student Teacher	
4	Other Adults	
V	Teacher Physical Activity Level	

a	Low Activity level	Shows no movement- For example, standing in the same place or sitting
b	Moderate Activity level	Shows some movement- For example, walking from one location to the other, or walking a few yards while engaging in an activity with a child.
c	High Activity level	Shows vigorous movement- running, jumping, etc.- activities that could lead to an increase in heart rate
VI	Child Activity	
1	Balancing	
2	Catching	
3	Climbing	Climbing up or going down the stairs
4	Crawling	
5	Dancing	
6	Digging	
7	Fine motor Toy Play	
8	Jumping	
9	Kicking	
10	Overhead event	Child swinging from overhead structure, feet not touching the ground.
11	Picking	
12	Pulling	Pulling objects, as well as pulling vehicles into the pathway (e.g., target child on the bike, not pedaling, pulling the bike into the riding pathway)
13	Pushing	
14	Riding	
15	Rocking	
16	Rolling	
17	Rough and	

	Tumble		
18	Running		
19	Sitting		
20	Skipping		
21	Sliding		
22	Spinning		
23	Standing		
24	Throwing		
25	Walking		
26	Other		Swinging from an overhead structure but feet touching the ground or base of the equipment, lying down, pushing the bike but not riding it
			<i>MODIFIERS for Child Activity</i>
1	Location		
a	Anchored Equipment		Large Fixed Piece
b	Animal Habitat		
c	Art and Craft Area		print panel, art and craft table
d	Balance Beam		
e	Bridge		
f	Enclosure		part of the playground that includes a roof, may or may not be covered on the sides, making it appear like an enclosed area
g	Jungle Gym		
h	Mulch area		
i	Multiple locations		

j	Music Area	
k	Natural Area	trees, grass, etc.
l	Paved Area	
m	Play House	
n	Project Area	non-fixed teacher provided play opportunity (i.e., water/sand play)
o	Raised Platform	
p	Ring Pull	
q	Sandbox	
r	Sitting area	benches, stoops, etc.
s	Slide	
t	Swing	
u	Tunnel	
v	Water play Area	
w	Other	
2	Speed	
a	Fast	
c	Slow	
d	Stationary	
VII	Child Vocalization	
1	Non talking noises	Noises made during dramatic play, etc., in other cases when the child is not really talking but making random noises
2	Humming	
3	Singing	
4	Talking	even when talking for few seconds/mumbling during the coding interval
5	Talking loudly	to get attention of other child(ren)/teacher from a distance or calling out to the other person
6	Yelling	is always associated by anger as the emotion

7	None	
8	Other	
		<i>MODIFIER for Child Vocalization</i>
1	Emotions	
a	Happy	Happy/ positive/ excited
b	Neutral	Neutral/ no strong affect displayed
c	Directive	Directive conversation, tell others what to do, strong leadership
d	Angry	Angry/ frustrated/ argumentative
e	Sad	Sad/ crying/ upset
VIII	Materials Used	
1	Balls	
2	Bird nest	
3	Boats	
4	Bucket	
5	Chalk	
6	Clay/ play dough	
7	Crayons	
8	Easel	
9	Funnel	
10	Hose	
11	Large wood blocks	
12	Markers	
13	Musical Instrument	

14	Natural Elements		
15	Paint		
16	Pencil		
17	Piece of cloth		
18	Puppets		
19	Rings/ Hula hoops		
20	Sand molds		
21	Shells		
22	Sifter		
23	Shovel		
24	Squeezed toys		
25	Small wood blocks		
26	Spinning wheels		
27	Skipping rope		
28	Trailer		
29	Tricycles		
30	Trucks/cars		
31	Wagon		
32	Waffle/ Plastic block		
33	Wheelbarrows		
34	None		
35	Other		

IX	Accelerometer Codes	
	1	0
	2	1-250
	3	251-500
	4	501-750
	5	751-1000
	6	1001-1250
	7	1251-1500
	8	1501-1750
	9	1751-2000
	10	2001-2250
	11	2251-2500
	12	2501-2750
	13	2751-3000
	14	3001-3250
	15	3251-3500
	16	3501-3750
	17	3751-4000
	18	4001-4250
	19	4251-4500
	20	4501-4750
	21	4751-5000
	22	>5000

Appendix C

Teaching Styles Rating Scale

<p>Context of observation sessions: S- Structured, teacher directed U- Unstructured, free play O- Outdoor activities M- mealtime</p>	<p>TSRS</p>
<p>Target Teacher: _____</p>	<p>Number of teachers: _____</p>
<p>Observer: _____ Weather _____</p>	<p>Number of children: _____</p>
<p>Childcare Center: _____</p>	<p>Date: _____ Time _____</p>
<p><i>TEACHING BEHAVIORS</i></p>	<p style="text-align: center;"><i>Never</i> <i>Occasionally</i> <i>Often</i></p>
<p>During the observation how often did the teacher exhibit the behaviors listed below?</p>	<p style="text-align: center;">0 1 2 3 4</p>
<p>1. Redirects Appropriately. Gets children to do something different from what they are doing. Stops children engaged in inappropriate behavior (i.e., Don't..., Stop...) (does not include natural classroom transitions).</p>	<p style="text-align: center;">0 1 2 3 4</p>
<p>2. Redirects Inappropriately. Interrupts children's activity when they are engaged in appropriate behavior (not following children's interest, unnecessarily interrupting children's engagement in appropriate behavior)</p>	<p style="text-align: center;">0 1 2 3 4</p>

3. Introduces. Teacher takes the initiate to introduce an activity that the child is not previously engaged in	0	1	2	3	4
4. Elaborates. Provides information to expand on children's engagement, without eliciting behavior. (Each exchange the teacher has with the child, whether verbal or non-verbal, whether the same topic or different can count towards elaborating behavior).	0	1	2	3	4
5. Follows. Attempts to elicit responses (verbal or behavioral, e.g., pointing) related to what children are already doing, ("what are you making"). Child may or may not respond.	0	1	2	3	4
6. Informs. Talks about possible activities, teaching a lesson or providing new information, provides nonelaborative information, tells stories, sings.	0	1	2	3	4
7. Acknowledges. Acknowledges (verbally) children without elaborating on what they're doing and without helping them (includes imitation).	0	1	2	3	4
8. Praises. Praises (verbally) children enthusiastically. Conveys pleasure or admiration for child, child's behavior, or child's product.	0	1	2	3	4
<i>AFFECT</i>					
<i>Circle one score for each item.</i>					
9. Activity Level	1 Exerts no energy to meet children's needs.	2	3 Exerts some energy to meet children's needs.	4	5 Exerts much energy to meet children's needs.
10. Positive Expression	9 Not Applicable	1 Looks blank when communicating (i.e., rarely smiles).	2	3 Communicates with little affect or expressiveness (i.e., occasionally smiles).	4
				5 Very frequently smiles and uses pleasing voice inflection when communicating.	

11. Negative Expression	9 Not Applicable	1 Often sounds grouchy or negative when communicating, frowning, sarcastic, cold and harsh.	2	3 Sometimes sounds grouchy or negative when communicating, frowning, sarcastic, cold and harsh.	4	5 Never sounds grouchy or negative when communicating frowning, sarcastic, cold and harsh.
12 a. Visual Involvement during Interactions (Eye contact)		1 Never looks at children.	2	3 Inconsistently looks at children.	4	5 Continually looks at children.
b. Visual Monitoring		1 Never visually follows children's activities.	2	3 Occasionally visually follows their activities.	4	5 Continually visually follows children activities.
13. Physical Responsiveness		1 Never has physical contact with children.	2	3 Occasionally has physical contact with children.	4	5 Very frequently has physical contact with children
14. Emotional Responsiveness		1 Responds to children in a detached, unemotional manner	2	3 Occasionally responds to children in a warm and nurturing manner.	4	5 Very frequently responds to children in a warm and nurturing manner.
15. Consistency of Interactions (regardless of the appropriateness of the interaction)	9 Not Applicable	1 Responds to children in a highly inconsistent, unpredictable manner.	2	3 Responds to children in somewhat consistent, predictable manner.	4	5 Responds to children in highly consistent, predictable manner.

<p>16. Responsiveness Toward Children's Interests (if the teacher redirects appropriately and introduces an activity of interest to the child then high score could be given)</p>	<p>1 Highly unresponsive. Ignores children's interests.</p>	<p>2</p>	<p>3 Somewhat responsive. Occasionally follows children's interest.</p>	<p>4</p>	<p>5 Highly responsive. Often follows children's interest</p>
<p>17. Child-Directedness</p>	<p>1 Controls and dominates the pace and activities.</p>	<p>2</p>	<p>3 Sometimes lets children dictate the pace and activities.</p>	<p>4</p>	<p>5 Always lets children dictate the pace and activities.</p>
<p>18. Amount of Communication</p>	<p>9 No communication</p>	<p>1 Very minimal communication.</p>	<p>2 3 Occasionally communicates.</p>	<p>4</p>	<p>5 Frequently communicates.</p>
<p>19. Tone</p>	<p>9 Not Applicable</p>	<p>1 Very frequently communicates in a bossy manner.</p>	<p>2 3 Occasionally communicates in a bossy, controlling manner.</p>	<p>4</p>	<p>5 Never communicates in a bossy or controlling manner.</p>
<p>20. Inclusion in Activities</p>	<p>9 Not Applicable</p>	<p>1 Forgets about children with special needs.</p>	<p>2 3 Occasionally helps children with special needs participate fully.</p>	<p>4</p>	<p>5 Consistently helps children with special needs participate fully in activities.</p>
<p>21. Teaching specific Skills</p>	<p>9 Not Applicable</p>	<p>1 Teaches no specific skills to children with special needs.</p>	<p>2 3 Teaches the same skills to children with special needs as to other children.</p>	<p>4</p>	<p>5 Individualizes the instruction of specific skills for children with special needs.</p>

<p>22 Gross Motor Abilities a. (such as walking, running, climbing, hopping, jumping, throwing and catching and balancing)</p>	<p>1 Provides no verbal stimulation to enhance children's gross motor abilities.</p>	<p>2</p>	<p>3 Occasionally provides verbal stimulation to enhance children's gross motor abilities.</p>	<p>4</p>	<p>5 Very frequently provides verbal stimulation to enhance children's gross motor abilities.</p>
<p>b. Materials Available</p>	<p>1 Provides no activities to enhance children's gross motor abilities.</p>	<p>2</p>	<p>3 Occasionally activities to enhance children's gross motor abilities.</p>	<p>4</p>	<p>5 Very frequently provides activities to enhance children's gross motor abilities.</p>
<p>23 Fine Motor Abilities (such as painting drawing, using chalk, cutting with scissors, scooping sand with a small shovel, grabbing mulch, spinning top, stacking blocks, planting seeds)</p> <p>a.</p>	<p>1 Provides no verbal stimulation to enhance children's fine motor abilities.</p>	<p>2</p>	<p>3 Occasionally provides verbal stimulation to enhance children's fine motor abilities.</p>	<p>4</p>	<p>5 Very frequently provides verbal stimulation to enhance children's fine motor abilities.</p>
<p>b. Materials Available</p>	<p>1 Provides no activities to enhance children's fine motor abilities.</p>	<p>2</p>	<p>3 Occasionally activities to enhance children's fine motor abilities.</p>	<p>4</p>	<p>5 Very frequently provides activities to enhance children's fine motor abilities.</p>
<p>24 Developmental Appropriateness (overall playground , all activities, regardless of who set it up)</p>	<p>1 Provides activities and content well below or above developmental level.</p>	<p>2</p>	<p>3 Occasionally gears activities and content to children's individual developmental level.</p>	<p>4</p>	<p>5 Often gears activities and content to children's individual developmental level.</p>

Appendix D

AREA/EQUIPMENT OPPORTUNITY CHECKLIST **Observer:** _____

Date: _____

Time: _____

<i>Equipment/ Area</i>	<i>No. of items</i>	<i>Measurement</i>
ANCHORED PLAY		
Slide <input type="checkbox"/>		
Swing <input type="checkbox"/>		
Jungle Gym <input type="checkbox"/>		
Tunnel/ Crawl-through tunnel <input type="checkbox"/>		
Ring Pull <input type="checkbox"/>		
Platform (on multiunit) <input type="checkbox"/>		
Zipline/Overhead Event <input type="checkbox"/>		
Ramps <input type="checkbox"/>		
Enclosures <input type="checkbox"/>		
Activity Board/Panel <input type="checkbox"/>		
Climber/ Ladder <input type="checkbox"/>		
Bridge <input type="checkbox"/>		
Bars <input type="checkbox"/>		
Riders <input type="checkbox"/>		
Roof <input type="checkbox"/>		
Talk Tubes <input type="checkbox"/>		
Multiunit equipment <input type="checkbox"/>		
NATURAL AREA		
Grassy Area <input type="checkbox"/>		
Trees <input type="checkbox"/>		

<i>Equipment/ Area</i>	<i>No. of items</i>	<i>Measurement</i>
Sand Play Area/Sand Box <input type="checkbox"/>		
Water Play Area <input type="checkbox"/>		
Animal Habitat <input type="checkbox"/>		
Paved Area <input type="checkbox"/>		
Play House <input type="checkbox"/>		
Music Area <input type="checkbox"/>		
Picnic Table <input type="checkbox"/>		
Small Stage <input type="checkbox"/>		
Sitting Benches <input type="checkbox"/>		
Acoustic Play Area <input type="checkbox"/>		
Project area <input type="checkbox"/>		

Shrubs	<input type="checkbox"/>		
Flowering plants	<input type="checkbox"/>		
Mulch	<input type="checkbox"/>		
ART AND CRAFT AREA			
Paint Panel	<input type="checkbox"/>		
Art and Craft table	<input type="checkbox"/>		

Appendix E

LOOSE PARTS AND ACTIVITIES CHECKLIST

Case Id 1: ____ Time: ____

Case Id 2: ____ Time: ____

Date: _____

Observer: _____

<i>Equipments/Toys</i>	<i>No. of items</i>
LOCOMOTION TOYS	
Tricycles <input type="checkbox"/>	
Wagons <input type="checkbox"/>	
Wheelbarrows <input type="checkbox"/>	
Other <input type="checkbox"/>	
GROSS-MOTOR TOYS	
Skipping Rope <input type="checkbox"/>	
Rings/Hula hoops <input type="checkbox"/>	
Balls <input type="checkbox"/>	
Other <input type="checkbox"/>	
FINE MOTOR TOYS	
Trucks/Cars <input type="checkbox"/>	
Sand molds <input type="checkbox"/>	
Buckets <input type="checkbox"/>	
Sifters <input type="checkbox"/>	
Funnels <input type="checkbox"/>	
Shovels <input type="checkbox"/>	
Clay/ Play dough <input type="checkbox"/>	
Other <input type="checkbox"/>	
ART AND CRAFT TOYS	
Chalk <input type="checkbox"/>	

<i>Equipments/Toys</i>	<i>No. of items</i>
SCIENCE	
Bird nest <input type="checkbox"/>	
Shells <input type="checkbox"/>	
Other <input type="checkbox"/>	
GENERAL TOYS	
Small wood blocks <input type="checkbox"/>	
Large wood blocks <input type="checkbox"/>	
Waffle/Plastic blocks <input type="checkbox"/>	
Puppets <input type="checkbox"/>	
Spinning wheels <input type="checkbox"/>	
Boats <input type="checkbox"/>	
Squeeze Toys <input type="checkbox"/>	
Piece of cloth <input type="checkbox"/>	
Hose <input type="checkbox"/>	
Other <input type="checkbox"/>	
Sand Box <input type="checkbox"/>	
Water Play Area <input type="checkbox"/>	
Balance Beam <input type="checkbox"/>	
Crawl-through tunnel <input type="checkbox"/>	

Pencils	<input type="checkbox"/>	
Crayons	<input type="checkbox"/>	
Markers	<input type="checkbox"/>	
Paint	<input type="checkbox"/>	
Easel	<input type="checkbox"/>	

Appendix F

Teacher Interview Questions

1. How would you describe an ideal outdoor environment for preschool children in child care centers? What are the important components in these settings?
2. What do you think are the barriers to centers creating even higher quality outdoor environments?
3. How much time does your class typically spend outdoors when the weather is nice? What about during the winter?
4. How much time do you think is important for children to spend outdoors?
(is the current amount of time spent outdoors sufficient, or do the children spend too little time, or too much time outdoors?)
5. In your view, which environment (outdoor or indoor) provides more learning experiences for children? Why?
6. What do the children normally do when they are outdoors?
 - 6a. Do you ever plan any activities for the children to do during their outside time?
If so what?
7. Ideally, how would you describe a teacher's role during outside time? Are there things that prevent teachers from engaging in this 'ideal' role outdoors? What are the barriers?
8. Do you change or rotate the materials for children's outdoor use?
If so, what kinds of materials do you rotate?
How often do you rotate the materials?
9. Do you take materials from the classroom outdoors?
Books? Art materials? Blocks? Dramatic play? Others?
10. Do you extend indoor projects outside?
11. Is outdoor time used in discipline methods? (Ex. Outdoor time prohibited for negative behavior, time extended for positive behavior).
12. How do you extend your knowledge about children in the outdoor environment?