Quality of preschool playgrounds and preschool teachers' behaviors and verbalizations during children's outdoor play

by

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A Thesis Submitted to the

Graduate Faculty in Partial Fulfillment of the

Requirements for the Degree of

MASTER OF SCIENCE

Department: Human Development and Family Studies
Major: Human Development and Family Studies
(Early Childhood Education)

Signatures have been redacted for privacy

Iowa State University
Ames, Iowa

1995

To the memory of
my father

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INTRODUCTION

Over the years, out-of-doors spaces have been viewed as important environments for young children's health (McMillan, 1921, 1924), learning experiences (Dewey, 1976; Froebel, 1887), and early childhood programs (Read, 1957). Educational philosophers, including Dewey, Freud, Froebel, McMillan, Prescott, and Read, have advocated the importance of the outdoors and outdoor play as well as the classroom environment. The outdoors is a healthy environment offering fresh air, sunshine, and active activities and it is considered a total learning environment for young children (McMillan, 1921; 1924).

Froebel (1987) created an outdoor environment that facilitated the development of the whole child, i.e., physical, cognitive, social, and emotional development. The play of young children had a more expanded developmental purpose than only motor development, according to Froebel. He considered it a significant medium for learning and development. Froebel argued that equipment for desirable outdoor play included plant and animal care areas, sand, water, swings, slides, seesaws, and a work corner with nails, hammers, and wood.

Dewey (1966) distinguished and contrasted play and work in an educational context and acknowledged that both aspects are valuable. He (1976) argued:

> The changing seasons of the year and the processions of outdoor games they bring furnish other motives for production that meet a real need of children. In the spring-time they want marbles and tops, in the fall, kites; the demand for wagons is not limited to any one season. Whenever possible the children are allowed to solve their own problems (p. 218).

Further, he argues that the work, such as making a town in a playground using large packing cases for houses and stores through carpentry work, building and repairing the houses, affords as much physical exercise as the ordinary sort of playground and it is an effective way for children to learn a useful and responsible share in healthy play in the open air.

Freud (1959) argued that play structures and the arrangement of outdoor play yards were important in accommodating pretend play and socially acceptable behavior. Read (1957), discussing the importance of outdoor play, argued that "every child needs the feel of wind and sun against his cheeks, the tickle of grass between his bare toes, the smell of fresh earth as he digs, the sight of blossoms drifting from the trees or of leaves falling" (p. 2) and emphasized plenty of space, variety, sunshine, shade, a digging area, large muscle activities, dramatic play outdoors, large block area, sand, water play, and the workbench.

Young children today have different access to experiences outdoors than in the past. As more mothers enter the work force and as housing provisions change, children spend more hours in early childhood settings such as family day care centers, child care centers, preschools, and before and after school care. U.S. Census (1993) reports show that 41% of the children under 5 years old in 1991 were cared for in another home or group child care facility by non-relatives. Therefore, the value and opportunity associated with the outdoors and outdoor play in early childhood settings needs to be reconsidered. In spite of the importance of the outdoors in children's development, most knowledge about children's development has come from research conducted in indoor environments such as home settings, classrooms, and research laboratories, and less is known about the behavior of children and teachers in outdoor settings (Hart, 1993).

The value of outdoor play for young children depends on such factors as playground design and the outdoor planning and teaching abilities of teachers. The teacher's perception of outdoor play influences her role in preparing the outdoor environment for children and interacting with them (Wade, 1985). Children's play occurs in both their physical environment and their psycho-social environment. The psycho-social environment of children includes their peers, teachers, and families and it is a critical influence on children's development. Physical and social environmental factors operate interactively to affect children's behavior and learning (Frost, 1992). Peers, teachers, and parents mediate the effects of physical environmental features, and then developmental change,

such as age-related behavior or cognitive behaviors, affect social interaction. The teacher and the contribution of the teacher's support and involvement in children's play are important factors (Yawkey, 1990). For example, in sociodramatic play, a child develops social competency, the ability to understand the rules of play, and the ability to see, think, and feel things from other people's perspectives. Frost (1992) argues that children should be encouraged to engage in social play through a conducive environment and by teacher involvement whether or not the children have the prerequisite social skills needed for group play. Further, teachers play an important role in promoting language and encouraging problem-solving during children's outdoor play, and they serve mediating and motivating roles in children's play. Some adult verbalizations help children extend play while others have a negative influence (Frost, 1992); therefore, the timing and type of teacher involvement are crucial factors in fostering children's development. Through teacher planning, interaction, and reflection, teachers make critical decisions influencing children's learning and experiences (Goffin, 1989). That is, the early childhood curriculum sets the parameters of children's play, and teachers are typically responsible for establishing and implementing the curriculum.

Despite its importance, outdoor play has been viewed as primarily providing an opportunity for physical exercise for young children, according to Esbensen (1990). He argues that the outdoor play environment should provide young children with experiences that increase their knowledge of nature and enhance play and learning situations. Further, Esbensen (1987) suggests that a playground attached to an early childhood setting should be viewed as an outdoor classroom and should be a learning environment designed to meet curriculum objectives by encouraging child-initiated, teacher-supported play activities.

Early childhood position statements regarding developmentally appropriate practices for children during outdoor play offer critical perspectives for understanding current guidelines. The position statement of the National Association for the Education of Young Children (1987) states, "outdoor activity is planned daily so children can develop large muscle skills, learn about outdoor

environments, and express themselves freely and loudly" (p. 56), whereas inappropriate outdoor activity is viewed as "recess, rather than an integrated part of children's learning environment" (p. 56). Further, adults need to "provide plenty of space and time indoors and outdoors for children to explore and exercise their large muscle skills... with adults close by to offer assistance as needed" (p. 48). In contrast, it is inappropriate when "adults restrict children's physical activity... or provide limited space and little equipment.... (or when) Adults limit large muscle outdoor activity to a short outdoor recess time" (p. 48). Additional explanations for these guidelines are not offered in this document.

This position statement is made more explicit in the accreditation criteria of the National Academy of Early Childhood Programs (1991) in a limited manner. The national accreditation guidelines only identify a minimum requirement of 75 square feet per child of outdoor activity space and offer one specific outdoor criteria that identifies "a variety of surfaces such as soil, sand, grass, hills, flat sections and hard areas...and shade; open space; digging space; and a variety of equipment for riding, climbing, balancing, and individual play" (p. 46).

In summary, the importance of outdoor play for young children is widely acknowledged as a healthy physical environment, a quality learning environment, and an integrated part of the early childhood curriculum. Teachers of young children play critical roles in planning and implementing the outdoor curriculum and in interacting and enhancing children's development outdoors.

Therefore, the purpose of this study is to explore the quality of the outdoor play environment in early childhood programs and teacher interactions in these settings with children during outdoor free play time. The specific objectives of the study are:

1. To explore the nature and characteristics of preschool playgrounds before and during children's scheduled outdoor play time.
2. To examine the relationships between the quality of preschool playgrounds and the type of preschool teachers' involvement in children's outdoor play.

LITERATURE REVIEW

The chapter is divided into two parts. The first part reviews the outdoor physical environment literature concerning types of playgrounds, the roles of play equipment and materials, and zoning of the playground in the play of young children. The second part addresses teachers' and children's play outdoors.

Outdoor Play

While there are many research studies concerning the functional relationship between play and play objects, and toys, there are few research studies examining relationships between children's play *and the design of playgrounds or the equipment and materials of playgrounds* (Frost, 1992). Frost (1992) argues that playgrounds are viewed as a collection of large play objects in close proximity to each other, and it is assumed that the novelty and complexity of playgrounds affect children's play. Henniger (1977) examined the play behaviors of nursery school children in indoors versus outdoors play, and found that playgrounds with a variety of fixed and movable equipment influences play differently than did indoor environments. Results showed that, with the correct equipment and careful teacher planning and encouragement, the outdoor environments stimulated the dramatic play of boys and cooperative play of boys and girls. To promote the developmental needs of children, outdoor play environments have been of concern from various professional perspectives including child development, education, landscape design, and architecture. Playground design, equipment and materials have been created to stimulate developmentally appropriate play for young children (Frost & Klein, 1979; Frost & Sunderlin, 1985; Hartle & Johnson, 1993; Johnson, Cristie, & Yawkey, 1987; Rivkin, 1990; Rohane, 1981).

The type of playground

Five orientations for children's play have been translated into playground design concepts and identified to characterize play locations and activities (Frost & Klein, 1979; Rohane, 1981). These orientations are traditional playgrounds, contemporary playgrounds, adventure playgrounds,

creative playgrounds, and comprehensive playgrounds. They are primarily relevant in the United States.

Traditional playgrounds, typically with large metal structures and "a collection of single function equipment" such as swings, slides, climbers, see-saws, balance beams, and merry-go-rounds are especially common in the United States. The gymnastic equipment of these playgrounds is based on play as the "physical exercise and recreation" philosophy and they are usually located in public parks and schools (Frost & Klein, 1979; Rohane, 1981).

The contemporary playground concept was introduced in the late 1950's. They are not as easily described by equipment names but architects and landscape architects have emphasized "novel forms, textures, and different height in aesthetically pleasing arrangements (Hayward, Rothenberg, & Beasley, 1974, p. 134)." They often include "cobblestone mounds to which slides are attached, tunnels under walls or mounds, and a tree house or platforms above the ground" (Hayward et al., 1974, p. 134). Exercise is still seen as an important aspect of children's play, however, aesthetic factors such as color and texture are also considered important (Frost & Klein, 1979; Rohane, 1981).

The concept of adventure playgrounds occurred in post-war Europe when vacant, urban lots with movable and unlinked materials and tools began to be used by children to create their own play structures. Today these play settings also furnish water, dirt, tires, and animals, for example, and are supervised by an adult play facilitator. This playground concept was imported to the United States in the 1960's (Rohane, 1981).

Creative playgrounds are sometimes built through community involvement. These spaces incorporate reusable, discarded materials, such as tires and wheeled vehicles, as well as sand and water areas. A wide range of inexpensive hand-built equipment and loose parts, and manufactured equipment is provided, depending on their availability (Frost & Klein, 1979; Frost, 1986).

Further, Rohane (1981) identified design guidelines for comprehensive playgrounds in addition to the categories identified by Frost and Klein (1979) and Frost (1986). Comprehensive playgrounds include a configuration in which "sports fields, jungle gyms, balance beams, see-saws and slides are placed together with pathways, ponds, and waterfalls, forests and hills...all part of a micro-universe of play settings" (p. 253). This playground concept has an emphasis on play as learning (Taylor & Vlastos, 1975). Outdoor play is viewed as an important medium of learning and is not only physical development but also emphasizes cognitive, social, and emotional development (Rohane, 1981).

Using a variety of playground types, such as traditional, contemporary, adventure, creative, and comprehensive playgrounds, researchers have investigated the relationships between the various types of playgrounds and children's behavior. Campbell and Frost (1985) examined the effects of two types of playgrounds on the cognitive and social play behaviors of second-grade children. The two playgrounds, defined as a traditional and a creative playground, were located on opposite sides of a private elementary school. Subjects were 45 second-grade boys and girls. Each child was observed for ten seconds twice during free play time one day per week on each playground, for a total of ten weeks. Each observer had a portable tape recorder and wore an ear plug that emitted a beep every ten seconds for the observer to score both a social and a cognitive category of play for the target child. The authors did not mention the location of the observation nor time of year. Results indicated a significant difference between the two types of play on these playgrounds. The cognitive play on the traditional playground revealed that 77.9% of the play was functional, 0.2% of the play was constructive, and only 2% of the play was dramatic. On the creative playground, 43.7% of the play was functional, 3.9% of the play was constructive, and 37% of the play was dramatic. The social play on the traditional playground showed that 3.4% of the play was solitary, 29.5% of the play was parallel, 8.5% of the play was associative, and 45.6% of the play was cooperative. In contrast, on the creative playground, 11% of the play was solitary, 12.6% of the play

was parallel, 12.8% of the play was associative, and 50.2% of the play was cooperative. The authors conclude that generally the creative playground encourages more complex cognitive and social behaviors in children than does the traditional playground. The role of teacher was not studied.

Hayward, Rothenberg, and Beasley (1974) investigated the play activities of preschool children, school-age children, teenagers, and adults on traditional, contemporary, and adventure playgrounds. The authors chose play settings which were public, accessible, and in the same neighborhood being used by a variety of racial and ethic groups. Observation began at 10:00 a.m. and continued till 4:00 p.m. for 10 or 11 days on each playground. They did not indicate the location or the time of year of the observations. Equipment, play activities, interactions with others, and amount of time children spent on each playground were examined through behavioral mapping, behavior setting records, and interviews. Behavior mapping involved observers recording the age, sex, location, and number of participants in selected activities and a time sampling of behavior. Behavior setting records included observations of the flow of an individual child's play and longitudinal accounts of a child's actions and conversation. Observers made a continuous tape recording of the child's ongoing activity throughout the day, using a 20-minute time sampling for the entire time the individual was on the playground. Interviews with each child were used to sample the self-preferences about the child's own play experiences and play settings. The interviews were conducted at the end of the data collection period so they would not influence the child's activities. Result showed that the total number of observations was 4,294 at the traditional playground, 9,765 at the contemporary playground, and 2,360 at the adventure playground. At the traditional playground and the contemporary playground, adults were the predominant age group present (39.8% and 35.7%, respectively) and were most frequently observed at the bench areas (38.7% and 65.9%, respectively). Preschool children were the second most frequent group at the traditional playground and the contemporary playground (29.5% and 35.2%, respectively). In contrast, at the adventure

playground, school-age children were the predominant group (44.6%) and practically no preschool children were observed (1.7%).

Hayward et al. suggest that the presence of particular age groups has an effect on the behaviors displayed at a playground; for example, the presence or absence of adults has the strongest influence and is an important aspect of each playground. Adults create and enforce the rules about acceptable and desirable behaviors, and children often look to adults for advice, suggestions, or approval of their actions. Adult activities appear to contribute to the atmosphere of the playgrounds. The primary adult activities (68.1%) at the traditional playground were talking, watching, pushing children on the swings, and walking. At the contemporary playground, talking, watching, reading/writing, and caretaking were the most frequent adult activities (81.2%). At the adventure playground, talking, moving materials, and watching were the major adult activities (75.3%). Talking comprised about one-third of adult activity at each playground. The authors did not identify whether the adults were talking to children or other adults.

Use of play equipment and mutual play activities comprised most of the conversation for children on the traditional and contemporary playgrounds. At the adventure playground, they engaged in a broad range of topics from their everyday life experience. Children's conversations were influenced by not only the type of equipment and its arrangement on each playground but also by the length of use and complexity of uses of equipment.

The drawbacks of earlier studies examining children's behaviors and types of playgrounds are the fact that some studies focused on the effects of differences between the type of equipment, while others focused on architectural design and landscaping (Hart & Sheehan, 1986). Hart and Sheehan (1986) examined 40 preschoolers' outdoor play, twenty 3-year-olds (mean age of 36 months) and twenty 4-year-olds (mean age of 54 months). They were attending a midwest university laboratory school where the playground was divided into a traditional space and a contemporary space. Both sides of the playground were equipped with some of the same types of equipment, such

as a slide, a sandbox and swings, in order to address methodological critiques of earlier playground studies. The traditional space had more moveable equipment, such as tires and wooden crates and more open space, and the contemporary space had more emphasis on sculptured landscaping, less open space, and little moveable equipment. For 7 weeks at the beginning of the school year and before the recorded playground observations began, children from the two age groups had equal access to both sides of the playground. Videotaped observations took place over a 4-week period on fair-weather days. During regularly scheduled outdoor time, the preschoolers were randomly alternated between the two playground areas and observers videotaped each individual child's play behavior until all of the 40 children were filmed for 12 times for 30 seconds in each area, a total of 360 seconds.

No differences were found in the cognitive play of the preschoolers on these two playgrounds. On both playgrounds, there were few occurrences of constructive play, dramatic play, or games with rules. The authors suggest that the lack of dramatic play materials and equipment may have been influenced by the limited number of dramatic play activities. Typically, preschoolers engage in few games with rules activities.

The children's social play behavior differed on the two playgrounds. On the contemporary playground, there were more unoccupied behaviors, solitary play, sitting behaviors, and walking behaviors, and fewer physical activities, whereas there was more active climbing in the traditional space. Hart and Sheehan concluded that the difference between the two playgrounds areas was not sufficiently meaningful in children's verbal interaction, social play, or cognitive play behaviors, although there was less physical play activity in the contemporary side. These findings suggest that any difference in play behaviors are not due to the type of playground, but, rather, differences are influenced by other playground factors such as the type and arrangement of equipment. The role of teachers or adults was not examined in this study.

Brown and Burger (1984) examined the relationships between various playground designs and preschool children's behaviors. In order to measure the type of playgrounds, they assessed the playgrounds of six preschools and day care centers using a 19-item rating scale that was divided into four categories of social /affective, cognitive, motor, and practical considerations (i.e., accessibility of the playground, natural elements, storage, and maintenance). They compared three playgrounds rated as a more contemporary design with three playgrounds of a less contemporary design. A total of 72 preschoolers, 12 at each of the six playgrounds, were observed; each child was observed continuously every 5 seconds for a 2-minute period for an unspecified number of days. The data were collected in a five-week period in October and November. The average total observation time per child was 27.7 minutes.

Results showed no significant differences between the children's social, language, or motor behaviors on the type of playground. Brown and Burger suggest that more contemporary designs do not necessarily promote more educationally desirable social, language, or motor behaviors than do less contemporary designs. However, they argue, "it would be a mistake to suggest that children behave the same on all playgrounds, no matter what the design" (p. 616), and they suggest three possible reasons. First, the playgrounds may be pleasing to the eye but only cosmetically different. For example, a beautiful landscape with trees, shrubs, and grassy areas, and a playhouse or play structure may not necessarily promote desirable behaviors without other important features. Second, the potential of the playground design characteristics may remain underdeveloped. For example, there are some design factors that require alteration or the introduction of additional elements, such as a play structure made of several platforms for adults to move to provide children with a variety of climbing patterns, yet the design potential may not be developed fully. Third, there may be some other environmental characteristics that negate potential design qualities. An example is a sand area that is located between two or more active play areas.

In summary, their findings suggest that the occurrence of desirable children's play behaviors is due to specific features of a playground, rather than the type of playground. Brown and Burger recommend a change in the form of adult involvement on playgrounds; they argue that most outdoor play in early childhood settings suffers from a "recess syndrome." To support this notion, they offered evidence that teachers viewed outdoor play as break time, and they seldom interacted with children on the playgrounds. Further, teachers sometimes used the outdoor play time as their recess from the children, i.e., teachers did not view outdoor environment as an extension of the indoor educational program. Brown and Burger caution that it is the task of architects to develop the potential of playground design, and it is the task of educators to introduce dramatic, constructive materials, or movement games into the outdoor environment and to encourage adult involvement in children's outdoor play.

Play equipment and materials

The physical environment, i.e., equipment and materials, have a direct impact on children's behaviors (Bergen, 1987; Phyfe-Perkins, 1980). Lewin (1931) offers a rationale for giving attention to the immediate environment and the factors within the environment. Behavior is the function of the interaction of the person and the environment according to him, B = f (PE). He suggests that objects, such as equipment and materials, in the physical environment have an immediate psychological effect on behavior. For example, children may be attracted by a slide with a climber; the attractiveness of the object is valence, a measure of attractiveness. The strength of the valence is part of what teachers bring to a classroom and playground. The valences of the equipment and materials change with age, developmental level, and psychological states of the individual.

Two current perspectives regarding children's play equipment and materials are available. One perspective is the variety and complexity of play space (Kritchevsky et al., 1969) and the other is the theory of loose parts (Nicholson, 1971; 1974). The first perspective is the variety and complexity of play equipment and materials presented by Kritchevsky, Prescott, and Walling (1969). They define

play spaces as potential units and play units, and they illustrate the content of these play spaces and investigate the relationship between the physical setting of day care and children's behavior. Potential units are play spaces that are easy to add several kinds of play materials to, and they can be used for spatial variety; therefore, they provide flexibility for the teacher's use. For example, an empty table, an empty corner of the playground, and a shady area under a tree or umbrella are potential units. The teacher's recognition of and attention to the potential units of play space is required. In contrast to potential units, play units are defined by Kritchevesky et al. as something to play with, such as a jungle gym. They classify play units according to their variety and complexity. Variety describes the kind of activity, and is a measure of the relative capacity of the space to elicit interest from children. Complexity describes the extent to which an environment contains "potential for active manipulation and alteration by children" (p. 10). They categorize play units as either a simple unit, complex unit, or super unit. A simple unit has "one obvious use and does not have sub-parts or a juxtaposition of materials which enable a child to manipulate or improvise" (p. 10) with the available materials. Examples are swings, a jungle gym, tricycles. A complex unit has "sub-parts or juxtaposition of two essentially different play materials which enable the child to manipulate or improvise" (p. 10). An example is a sand area with play materials (pails and shovels). A super unit has "one or more additional play materials, i.e., three or more play materials juxtaposed" (p. 10). Examples are a sand box with play materials and water, and a jungle gym with movable climbing boards and a blanket.

Variety and complexity of equipment and materials are critical factors in promoting and sustaining children's interest in play, according to Kritchevsky et al. Based on the relative value of simple, complex, and super units for promoting children's play, they developed a method for approximating the number of play spaces that a classroom or playground offers children. They concluded that complex units would generally accommodate four children at once and that super

units would be equal to two complex units. Thus, they assigned a value of 1 to simple units, a value of 4 to complex units, and a value of 8 to super units.

By determining the total number of play spaces of a classroom or playground, and the appropriate number of play spaces available to each child, the sum can be divided by the total number of children in the indoor or outdoor space. A ratio of the total number of play spaces to the number of children gives the approximate number of play spaces available to each child. For example, if the playground has 6 riding vehicles, 1 jungle gym with boards, and 1 sand area with play materials and water, the number of weighted play spaces would be 6, 4, and 8, respectively (see Table 1), and the total number of play spaces would be 18 (6 + 4 + 8 = 18) (see Table 1). If there are 9 children on the playground, the ratio of the total number of play spaces and the children would be 2 : 1 for this playground. Prescott (1981) argues that good space for free selection time requires 4 to 5 play spaces per child; therefore, a ratio of 2 : 1 or 2.5 : 1 is not sufficient.

Table 1

Number of play units and play spaces

Number of play units	Type of unit	Number of play spaces
6 riding vehicles	simple = 1	6 x 1 = 6
1 jungle gym with boards	complex = 4	1 x 4 = 4
1 sand area with play materials & water	super = 8	1 x 8 = 8
Total play spaces		18

Gets and Berndt (1982) used the rating system for play equipment developed by Kritchevsky, et. al. They examined the effects of the play features of amount, complexity, and arrangement of play resources on children's behavior during free play in the gymnasium of child care centers in a midwestern urban area. A baseline-treatment-return to baseline (A-B-A) design was used. Result

showed that the average ratio of number of play spaces per child at baseline was low, 0.8 : 1 (center A) and 1.4 : 1 (center B) and that positive involvement with teachers, peers and play equipment increased significantly from baseline to treatment. Fewer children were involved in conflicts on treatment days than on baseline days, but the differences were not significant.

Dunn (1993) measured the quality of indoor play space in accredited child care centers using the same rating system of Kritchevesky et al. Her results indicated that the average ratio of number of indoor play spaces per child was low, 1.2 : 1. Dunn created a variety score by summing the number of different types of activities available. Her results indicated that the average variety score for the indoor play for these centers was 4.9.

A second perspective regarding children's play equipment and materials is the theory of loose parts (Nicholson, 1974). The main proponent of loose parts is Nicholson (1974), who argues that an environment with "loose parts" has many unattached, dynamic, interchangeable, and manipulable elements available to be used in an infinite variety of ways by children. In his theory of "loose parts," Nicholson explains, "In any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kinds of variables in it" (p. 223). Further, he warns that clear and static environments without loose parts rob children of their creativity. Children's play is enhanced in environments that offer the possibility of discovery, inventiveness, and creativity.

Using the two perspectives of play equipment and materials, that is, variety and complexity of play spaces, and the theory of loose parts, Jones (1989) observed outdoor play in a preschool and described the changes of the playground equipment by introducing the concept of loose parts. By adding loose parts to a playground, a less stimulating environment was transformed into one that permitted dramatic play and language use, and was interesting to children. Examples are tools for the sand area to which children added water, and a bed with pillows and dolls to which children brought containers of sand to feed the dolls. The drinking fountain served as both a play space and a water

source. With these additions, the change in variety of play spaces increased from 6 activities to 19 activities. In addition to using the complexity of units measures, the total number of play spaces increased from 11 to over 90, and a ratio of the total number of play spaces to children of 3 : 1 for 30 children. Jones concluded that the addition of loose parts made an immediate difference in the quality of children's play and emphasized the importance of teachers' provision of appropriate outdoor play materials.

Another way to determine the adequate organization of play space is the notions of clear path, empty space, and dead space, according to Kritchevsky et al. They defined that the criteria for *good organization have clear path and adequate empty spaces and reduced dead space.* Play units and their boundaries are placed clearly visibly at child's-eye level. Too much equipment placed too close together is disruptive, and it is necessary to adequate empty space in which children move around. Dead space is a large amount of empty space. In contrast to a potential unit, dead space has no visible or tangible boundaries. Their findings suggest that good organization of play space has a range of no less than one-third to no more than one-half uncovered surface. These criteria will not be used in this study because it is subjective and the method to measure them is underdeveloped.

In conclusion, two current perspectives in regard to children's play equipment and materials, that is, the variety and complexity of play space, and the theory of loose parts, were discussed. Complexity and variety of play spaces is a useful method for quantifying the physical features of equipment and materials for children's play and in determining the suitability of total play spaces.

Zoning the playground

An understanding of play development is essential for effective playground zoning, according to Frost (1992). He argues that, in order to have developmental advantages for children, an environment must stimulate and support every form of play naturally engaged in by the participating children. Frost & Klein (1979) propose a design framework for the outdoor environment by using a

zoning concept based on forms of play such as physical play, social play, and cognitive play. For example, the various forms of social play are accommodated by the provision of different types of places for quiet solitary play, for observing and reflecting, and for cooperative play.

Further, Esbensen (1987) developed a more detailed framework to be used for the design of the outdoors. He conceptualized the outdoor play space into a transition zone, manipulative/creative zone, projective/fantasy zone, focal/social zone, social/dramatic zone, physical zone, and natural elements zone. The transition zone refers to the area immediately outside the building, and serves as an area where children have an opportunity to assess their options and make choices. The manipulative/creative zone is characterized by relatively quiet and concentrated activities such as clay, playdough, paints, easels, a water table, and a carpentry bench for woodworking. The projective/fantasy zone refers to "a separate sand area, sand box, or sand table that allows children to mix sand and water and to use small objects to pretend and project their ideas" (p. 69). The focal/social zone is "an area where teachers and children can quietly sit together, talk, and observe the activities...and should be provided in a relatively central place on the site" (p. 69). The social/dramatic zone includes play houses and stores with tables and benches, dress-up clothes, household utensils, blocks, and boards. Proximity to a wheel toy pathway, with a parking area for tricycles and wagons, along with a water fountain, will have an impact on dramatic play activities in this area. The physical zone provides a number of motor challenges for children, such as running, climbing, rolling, sliding, and balancing. And, finally, a natural elements zone provides trees, bushes, flowers, grass, sand, and water. A garden area enables young children to plant, water, weed, and reap the harvest. The zoning of playground is a critical step for understanding outdoor play conceptually; however, in practice, there is no clear-cut designation of each zoning, and often the zones are interrelated with each other.

The National Survey of Playground Equipment in Preschool Centers (1989) reports the assessment of 349 playgrounds of preschool centers in 31 states. There were 2,447 play structures,

such as swings, slides, and balance beams, 2,783 portable play materials, such as tricycles, loose tires, and sand, and 2,919 other provisions on the playgrounds, such as tables, grassy areas, and water faucets (Bowers, 1990). The results gave evidence that early childhood outdoor play environments are underdeveloped. Items classified as loose parts and related to practice, such as wheeled toys and manipulatives outdoors, were found in only about 50% of the centers, and only 19% provided wooden building blocks outdoors. Art materials and gardening tools were provided in less than 2% of the centers. Only 15% of the centers had a garden area, and only 17% of the centers had trees planned as part of a play structure.

Playground design consultants have an important role in outdoor play settings; however, teachers of young children also have a crucial role (Esbensen, 1990). Esbensen argues that if teachers think the outdoors is simply a space to allow children to "let off steam", then the playground sites will stay underdeveloped. In order to provide safe and challenging play and learning opportunities for young children, attention only to the design and organization is not enough. Teachers need to plan actively for outdoor play by introducing effective, stimulating materials and equipment, and by locating them in effective places to promote children's development.

Teachers and Children's Play

Theoretical view of adult roles in children's play

Theorists have considered play from the perspectives of psychological, social, and anthropological concerns, as well as from the perspective of child development (Fromberg, 1992). Freud focused on the value of play, and proposed that play provides a child with a way for wish fulfillment and the mastery of traumatic events (Freud, 1959; Rubin, Fein, & Vandenberg, 1983). Further, he considered play to be the child's way of expressing aggression, sexuality, and anxiety.

Erikson made a theoretical contribution to the mastery aspect of Freud's play theory. He viewed play as important in personal adjustment and as a way to create a sense of mastery over both

immediate and imaginary situations (Erikson, 1976; Rubin, Fein, & Vandenberg, 1983). He analyzed the role of play in early development, focusing on the interplay of culturally determined symbols and values with the young child's psychic nature (Zimiles, 1992).

The educational implications of Freud and Erikson's theories are that adults can facilitate children's abilities to cope with their feelings and their environment. Adults should provide a physical and psycho-social environment that is emotionally supportive, physically appropriate for the child's level of development, and socially responsive and consistent (Fromberg, 1992). The realistic role for adults in children's development includes mediating children's conflict and contradicting their irrational needs by explaining why it is prohibited, clarifying confusion, and limiting threats (Shapiro, 1992).

Piaget (1962) considered play from personal and biological roots, and proposed that play was influenced by developmental cognitive functions. The three major play categories that he identified are sensory-motor practice play, symbolic play, and games with rules. Sensory-motor practice is mere repeated exercise on any newly mastered motor ability and repetitive movement. Symbolic play is the link between the "signifier (image)" and "signified (object or event)," and occurs around two years of age and increases at three and four years of age, and then decreases around six years of age. Games with rules develop later in childhood, around age seven, and involve structure and organized activities due to the demands of concrete operations. Piaget (1962) argued that symbolic play provides the child with a means of assimilation needed to rethink past experience. In symbolic play, the systematic assimilation forms a particular use of the semiotic function; that is, one thing can represent something else in order to express everything in the child's experiences.

Assimilation is the incorporation of the environment, such as materials and mental images, to match existing schemes, according to Piaget. For example, a young child may name all red flowers "tulips" on a playground. In contrast, accommodation is the modification of one's existing scheme to meet the new coming information or the demand of the environment. For example, the child identifies a tulip from other red flowers, such as roses or geraniums, by the shapes or smells of the flowers.

In terms of how children's behavior changes, Piaget suggested that the child must reach a state of disequilibrium between assimilation and accommodation before further cognitive reorganization can occur. The information that triggers reorganization must be only slightly more difficult than that which the child is currently able to assimilate. Thus, the role of adults is to induce the child into disequilibrium and cause the child to construct a new scheme which better accounts for the situation. Adults must encourage children's mental actions, the process of making sense of things and events by trial and error (Kamii, 1992).

Vygotsky (1966) emphasized the social nature of thought and language as they develop through symbolic play. He defined play as the child's creation of an imaginary world, and argued that play emerges from the tension between desires that can neither be forgotten by the child nor fulfilled by society. Through play, the child is provided with a means of tension reduction, and symbolic play comes as a need for reality substitution. Vygotsky (1966) argued that play is "the leading source of development" in children and that the child learns to think abstractly through his/her involvement in symbolic play.

Vygotsky (1978) proposed a zone of proximal development, "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), and argued that the culture changes the child to meet new demands. The child models, what is suggested and taught by culture, and then recognizes his/her knowledge in social context.

Vygotsky's notion is that children should become more skillful in solving problems when given special assistance and encouragement to play. Adults or more competent peers serve a child as a vicarious form of consciousness until the child is able to master his action through his own consciousness and control (Bruner, 1985). Until the child achieves conscious control over a new function or conceptual system, the adults or peers perform the function of scaffolding the learning

task to make it possible for the child. For example, when a child is asked in a sand area, "How many scoops of sand will fill the bucket?" the child may experiment and estimate quantity. By intellectual scaffolding, the child can reach a higher level of development. The effective teacher recognizes what tasks the child can accomplish alone and what tasks the child can accomplish with the assistance of teachers or more competent peers.

The theories of Piaget and Vygotsky have many educational implications in terms of the child's learning, the teacher's teaching, and the role of adults in children's play. Piaget argued that the role of adults is only important when children are in a period of disequilibrium. The child has to be in the familiar setting, then the child makes a prediction about what the result is likely to be, and then the child notices that the result contradicts his prediction. Thus, the role of adults, according to this theory, is to induce the child into disequilibrium. In contrast, Vygotsky's notion is that the role of adults is to guide the child until the child can master the skill and to minimize the opportunity of errors. Modeling and feedback are critical. There is dialogue throughout these processes, and the adult uses language to induce the child into a zone of proximal development.

In summary, Freud, Erikson, Piaget, and Vygotsky considered play from different theoretical perspectives; thus, these theories offer different educational implications for teachers' roles in children's play. Distinctions between indoor and outdoor play are not made by these theorists.

Adults' role for promoting children's development

Research concerning the importance of adults in children's learning and development has investigated the roles of adults in promoting children's development from different perspectives. In parent-child interaction literature, play research indicates that toddlers engage in more complex forms of symbolic play when children play with their mothers than when they play alone (Fiese, 1990; O'Connell & Bretherton, 1984; Slade, 1987) and that mothers contribute to toddler play in different ways at different ages. Adults' involvement into children's cognitive development is maximized when adults concentrate their assistance at just above the level at which children can accomplish alone

(Vygotsky, 1978). Researchers have most often studied the impact of adult guidance on children's task performance during puzzle (Wertsch, 1979; Wertsch et.al., 1980), and counting activities (Saxe, Gearhart, & Guberman, 1984; Saxe, Guberman, & Gearhart, 1987). Results suggest that adults adjust their assistance to match or slightly exceed the level at which children are able to achieve alone, and the adults change their assistance according to children's success or failure.

Henry (1990) argues that when adults actively engage children in mutual pursuits every day, they enhance children's social, emotional, and cognitive development. He emphasizes adult roles as not only facilitators and supporters, but also as initiators and partners in children's leaning, and the importance of adult-child mutually directed activities.

A number of researchers have investigated the effect of teacher intervention on disadvantaged children's play, and revealed that direct adult involvement in children's play has beneficial effects on their cognitive growth and social competence. Active teacher involvement and participation improved the quality of children's play and resulted in improved problem-solving (Rosen, 1974; Simon & Smith, 1985), creativity (Dansky, 1980), verbal intelligence (Christie, 1983; Saltz, Dixon, & Johnson, 1977), language usage (Roger, Perrin, & Waller, 1987), perspective taking (LeMare & Rubin, 1987; Smith & Syddall, 1978), social skills (Rubin, 1980), and peer interaction (Cole, Meyer, Vandeercook, & McQuarter, 1986). Thus, teachers' direct involvement in play training promoted and encouraged a gain in children's cognitive development, i.e., problem solving, creativity, verbal intelligence, language usage, and perspective taking, as well as social skills such as cooperation, impulse control, and peer interaction.

Smith and Sydall (1978) examined the effects of play training by comparing one group of children in play-training sessions with another group of children in skill-training sessions. Results showed that the two groups got equal improvement in language and cognitive abilities. They concluded that the gain in language and cognitive abilities in other earlier studies may have been due to a lack of control for teacher contact in control groups.

Cristie (1983) examined play quality, verbal intelligence, and creativity in two groups, including a play-training group and a skill-training group. Both groups received a comparable amount of adult contact. Results showed that both the play-training and the skills-training group were effective in increasing children's verbal intelligence and ideational fluency, and that these gains were maintained on post-tests up to three months after treatment had ceased. Neither group had a significant increase in play quality. The author concluded that the play training gains were due to adult contact, rather than due to enhanced levels of play.

Frost (1992) maintained that the implication of these play training studies was that early childhood educators should engage children in tutorial interactions; however, these were short-term tutoring situations for low socioeconomic status children. Several types of tutoring were employed in the studies, and these may have varied from daily experience; therefore, one should distinguish carefully between experimental language and language used in common classroom settings. Further, Frost argues that adult tutoring is effective for improving children's cognitive and social skills, but the issue of the benefit of training versus other adult-child interaction remains unresolved.

Another view of the importance of adults' promoting children's development is studied by play training for teachers. Collier (1985) argued that play training for children lacks practical application of these techniques by "real" teachers in a "natural" setting. He examined the effects of preschool teacher training programs in fostering children's play. Three preschool teachers and 18 children were in an experimental group, and five teachers and 15 children were in a control group. Only the teachers in the experimental group received 11 two-hour sessions on techniques for facilitating children's play, on observing the leaning and development occurring in children's play, and on techniques for facilitating play through appropriate adult provision and interaction. Results showed that play training for teachers stimulated increased interaction and dialogue between teachers and children. Preschool children in the experimental group increased their mean verbal expression scores, and the effect increased in the delayed posttest.

Wade (1985) investigated the behaviors of five teachers (3 teachers of 3-year-olds and 2 teachers of 4-year-olds) and 69 children on the playground before and after completing a teacher training program. Each child was observed for a 25-second interval and coded once daily for 30 school days. The teachers' verbal and nonverbal playground behaviors were observed for ten-second intervals and coded for 10 minutes daily for 30 school days. At the end of the first 15-day observation period, a training program for the 5 teachers providing indirect teacher intervention techniques was conducted. Then the children and teachers were observed an additional 15 days. Results showed that the play behaviors of children were significantly different before and after teacher training, and that there were significantly greater post-training frequencies of the parallel-dramatic, group-dramatic, parallel constructive, and group-constructive play. The verbal playground behaviors of teachers were significantly different before and after the teacher training program. The teachers used more preparatory, dealing, questioning, extending, accepting, and praising categories. In addition, the nonverbal playground behaviors of teachers were significantly different after completing the training program. Teachers engaged more in behaviors of smiling, positive contact, and positive nodding, and no visible behavior was decreased. Wade concluded that increased teacher verbal and nonverbal intervention strategies influenced children's play behaviors, and the teachers' utilization of verbal and nonverbal teaching techniques stimulated higher levels of social and cognitive play behavior on the playground. The appropriate use of teacher verbal and nonverbal behaviors on playgrounds helps enhance children's cognitive and social play behaviors.

In summary, parents and teachers influence children's cognitive and social development. Research findings in parent-child interaction, play training, and teacher training reveal that effective and appropriate adults enhance children's creativity, problem-solving, and language development, and encourage social competency. Adults play an important role in children's learning.

Outdoor play curricula

Playgrounds should be learning environments that meet curricular objectives by encouraging child-initiated and teacher-supported play activities through safe and healthy experiences. They should also be supportive of healthy physical risk-taking experiences (Smith, 1990) and promote a variety of play activities that have graduated challenges (Esbensen, 1987; Henniger, 1994). Especially in early childhood settings, the teachers play an important role in establishing the quality of the program for young children (Dunn, 1993; Howes & Clement, 1994; Phillips & Howes, 1987; Rosenthal, 1991).

Bredekamp (1987) argues that the degree to which both teaching strategies and the curriculum are developmentally appropriate is a major determinant of the quality of an early childhood program. Developmentally appropriate practices (DAP) in early childhood education settings are both age appropriate and individually appropriate (Bredekamp, 1987). There are two basic assumptions underlying DAP: First, young children have different physical, social, emotional, and learning needs than older children and adults. Second, there are individual differences between children that should impact teaching practices. Same-age children vary widely in their rate of development, needs, interests, temperament, experiences, and cultural background. Further, Bredekamp and Rosegrant (1992) explain that DAP is a framework, a philosophy, or a guideline to determine the nature of early childhood programs. Good early childhood programs must adapt for individual diversity of all kinds, including children with special needs, cultural values, and individual variation in growth. Multicultural education that includes many dimensions, such as ethnicity, national origin, socioeconomic status, age, differential ability, and sexual orientation, is a continuing issue today (Williams, 1991).

A review of the NAEYC developmentally appropriate guidelines defines teaching strategies appropriate for 4- and 5-year-old children without distinguishing between play indoors and outdoors (Bredekamp, 1987). Selected identified strategies are:

> Teachers prepare the environment for children to learn through active exploration and interaction with adults, other children, and materials.
>
> Children select many of their own activities from among a variety of learning areas the teacher prepares, including dramatic play, blocks, science, math, games and puzzles, books, recordings, art, and music.
>
> Children are expected to be physically and mentally active. Children choose from among activities the teacher has set up or the children spontaneously initiate.
>
> Children work individually or in small, informal groups most of the time.
>
> Children are provided concrete learning activities with materials and people relevant to their own life experiences.
>
> Teachers move among groups and individuals to facilitate children's involvement with materials and activities by asking questions, offering suggestions, or adding more complex materials or ideas to a situation.
>
> Teachers accept that there is often more than one right answer. Teachers recognize that children learn from self-directed problem solving and experimentation (p. 54-55).

It can be argued that these guidelines are equally valid for outdoor play, as well as indoors, even though such a claim is not specifically stated in the guidelines.

Teachers of young children are rationally and intentionally responsible for each child, as well as the whole group of children assigned to their classroom (Katz, 1980). Goffiin (1989) discusses the complexities of teaching and learning and the importance of the teacher role for early childhood education before first grade. First, effective teaching is active teaching, and effective teachers are effective managers who use active teaching strategies. Second, effective teaching is not content-free; rather, it is content-bound. Third, effective teaching makes children active. Teachers need subject-matter knowledge and knowledge of classroom management for children to be active

learners. Fourth, effective teaching occurs during teacher planning (preactive teaching), teacher-child interaction (interactive teaching), and teacher reflection (reflective teaching), and teachers are decision makers. Fifth, effective teaching refers to active involvement of both teachers and children in the teaching-learning process. In addition, selected types of adult participation in children's play are viewed as valuable for children's development (Piaget, 1962; Smilansky, 1968; Smilansky & Shefatya, 1990; Vygotsky, 1966, 1978). In early childhood settings, the degree of teacher involvement in children's play represents the teacher's knowledge and perspectives on children's play development.

In summary, playgrounds are learning environments that meet curricular objectives. The degree to which both teaching strategies and the curriculum are developmentally appropriate is a major determinant of the quality of an early childhood program.

Setting the environment

Prior to actual involvement in children's play, teachers need to plan for children's play by setting the environment. Bredekamp (1987) indicates that it is necessary to provide plenty of space and time both indoors and outdoors for young children (age 3) to explore and exercise, with the teacher's assistance as needed. The goal is to create an environment in which the benefits of play are maximized and conflict is minimized (Ford, 1993). Teachers need to consider time, space, materials, and preparatory experiences in planning for children (Griffing, 1983; Johnson, Cristie, & Yawkey, 1987; Yawkey, 1990).

The first consideration for planning children's play is scheduling adequate time with suitable materials for children to develop their thinking. Ford (1993) suggests that activities requiring children to concentrate should be scheduled for the beginning of the day, when children are fresh and alert. The exact amount of time needed varies, depending on the age and play skills of the children (Johnson et al., 1987); 30- to 50-minutes of free choice play time is considered appropriate for 3-, 4-, and 5-year-olds (Griffin, 1983; Johnson et al., 1987; Yawkey, 1990). For monolingual and bilingual

preschoolers and kindergartners in full-day programs, a 60-minute free play period is recommended (Peters, Neisworth & Yawkey, 1985; Yawkey, 1990).

Generally, for preschoolers, it is preferable to schedule a longer play period than to have many short (10- to 15-minute) play periods per day (Johnson et al., 1987; Yawkey, 1990). This permits children to develop their thinking and generalize concepts through a variety of play activities without interruption. Katz and Chard (1989) argue that frequent interruptions threaten children's disposition to lose oneself in an activity and recommend that the daily program for young children should be flexible rather than fragmented in allocating time to various activities.

Space is the second consideration for early childhood educators when they are planning for young children. While the actual amount of space is not determined by the teacher, generally, it is an important consideration (Phyfe-Perkins, 1980). Spatial and social crowding affects children negatively, especially when space rations are below 25 square feet per child, because it may increase aggressive behavior and inhibit social interaction. Thirty-five square feet per child of activity space of indoors and 75 square feet per child of activity space of outdoors is often a minimum requirement (Accreditation criteria of NAECP, 1991).

The group size in early childhood settings has an impact on the quality and quantity of children's play. Crowding has a negative impact on social interactions of children. Field (1980) examined the play of preschoolers in classrooms with differing spatial arrangements and teacher-child ratios. She found that classrooms with a low teacher-child ratio and a partitioned play area facilitated peer interaction and dramatic play.

Further, rooms should also be arranged with playthings located at young children's eye level for children's accessibility and safety (Johnson et al., 1987). Teachers need to account for the amount of space available and how it is to be utilized for children to engage in more optimal play and interactions. In outdoor studies, Gets and Berndt (1982) examined the effects of the play features of amount, complexity, and arrangement of play resources on children's behavior during free play in a

gymnasium at child care centers in a midwestern area. According to their baseline-treatment-baseline (A-B-A) design study, they observed thirty 3- to 5-year-old children's behavior for 3 days as baseline, 3 days as treatment, and 2 days as return-to-baseline, changing the number of selection per child for play space. Results showed that conflicts among children rarely occurred during baseline or treatment, although there were only 0.8 (center A) or 1.4 (center B) activity selections per child for play spaces. However, during the post-treatment condition, there were 1.0 (center A) or 2.1 (center B) selections per child for play space, and conflict behaviors of the children increased. In addition, there was a significant increase in play participation from baseline to treatment condition. They describe "a child who participates by repeatedly riding a tricycle around and around a gymnasium with few other play resources available is having a significantly different experience from a child who participates by first throwing bean bags at a target, then cutting and pasting pictures..., and finally presiding over a birthday party for a favorite doll" (p. 303). They concluded that the visibility, accessibility, and variation in complexity level, and availability of alternate selections for play choice in gymnasium, affected children's play behavior.

A third consideration for planning young children's environments is the need for play materials, both quantity and quality, in the indoor and outdoor play environments. A national survey of outdoor play materials found that only 2.1% of the total of 349 preschool centers had building materials available on the playgrounds (Bowers, 1990); thus, constructional play materials were needed in outdoor areas.

Teachers need to plan for a variety and complexity of play units. Research shows that complex and super play units foster cooperative play and social interaction, and sustain group play (Kritchevsky et al., 1969). A variety of play spaces per child are necessary because each child's attention span differs and preschoolers need many choices to challenge their developmental potential through play activities.

In addition, teachers can prepare play materials from the perspective of movability (Aguilar, 1985; Brown & Burger, 1984; Naylor, 1985). In order to support and challenge their potential of learning, young children should have opportunities to move the play materials and equipment (Yawkey, 1990). Brown and Burger (1984) emphasize the value of vehicles to an outdoor educational environment to promote social interaction and language as well as gross motor skills. They suggest that the provision of appropriate materials is one of the most important playground design characteristics, and wheeled vehicles are an extremely valuable factor. Movement of the body, fine and gross motor skills, and coordination of those skills ensure children's motivation as a by-product of the play materials.

The final consideration of the teacher's role for setting the play environment is to plan preparatory experiences for children. Young children need real and concrete play experiences. Teachers need to plan and implement the concrete experiences as roots of play and learning (Yawkey, 1990). Trostle and Yawkey (1990) suggest that teachers can help clarify children's understanding by providing sources such as field trips, walks, resource people, and novel objects. For example, field trips to a post office, a railway station, and a carnival, and listening to the talk of people in different occupations and stories about different jobs, provide children with active experiences for their play activities and interaction. Role playing in indoor and outdoor environments requires children to use their prior knowledge and to act out roles as they understand them.

In summary, teachers have a responsibility to make provisions for children's play in terms of time, space, materials, and preparatory experiences in which children can explore, consolidate, and make meaning from their experiences. Teachers need to plan for play experiences in both indoor and outdoor settings.

Teaching strategies with young children

Teachers use a variety of strategies in supporting children's learning and being actively involved in their play. The categorization schemes used to describe these strategies generally

include verbal and behavioral interactions of the teachers. Bredekamp and Rosegrant (1992) argue "teachers of young children make hundreds of decisions each day about which specific teaching behavior or form of adult assistance is appropriate for this child in this situation at this point in her or his process of learning" (p. 39). Research studies examining teaching strategies vary in their degree of complexity; i.e., some are simple categories, some are strategies applied only during play time, and others vary in purpose and do not reflect play goals.

Tamburrini (1982) argues that it is important to distinguish between two kinds of interaction styles that teachers use in children's play, the redirecting style and the extending style. The redirecting style is utilized when teachers predominate with their own preconceptions and curriculum priorities, rather than on a prior assessment of what children are playing. The redirecting style includes the channeling of play activities into other kinds of activities and implicitly devalues children's play, although there are some situations when the redirecting style is required, for example, when play is low and repetitive. In contrast, the extending style requires first ascertaining the nature of children's intentions. A teacher's interaction may involve two kinds of appraisal, a diagnosis and an evaluation of children's play. In the extending style, a teacher helps a child to be more inventive to solve problems, and to be more imaginative in their play. Tamburrini (1982) recommends the extending style for two reasons. First, there is evidence that children function best when the adult's action synchronizes with children's intention and helps them elaborate and have meaningful activities. Second, the extending style implicitly values play.

Wood, McMahon, and Cranstoun (1980) analyzed preschool teachers' verbal interaction with children. Twenty-four preschool teachers made 30-minute audio recordings in their classrooms and then transcribed their own recordings. A total of fifteen hundred minutes of talk and interaction with teachers were analyzed using 26 categories. From their transcriptions, the authors revealed five major functions of teachers' verbalization, including management, instruction, pretend play, conversation, and rapport (p.34). Management included 6 categories, i.e., asking about intention,

directing, prohibiting, negotiating, indicating own intention, and providing services. Instruction referred to 8 categories, including marking action, describing environment, asking for description, instruction, assisting act, demonstrating, evaluating, and asking for evaluation. Pretend play referred to 3 categories, i.e., elaborating pretend symbolic play, acting as speaker for rules of the game, and allocating roles. Conversation referred to 5 categories, including asking for information, giving information, asking for causal explanation, giving causal explanation, and talking about reasons for others' actions. Finally, rapport referred to 4 categories, including agreement with child, disagreement with child, repeating what the child said, and monitoring. The authors concluded that most teachers accept their role in management and conversation with children but fewer teachers expected to play with the children. From their tapes, the author revealed that teachers were involved in children's play in four types of roles including parallel playing, co-playing, play tutoring, and being a speaker for reality.

Teachers as parallel player refers to the teacher playing with the child by using same materials but not interacting with the child. This type of adult involvement occurs often in functional play or constructive play (Johnson, Christie, & Yawkey, 1987). Teachers as parallel player comfort children and support them by indicating that play is worthwhile activity (Wood et al., 1980).

Teachers as co-player refers to the teacher joining in ongoing children's play, but letting them control the flow of the play. Teachers comment, ask questions, make suggestions, and respond, but the children's reactions, such as acceptance or rejection of teacher involvement, are not controlled. Teachers as co-player does not teach new behaviors, but introduces subtle extensions of play. Co-playing is successful with children who engage in high levels of sociodramatic play or constructive play, but are less successful with children who lack cognitive or social experiences and skills.

In play-tutoring, a teacher initiates a new play episode, takes a dominant role, and teaches the child new play behaviors. The ideas of teachers as play-tutors came from play training intervention. Smilansky (1968) identified inside intervention and outside intervention. In inside

intervention, the teacher takes on a role, actually joins in the children's play, and models the verbal exchanges. In outside intervention, the teacher does not actually get involved in the play but initiates and controls the flow of play. Whenever a teacher structures and controls a play, there is the danger that the activity may stop the children from getting involved; therefore, when the child begins the desired play behavior, the teacher phases out the play tutoring roles, according to Johnson et al.

In their scheme, the fourth type of teacher involvement in children's play is the teacher being a speaker for reality and trying to get the children to think about real-life consequences in their play. Teachers draw the child's attention to what happens in reality. These four teacher roles, such as parallel player, co-player, play tutor, and speaker of reality, occur when children are actually playing.

Another category of teaching behavior during play is proposed by Wolfgang and Sanders (1982). They propose the Teacher Behavior Continuum (TBC) for teachers who work in an open and dynamic play-centered preschool environment. The TBC continuum increases the intrusion by the teacher into the ongoing activities of the children, from "looking on, non-directive statements, questions, directive statements, modeling, to physical intervention (p.113)." This TBC is a construct for teacher facilitation of play. In a play environment, the teacher maintains an active looking-on position. Then the teacher gradually moves into the free-flowing play of the child using the increased power of non-directive statements, and questions. Wolfgang and Sanders (1982) argue that the general rule is that the minimum power levels of teacher behaviors are used; but when play is not progressing, such as repetitive or stereotypical, the teacher moves toward maximum power, such as physical intervention.

Dunn (1993) examined teacher strategies in child care classroom settings. In terms of teacher-child interaction, two types of teacher behaviors were assessed: teachers' divergent questioning of children, and teachers' facilitation or elaboration of children's play. An observer audio-recorded to describe interaction during a 2-hour observation period, recordings were transcribed and coded, and the divergent and elaborate interactions were then summed to create a single score.

In addition, teachers' guidance of social-emotional development was assessed according to teacher facilitation of children's self-control through positive guidance technique. The previously described audio recording was used to obtain a frequency of teachers' guidance techniques by the following categories: 1) giving praise or encouragement; 2) providing nurturance, comfort, help, or affection; 3) redirecting behavior or suggesting alternative activity. Frequencies of these behaviors were summed to create a total score.

A second measure of guidance was teachers' setting of limits for children. Limits were assessed from the transcription by the following categories: 1) teacher gives directive and child complies; 2) teacher gives directive and follows up until child complies; 3) teacher gives directive but does not follow up until child complies; and 4) teacher threatens action on which child cannot follow up.

Results showed that, in higher levels of classroom environment, teachers used more divergent questioning interaction strategies, facilitated or elaborated children's play, and set fewer limits for children. Teachers who engaged in higher levels of divergent and elaborate interactions used more praise, nurturance, and redirection than did limiting settings.

Rosko and Neuman (1993) observed qualities of teachers' role-taking in children's literacy-related play, and revealed that six teachers varied in their physical positioning, and in their level of intrusiveness as onlooker, player, and leader. They mention that the sets of teachers' behaviors were responsive to the play of the moment, and they created a cycle of adult involvement that extended children's literacy-related play.

Kontos, Banuelos, and Wilcox-Herzog (1994) examined preschool teachers' verbal support of children's play. "Twelve preschool teachers of varying levels of expertise in three different classrooms of high-quality, accredited preschool programs were audiotaped for 10 minutes on 3 different days during free play time using cordless microphones and remote tape recorders. ...Each teacher verbalization was coded into one of six mutually exclusive categories: facilitating cognitive

play, facilitating social play, socializing with child, behavior management, practical/personal assistance, and talking with another adult" (unpublished abstract). Result showed that preschool teachers are more supportive of cognitive play rather than social play.

Shin and Spodek (1989) examined the relationship between children's play patterns and types of teacher involvement in four preschool settings, such as manipulative, art, dramatic, and constructive areas, during indoor free play. Teachers and children from ten classrooms were observed on 5 days during free classroom play using event sampling. They found that the most frequent teacher involvement in the social play categories occurred during solitary play, and those in the cognitive categories occurred during constructive play. In addition, different patterns of teacher's involvement were used in each of the four play areas, including manipulative area, art area, dramatic area, and constructive are: Teachers entered children's play in the art area most often and in the dramatic area least often. Results indicated that teachers influence children's play by how teachers intervene in the children's play.

More recently, Bredekamp and Rosegrant (1992) argued that teaching young children is a complex activity because the teachers of young children face the complexity of options and make decisions every day that depend on a situation and a child's learning level. They proposed a continuum of teaching behaviors, ranging from non-directive to directive that describes teachers' behavior more completely. The behaviors vary in degree of intrusiveness; they are "acknowledge, model, facilitate, support, scaffold, co-construct, demonstrate, and direct" (p. 39).

"Acknowledging is giving attention and positive encouragement" (p. 40). Modeling is teacher's displaying for children the desirable behaviors, and has both implicit and explicit forms: The implicit modeling is less directive, and the explicit modeling is more directive. For example, if polite conversation is valued, teachers speak courteously and kindly to children (the implicit modeling). "Facilitating is usually temporary assistance to help children get to the next step as the child is ready (p. 40)." Supporting allows children to participate, but with clearly available assistance.

Scaffolding is "setting up challenges and assisting children to work "on the edge" of their current competence or for pushing the limits of their current developmental level (p. 40)." Co-constructing is actually doing a project or an activity with the child, and "...the teacher and the child are both learners and both teachers simultaneously (p. 40)." Demonstrating is the teacher's active participation while the children observe the outcome of the demonstration, and it is appropriate when an activity can be done in a way that is wrong or unsafe. Directing instruction is the more intrusive end of the continuum.

Bredekamp and Rosegrant (1992) argue that dichotomies such as child-initiated versus teacher-directed in early childhood education are too simplistic, and that the true dilemma in a decision about teacher-child interaction depends on what is best for the child in this situation working toward this goal. Interactive teaching is related directly to how children learn to be aware, explore, inquire, and utilize their knowledge, and all of these teaching behaviors are appropriate at certain times and under certain conditions. In this study, Bredekamp and Rosegrant's teaching continuum is used because this describes teacher behaviors more completely, and because it is applied to both indoor and outdoor play time.

In summary, teachers use a variety of strategies in supporting children's learning and being involved in their play. Research findings examining teaching strategies vary in their degree of complexity. Some are simple categories, such as, redirection and enhancement; some are strategies applied only during play time, such as parallel player, co-player, play-tutor, and a speaker of reality; and the others vary in their purpose.

In outdoor playground research, some researchers emphasize the importance of adults' provisions and interactions (Brown & Burger, 1984; Esbensen; 1987, 1990; Hayward et al., 1974). With an absence of research concerning teachers' roles in children's outdoor play, the need exists to examine the teacher involvement in children's play in outdoor settings.

Teacher involvement in children's play environment

This study reflects a model of teacher involvement in children's play environment that is presented in Figure 1. Children's play is influenced by both their physical environment and their psycho-social environment. Teacher involvement in children's play is affected by various factors,

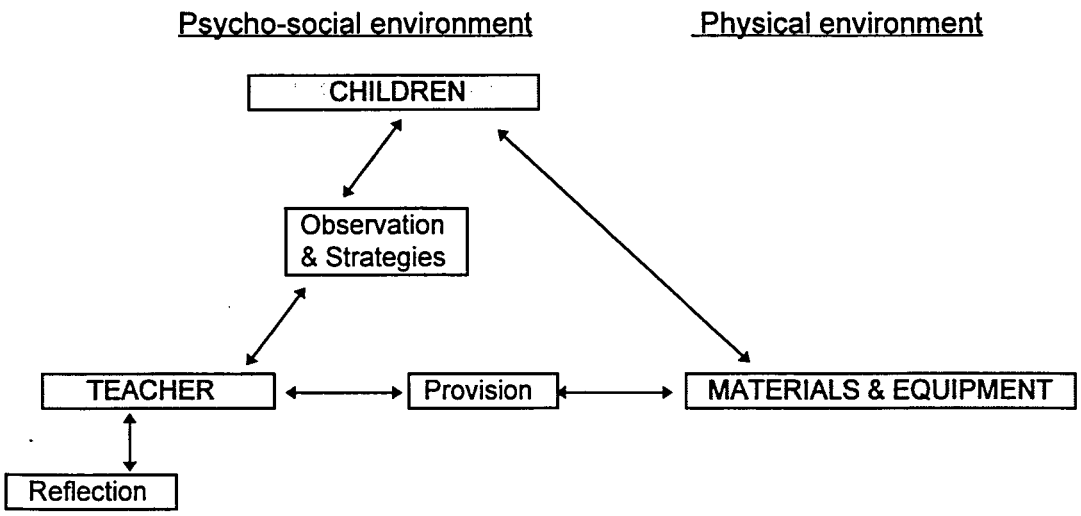

Figure 1. Teacher involvement in children's play environment.

such as children themselves, the physical environment and the psycho-social environment. Each child differs because of the child's age, needs, interest, developmental level, and cultural background. The physical environment includes teachers' provision of time, space, and materials, play areas, the location of indoor and outdoor, temperature, season, region, and culture. The psycho-social environment includes peers, teachers, families, and school. Children are viewed as developing persons who play an active roles in their physical and psycho-social environment. In turn, the physical and psycho-social environmental factors operate interactively to affect children's behavior and learning (Frost, 1992). Therefore, children and their physical and psycho-social environment interact mutually and negotiate their relationship over time in response to changes in one another (Garbarino, 1989).

In this study, teachers were focused on, that is, how teachers interact with children using their verbalizations and behaviors and how they provide equipment and materials for children's outdoor physical setting. The teachers influence children through observation and strategies used as shown in Figure 1. The teachers also influence the physical setting through their provision of materials and equipment; this relationship is also shown in Figure 1.

In terms of teachers' roles in children's play, there are three phases of teaching that Goffin (1989) presents. Effective teaching occurs during teacher planning (preactive teaching), teacher-child interaction (interactive teaching), and teacher reflection (reflective teaching). In this study, how teachers plan before children enter the playgrounds, how the teachers set the physical environment outdoors, what the teachers do during outdoor play time, and what kinds of interactions and strategies are used were examined.

The purposes of this study are to examine preschool playground quality and teachers' behavior on those playgrounds and to investigate preschool teachers verbalizations and behaviors during outdoor free play time. The specific objectives of the study are:

1. To examine the relationships of the quality of playgrounds, i.e., complexity, variety, play spaces per child, and loose parts.
2. To examine the quality of preschool playground environment across three time periods, that is before outdoor play time, at the beginning of outdoor play time, and 10-minutes after outdoor play has begun.
3. To explore the preschool teachers behavior and verbalization during children's outdoor play.
4. To examine the relationships between the quality of the playground environment and the verbal interactions and behaviors of teachers with preschool children.
5. To examine the relationships between the playground environment prepared by the teacher (teacher provision) and the behaviors and verbal interactions of teachers with preschool children (teacher interaction).

6. To examine the relationships between the play areas and the behaviors and verbal interactions of teachers with preschool children.

The following is a model of the five variables in this study (see Figure 2). The independent variable is quality of playgrounds, the dependent variable is teachers' behaviors and verbalizations. The third variable is teachers' background, the fourth variable is play area, and the fifth variable is the existence of portable equipment.

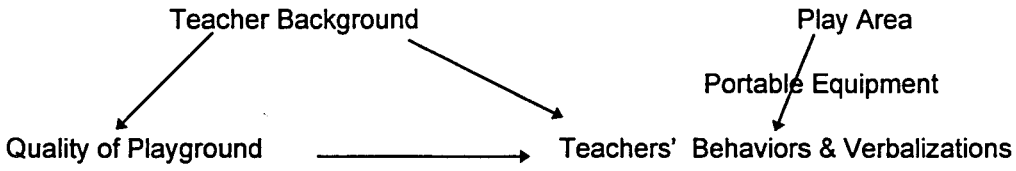

Figure 2. The proposed model.

The research questions examine the relationship between the quality of the preschool playground on teachers' behaviors and verbalizations. The specific research questions are:

1. What kinds of equipment and materials are used on preschool playgrounds?
2. What relationships exist among the preschool playground quality variables?
3. How do day, playground location, and teacher influence the quality of preschool playgrounds?
4. How do the preschool teachers use their teaching and non-teaching strategies on playgrounds?
5. How do day, playground location, and teacher influence the preschool teachers' behaviors and verbalizations?
6. How are teachers' behaviors and verbalizations related to the quality of preschool playgrounds?
7. How are preschool teachers' behaviors and verbalizations related to playground play areas?
8. How are preschool teachers' behaviors and verbalizations related to their background?

METHOD

Sample

The sample consisted of ten head teachers from five child care programs in a midwestern university community. Two head teachers from each program were observed. Child care programs were selected for the study if: a) an unstructured time during the outdoor play period could be scheduled, b) the head teachers could be present on the playground to interact with the children, c) a continuous thirty-minute outdoor play period was part of the daily schedule, d) the playground was enclosed and had some play equipment available, and e) the designated head teacher, her staff, and her group of children would be alone on the playground during observation time. Head teachers for the study were recruited, first, by contacting the directors of six child care programs by mail stating these criteria and explaining the study (see Appendix B). Five centers (83%) agreed to participate. After receiving approval from the directors, letters with consent forms were mailed to the eligible teachers (see Appendix B). Thirteen teachers were invited to participate in the study, and twelve teachers (92%) agreed to participate. Only ten teachers, who were primarily teaching 4-year olds, were selected for the study.

Programs

Three of the participating child care programs were day care programs and two offered half-day preschool programs. Four of the participating centers were nonprofit programs. One program was accredited by the National Academy of Early Childhood Programs (NAECP) and a second program had submitted materials for the NAECP validation process. The children were primarily 3- and 4-year-olds. Average classroom group size during observations was 12.8 (SD = 2.5) and average group size enrolled was 16.5 (SD = 1.3). Average ratio of adults to children during observations was 1: 5.4 (SD = 2.0) and average ratio of adults to children enrolled in the participating classroom was 1: 5.3 (SD = 2.3) (see Table 2).

Table 2

Descriptive statistics for background information and quality of playgrounds

Variable name	M	SD	Range
Background information			
Group size enrolled	16.50	1.27	15—18
Group size observed[a]	12.77	2.47	8—18
Ratio enrolled	1: 5.26	2.33	1: 2.43—1: 8.50
Ratio observed[a]	1: 5.37	2.05	1: 2.80—1: 12.00
Teacher education years	15.80	1.75	12.00—18.00
Teacher experience years	7.25	5.41	1.5—18.0

Note. [a]Group size observed and ratio observed were measured at beginning of observation.

Teachers

All of the head teachers were white females. Six out of the ten teachers had completed a bachelors degree in early childhood education or a related field. The teachers' mean number of years of teaching experience with young children was 7.3 years (SD = 5.4) with a range of 1.5 to 18 years (see Table 2).

Measures

Five measures were used for the study. Three measures were for playgrounds and two of them were for teachers. Playground measures were quality of outdoor playground, play area, and portable equipment and materials. Teacher measures were teachers' behaviors and verbalizations, and teachers' demographic information.

Quality of outdoor preschool playground

The outdoor play environment was evaluated for complexity and variety of equipment and materials, number of play spaces per child, and loose parts items. The measures are described below.

Complexity of equipment. The quantification of the outdoor preschool playgrounds follows the Kritchevsky, Prescott, and Walling (1969) protocol for evaluating the quality of play spaces. Their operational definition for complexity of equipment is:

> the extent to which they contain potential for active manipulation and alteration by children. Elaborating on this distinction, it is possible to discern three types of play units---simple, complex, and super, which vary both in their relative capacity to keep children interested, and in the relative number of children they can accommodate at one time (p.10).

A simple play unit has one obvious use, and it does not have sub-parts or a juxtaposition of materials that enable the child to manipulate or improvise, such as swings, jungle gym, and tricycles. A complex play unit has sub-parts or a juxtaposition of two essentially different play materials that enable the child to manipulate or improvise. Also included in this category of play units are single-function materials and objects which encourage substantial improvisation and/or have a considerable element of unpredictability, such as a sand table with digging equipment, a playhouse with equipment, all art activities (dough or paper), and an area with animals. A super play unit is a complex unit which has one or more additional play materials, i.e., three or more play materials juxtaposed, such as a sand box with play materials and water, a climber with slides and tires, and a table with playdough and tools.

A play unit is categorized as either a simple unit, complex unit or super unit. A simple unit is assigned a value of 1, a complex unit is assigned a value of 4, and a super unit is assigned a value of 8, using this protocol. Following the assignment of values for each play unit, the scores of the complexity of equipment and materials of the preschool playground are summed to obtain a total

score. A higher complexity score indicates that there are more play spaces on the playground than represented by a lower score (see Appendix C).

Variety of equipment. The operational definition for variety of equipment is:

> the number of different kinds of units (only in terms of differences in activity, and regardless of whether they are simple, complex, or super)...and is a measure of the relative capacity of the space to elicit immediate interest from children" (Krichevsky et al., p.12).

The equipment categories used to determine the variety of equipment are large rockers, smaller rockers, climbing units, hanging units, wheel toys, slides, swings, empty, low prototypical house, empty, high prototypical house, single props, housekeeping center, building equipment, table toys, manipulatable cars, books, digging area and equipment, animal with or without a cage, water pump, climbing tree, swimming pool, water table, art equipment, and miscellaneous. Specific examples of each category are listed in Appendix D.

The equipment and material categories checklist is provided in Appendix E. Both equipment and material items are evaluated for variety. A variety score is summed across these categories.

Number of play spaces per child. The operational definition for number of play spaces per child is:

> when the total number of play spaces of a yard or room is determined, this sum can be divided by the number of children expected to use the space....the ratio gives the approximate number of play spaces available to each child at any given time (Krichevsky et al., p.13).

Based on the relative value of simple, complex, and super units of equipment and materials, Krichevsky et al. devised a method for approximating what is called the number of play spaces for a particular classroom or playground. The number of play spaces per child is determined by the total number of play spaces on a playground divided by the total number of children using the playground. The ratio of the total number of play spaces and children gives the approximate number of play

spaces available to each child. The number of play spaces per child on the playground is calculated using the following formula.

$$\text{\# of play spaces per child} = \frac{\text{total \# of play spaces of playground}}{\text{total \# of children}}$$

Loose parts. The operational definition of loose parts is unattached, interchangeable, and manipulative elements and materials available to be used in an infinite variety of ways by children (Nicholson, 1974). Loose parts items are readily movable and portable by children. The number of loose parts items are counted and summed. Examples of loose parts items are sand equipment, cars, chalk, balls, tires, and hoops. The loose parts measure is used to offer a more precise indicator of playground quality.

Play area

The play areas on the playgrounds were placed into one of the following five categories. The areas are 1) sand box and sand area, 2) stand-alone swing, slide, and rocker, 3) basketball hoops, 4) climber with parts, climbing tree, and enclosed space, and 5) open area, bench and buildings. Examples of the sand box and sand area are sand boxes, sand tables, pea gravel with defined space, and loose composite material with defined space. Examples of stand-alone swing, slide, and rocker are swings, tire swings, bench swings, sliding poles, slides, rocking boards, see-saws, and rocking tubes. Examples of a climber with parts, climbing trees, and enclosed space are climbing steps, jungle gyms, balance beams, hanging bars with climbers, net with climbers, play houses, tents, large empty crates, and tunnels. Examples of an open area, bench, and buildings are tables with benches, buildings, structures, and deck with no equipment or materials within 10 feet. These categories were defined by the author based on observations of local preschool playgrounds and modified from Bowers (1987), Hayward, Rothenberg, & Beasley (1974) and Shin & Spodek (1991).

For this study the play areas were classified from the videotapes every 10 seconds in one of five mutually exclusive categories (see Appendix F). Thus, 1,800 judgments were made to categorize the play areas where the teacher was located (N = 6 10-seconds intervals x 10 minutes x 3 days) for each teacher.

Portable equipment and materials

Portable equipment and materials were items added to the fixed playground equipment by the teacher. These items often are tricycles, wagons, balls, tires, hoops, bubbles, water tables, parachute, sand equipment, art equipment, and music equipment. The portable equipment and materials were recorded every 10 seconds if they were present on the playground. This item was developed by the author to examine in detail the nature of the open area.

Teachers' behaviors and verbalizations

A continuum of teaching strategies, ranging from non-directive to directive teaching and describing teachers' behaviors, was adapted from Bredekamp and Rosegrant (1992). The strategies are acknowledging, modeling, facilitating, supporting, scaffolding, co-constructing, demonstrating, and directing, and they are considered mutually exclusive categories. In addition to these teaching categories, several non-teaching categories, such as, observing, talking with other adults, maintenance/preparation, and practical/personal assistance were examined also. The operational definitions of the 8 categories of teaching and 4 categories of non-teaching interaction strategies are presented below. Validity and reliability are not available for this measure.

Acknowledging. The teacher gives attention and positive encouragement, notice, and approval of the child's behavior. Examples are nodding, smiling, holding the child, and signaling okay to the child with a hand signal.

Modeling. The teacher displays desirable behaviors for the children in either implicit or explicit forms. Implicit modeling is less directive while explicit modeling is more directive. For example, the teacher uses implicit modeling when she speaks courteously and kindly to the children.

Facilitating. Verbal and nonverbal behavior of the teacher provides structure to the ongoing behavior of the child, and is designed to keep the child engaged in a child-focused play activity with toys and materials. The teacher keeps the child engaged in ongoing play or teacher-child interaction, but without any attempt to modify, change, or elaborate his/her behavior. For example, the teacher offers help by holding the back of the bike for a brief moment until the child gains a sense of balance, or she offers help by saying, "Do you want a bucket?" or "Do you want to use chalk?"

Supporting. The teacher and child together determine when support is no longer necessary and the teacher allows the child to participate but with clearly available assistance. Examples are "Push the bike yourself. I'll be back," "Grasp this bar with your hands and put your feet on that bar," and "I will be here while you are on the swing."

Scaffolding. The teacher recognizes what tasks the child can accomplish alone and what tasks the child can accomplish with the assistance of teachers, then sets up challenges and assists children to work "at the edge" of their current level of competence or by extending the limits of their current developmental level. Examples are "How can everyone have a turn?" and "How is your building like mine?"

Co-constructing. The teacher actually does an activity with the child where both the teacher and the child are learners and teachers simultaneously. For example, the teacher builds a block structure with a child, or they have a tea party in the house area as equal players, or the teacher and child swing on separate swings at the same time.

Demonstrating. The teacher actively participates while the child observes the demonstration. The child does not need to repeat the demonstrated activity but the teacher acts intentionally. An example is when a teacher draws a circle on the cement with a piece of chalk while a child watches her.

Directing. The teacher imposes order, and insists that the child perform a behavior unrelated to her ongoing play or course of action. The teacher both directs the child's behavior away from her

ongoing play, and requires her to perform or engage in a teacher-selected activity. The teacher verbally and/or physically demands that the child perform a particular behavior in a specific way. For example, the teacher directs the child by saying "Stop throwing sand," and/or holding the child's hand, or " Put the bucket with water right down here so everyone can get to it," and "I will call the name and that's the person who will go under the parachute."

Observing. The teacher watches the child play but neither talks to the child nor actively directs behavior toward the child. The teacher appears interested in observing what the child is doing. For example, the teacher walks around the climber and watches while the children are playing on a climber.

Talking with another adult. The teacher talks with another adult, such as a parent, volunteer or another staff member about any topic. The primary focus is the adult interaction.

Maintenance/preparation. The teacher adds materials and equipment to the playground or prepares other activities. An example is the teacher adds shovels and buckets to the sand and then pours water on the sand.

Practical/personal assistance. The teacher and children engage in routines of eating, dressing, toileting, and comforting. For example, the teacher helps a child zip up his/her coat or rocks a child while sitting on a bench.

In this study, the teachers were videotaped and those videotapes were transcribed for coding. The teachers' verbalizations and behaviors on the playground were coded every 10 seconds for 10 minutes into one of these twelve mutually exclusive categories—acknowledging, modeling, facilitating, supporting, scaffolding, co-constructing, demonstrating, directing, observing, talking with another adults, maintenance/preparation, and practical/personal assistance (see Appendix F). There were 1,800 recordings for ten teachers (N = 6 10-seconds intervals x 10 minutes x 3 days x 10 teachers).

Teachers' demographic information

The teachers' number of years of education and number of years of teaching experiences were used as measures of teachers' background. Teacher interviews were done on the final day after all observations had been completed (see Appendix G).

Procedure

Preliminary recordings of playground equipment and materials, and teachers' behaviors and verbalizations were completed during the summer. Four teachers participated in the pilot study to determine the appropriateness of the procedures, accuracy of the measures and the overall plausibility of the study. The playgrounds were coded using the complexity, variety, play spaces per child, and loose parts measures. Teachers' behaviors and verbalizations on the playgrounds and play areas were videotaped and audiotaped for at least 10 minutes on 3 different days. Revisions were made in the number of play area categories by collapsing thirteen categories to the 5 categories presented. The pilot videotapes were used later for the training of coders (see Appendix I).

The data were collected in a six-week period on fair-weather days in September and October. The five playgrounds were assessed in terms of equipment and materials using complexity, variety, number of play spaces per child, and loose parts items at three different times for each teacher on 3 different days during their preschool outdoor play time. First, the original preschool playground quality was assessed by recording the original preschool playground equipment and materials and any materials left by others and were not part of the target head teacher's planning. Second, equipment and materials on the playground at the beginning of outdoor play was recorded, that is, how much the teacher prepared before the children went out on the playground. Third, equipment and materials of the end of program observation was recorded at 10-minute observation periods.

The teachers wore a cordless microphone so their verbal interactions could be clearly recorded and videotaped. A 10-minute informal interview with the teacher concerning her education and experiences, number of boys and girls in their classroom, and aspects of outdoor planning was done on the final recording day after all observations were completed (see Appendix G).

Analyses

Coding and reliability

Quality of playgrounds. The written listings of equipment and materials for each playground were prepared by the author. The author visited all five playgrounds and recorded the equipment and materials present for every day of observation at three different times, i.e., before the teacher and children entered the playground (time 1), when they entered the playground (time 2), and 10 minutes after they had been on the playground (time 3). Following data collection, a second coder evaluated 10% (n = 3) of the thirty completed outdoor preschool playground equipment and materials recording forms. The author and an early childhood education graduate student, who was naive to the purpose of the study, judged the quality of the playgrounds using the measures of complexity, variety, play spaces per child, and loose parts following training sessions (see Appendix I).

Interobserver reliability of quality of playgrounds. Scott's coefficient of intercoder agreement was computed to measure intercoder reliability for playground complexity, variety, number of play spaces per child, and loose parts items. Scott's coefficient of intercoder agreement is defined as

$$(Po - Pe) / (1 - Pe)$$

where Po is the observed proportion of agreement while Pe is the expected proportion of agreements (Kotz, Johnson, & Read, 1988; Scott, 1955).

Interrater reliability was established for 10% (n = 3) of the playground observations with a value of 1.00 (100% agreement) for each of the measures, i.e., complexity, variety, play spaces per child, and loose parts.

Coding videotapes. All audiotaped recordings of the teachers' verbalizations on the playgrounds were transcribed by 3 students in early childhood education and family studies. The transcriptions were coded using a time-sampling procedure for each 10-second time interval for teachers' verbalizations, play area categories, and the presence of portable equipment and materials. Whenever more than one category of verbalization or play area was observed, the interval was coded for the category or area occurring for the longest amount of time.

The same two coders judged the outdoor play videotapes for teachers' verbalizations, play area categories, and the presence of portable equipment and materials following training sessions and after establishing reliability (see Appendix I).

Interobserver reliability of videotapes. Scott's coefficient of intercoder agreement was computed to measure the intercoder reliability for teachers' verbalizations, play area categories, and the presence of portable equipment and materials. Interrater reliability was established for 10% (n = 3) of total observations for 10-minute intervals. The interobserver agreement of teachers' behaviors and verbalizations was .81. The interobserver agreement of play area was .98. The interobserver agreement of the existence of portable equipment and materials was .94.

RESULTS

This chapter presents the interrelationships among quality of preschool playground variables and teachers' behaviors and verbalizations. Then, the following relationships are examined: 1) the relationships between quality of playgrounds and teachers' behaviors and verbalizations, 2) the relationships between play areas and teachers' behaviors and verbalizations, and 3) the relationship between the teachers' background and their behaviors and verbalizations.

Quality of Preschool Playgrounds

Preliminary data and analyses concerning playground variables

Preliminary data analyses were performed by examining the frequency distributions of playground variables. Measures of central tendency (i.e., mean) and the measures of variability (i.e., range and standard deviation) were employed to obtain characteristics of the variables of complexity, variety, play spaces, and loose parts across the three time periods. A fourth set of variables called complexity added, variety added , play spaces added, and loose parts added was created to examine the extent to which teachers provided equipment and materials to enhance outdoor play, i.e., the differences between permanent and fixed equipment and materials and toys left outdoors from previous groups of children and 10 minutes after the children began outdoor play (see Table 3). An average of 8.0 items, i.e., a variety of materials and equipment, were on the playground before teachers or children entered the playground, and teachers added an average of 1.7 items (range 0-5 items).

What relationships exist among the preschool playground quality variables?

First, the intercorrelations among the playground quality variables were examined. The variables were combined according to similar type of playground quality. Then, all playground observations (N = 30) were categorized into two groups, low and high quality playgrounds, for the

Table 3

Descriptive statistics for quality of playgrounds

Variable name	M	SD	Range
Quality of playgrounds			
Complexity time 1[a]	38.47	7.47	29.00---55.00
Complexity time 2[b]	49.40	12.83	30.00---83.00
Complexity time 3[c]	52.00	14.52	30.00---95.00
Complexity added[d]	13.53	12.06	0.00---49.00
Variety time 1[a]	8.00	1.53	7.00---12.00
Variety time 2[b]	9.40	1.75	7.00---13.00
Variety time 3[c]	9.73	1.65	7.00---14.00
Variety added[d]	1.73	1.38	0.00---5.00
Play spaces per child time 1[a]	3.12	0.76	1.90---4.60
Play spaces per child time 2[b]	3.95	0.85	2.30---5.90
Play spaces per child time 3[c]	4.11	0.92	2.70---6.30
Play spaces per child added[d]	0.98	0.88	-0.7---3.2
Loose parts time 1[a]	4.37	4.04	0.00---10.00
Loose parts time 2[b]	22.43	21.43	0.00---93.00
Loose parts time 3[c]	27.03	20.77	0.00---93.00
Loose parts added[d]	22.33	19.21	0.00---84.00

Note. [a]Time 1 was measured before outdoor play, [b]time 2 was measured at the beginning of outdoor play, [c]time 3 was measured after 10-minutes of outdoor play observation, and [d]added was the difference between time 3 and time 1.

three time periods and a change in playground quality variable, called added, was created. The time periods were before the playground was used every day (time 1), at the beginning of outdoor play (time 2), and at the end of the 10-minute observation time (time 3). The other playground quality variable was the change in the playground between time 1 and time 3, called added.

Intercorrelations among playground quality variables. Tables 4 to 7 present correlation coefficients among playground quality variables. Results of correlation coefficients among complexity variables showed that all of the complexity variables of the four reporting time periods were positively correlated. The variety variables were positively correlated except for the correlation between variety

at time 1 and added. The play spaces per child were also positively correlated across the four reporting time periods, except for the correlation between play spaces at time 1 and added. In other words, teachers with playgrounds of lower variety at time 1 were more likely to increase variety during time 2 and time 3 than teachers with playgrounds of higher variety at time 1. Similarly, teachers with playgrounds that had fewer play spaces per child were more likely to increase the number of play spaces per child during time 2 and time 3 than teachers with playgrounds which had more play spaces per child at time 1. All of the loose parts variables were positively correlated.

Table 4

Correlation coefficients among complexity variables across reporting times

	Complexity time 1	Complexity time 2	Complexity time 3	Complexity Added
Complexity time 1	--			
time 2	.52 **	--		
time 3	.56 **	.96 ***	--	
Added	.05	.83 ***	.86 ***	--

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

Table 5

Correlation coefficients among variety variables across reporting times

	Variety time 1	Variety time 2	Variety time 3	Variety Added
Variety time 1	--			
time 2	.59 ***	--		
time 3	.62 ***	.94 ***	--	
Added	-.37	.47 **	.51 **	--

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

Table 6

Correlation coefficients among play spaces variables across reporting times

	Play Spaces time 1	Play Spaces time 2	Play Spaces time 3	Play Spaces Added
Play Spaces time 1	--			
time 2	.49 **	--		
time 3	.47 **	.92 ***	--	
Added	-.38 *	.55 **	.64 ***	--

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7

Correlation coefficients among loose parts variables across reporting times

	Loose Parts time 1	Loose Parts time 2	Loose Parts time 3	Loose Parts Added
Loose Parts time 1	--			
time 2	.47 **	--		
time 3	.53 **	.90 ***	--	
Added	.39 *	.89 ***	.98 ***	--

* $p < .05$. ** $p < .01$. *** $p < .001$.

Combining playground quality variables. The internal consistency of the four quality of playground variables was investigated for both individual raw scores and standardized scores for each variable separately using Cronbach's correlation analysis. Cronbach's alpha provides a means for evaluating multiple-item additive scales through the computation of coefficients of reliability in terms of consistency and direction (Cronbach, 1951; Hull & Nie, 1979). Results indicated that the three standardized variables, that is standardized complexity, standardized variety, and standardized play spaces, had much stronger relationships than those for the three raw data variables across all three time periods (time 1, $\alpha = .78$ vs. .44; time 2, $\alpha = .84$ vs. .36; time 3, $\alpha = .86$ vs. .33) (see Table 8). The three standardized data variables were strongly correlated across the three time

periods (see Tables 9, 10, and 11), which results in high values of Cronbach's alpha. The fourth variable, loose parts, had relatively low correlations and some negative correlations with other variables (see Tables 9, 10, and 11). For example, in time 1, loose parts had negative relationships with complexity 1 and variety 1, which results in a low Cronbach's alpha in time 1 (see Table 9). Based on these measures of internal consistency, it is reasonable to combine the 3 standardized variables as one variable, and use the standardized loose parts variable as a second variable. Thus, in this study, two variables were used to measure the quality of the preschool playground. One variable, named the Quality variable, is a mean created from the combined standardized complexity score, the standardized variety score, and the standardized play spaces score. A Quality variable was created for each time period. For example, Quality 1 is the mean of combined standardized complexity 1, standardized variety 1, and standardized play spaces 1. Quality 2, Quality 3, and Quality Added are computed similarly. The other variable is the standardized score for loose parts; it is referred to here as Loose Parts.

Table 8

Cronbach's coefficient alpha for quality of playgrounds

	3 variables		4 variables	
	Raw Data Variables	Standardized Variables	Raw Data Variables	Standardized Variables
Time 1	.44	.78	.19	.53
Time 2	.36	.84	.46	.81
Time 3	.33	.86	.37	.76

Note. 3 variables indicate complexity, variety, and number of play spaces per child. 4 variables indicate complexity, variety, play spaces per child, and loose parts.

Table 9

Correlation coefficients among playground quality variables before outdoor play (time 1)

	Complexity 1	Variety 1	Play Spaces 1	Loose Parts 1
Complexity 1	--			
Variety 1	.78 **	--		
Play Spaces 1	.50 **	.35	--	
Loose Parts 1	- .16	-.21	.08	--

** $p < .01$.

Table 10

Correlation coefficients among playground quality variables at the beginning of outdoor play (time 2)

	Complexity 2	Variety 2	Play Spaces 2	Loose Parts 2
Complexity 2	--			
Variety 2	.88 **	--		
Play Spaces 2	.65 **	.41 *	--	
Loose Parts 2	.44 *	.40 *	.31	--

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

Table 11

Correlation coefficients among playground quality variables after 10-minute outdoor play observation (time 3)

	Complexity 3	Variety 3	Play Spaces 3	Loose Parts 3
Complexity 3	--			
Variety 3	.86 **	--		
Play Spaces 3	.70 **	.45 *	--	
Loose Parts 3	.28	.28	.07	--

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

As defined above, the notation of "Quality" is used to indicate the means for the combined standardized complexity score, standardized variety score, and standardized play space. "Quality 1" indicates the "Quality" of the playground at time 1, that is, the quality before the playground is used by the teacher or children each day; generally this refers to the fixed, permanent playground

equipment and materials. "Quality 2" indicates the "Quality" of the playground at time 2, that is the quality as the children arrive on the playground, including any materials provided on the playground by the staff for outdoor play. "Quality 3" indicates the "Quality of time 3, that is, the quality at the end of the 10-minute observation time, and "Quality Added" indicates the "Quality" of added, that is, the change in the playground quality between time 1 and time 3.

Determining high and low quality of playgrounds. Using the Quality variables, the playgrounds were categorized into low and high quality using standardized scores for each observation day at times 1, 2, and 3, and for added (see Table 12) to measure the quality of each playground each day at each time period, and to examine the relationships between low and high quality playgrounds and other variables, such as teachers' verbalizations. The standardized scores reveal that the quality of the same playground during the same time period, such as Quality 1, changed across the 6 observation days. Thus, each playground was designated either a low-quality playground or a high-quality playground for each day of observation.

Using the Loose Parts variables, the playgrounds were categorized into low and high quality using standardized scores for each observation day at times 1, 2, and 3, and for Added (see Table 13). The standardized scores revealed that the loose parts of the same playground during the same time period, such as Loose parts 1, changed across the 6 observation days. Thus, each playground was designated a low-quality playground or a high-quality playground for each day of observation.

What relationships exist among the created preschool playground quality variables?

For the following analyses, pairwise plots of playground quality variables are produced in order to examine the relationship among the playground quality variables visually. The plots are located in Figures A1 through A12 in Appendix A.

Relationships among the created playground quality variables at four reporting times. Relationships among the created Quality variables were examined. As shown in Figure A1, Quality 1 and Quality 2 were positively correlated, but the correlation was not strong ($r = .45$, $p < .05$) (see

Table 14). In addition, Quality 1 and Quality 3 were positively correlated (see Figure A2) (r = .52, p < .01) (see Table 14). As shown in Figure A2, among 30 observations, 5 observations had low Quality 1 and high Quality 3, while 8 observations had high Quality 1 and low Quality 3. In order to examine the teachers' preparation for play on the playgrounds by their addition of equipment and materials, the relationship between Quality 1 and Quality Added was examined. There was a negative relationship between beginning outdoor play quality (Quality 1) and quality added (Quality Added), although it was not significant (see Figure A3 and Table 14). Teachers with lower-quality playgrounds tended to add more equipment and materials to the playgrounds either before the children went outdoors to play or during the outdoor play time than did teachers with higher-quality playgrounds. Observations with low Quality 1 and high Quality 3 also had high Quality Added, according to the definition of the Quality Added variable. These data indicate that the teachers with low-quality playgrounds compensated for the lower quality of the playground by adding equipment and materials.

Examination of Figure A3 indicates that there are 3 observations in the upper-right corner that could be considered as outliers. These 3 outliers had high Quality 1 and high Quality Added. Therefore, these 3 observations were omitted and the relationships among Quality 1, 2, 3, and Added were examined again (see Table 15). While the correlation coefficients among Quality 2, 3, and Added remained at the same level of significance, only the negative correlation of Quality 1 and Quality Added was significant (r = -.57, p < .01) using these analyses.

Observations 15, 16, and 18 were outliers (see Table 12) and these 3 outliers were from the same playground, that is the same preschool. These 3 observations were circled in every plot. In Figures A1 through A4, these 3 observations are separated from others and explain how these outliers influenced the correlation coefficients in Table 14. Therefore, these 3 observations have been removed from future analyses; that is, 27 observations are used in subsequent statistical work.

Table 12

Combined standardized playground quality variables for 30 observations

Obs.	Playground	Teacher	Day	Quality 1	Quality 2	Quality 3	Quality Added
1	P 1	T 1	1	.10	-.72	-1.13	-1.43
2			2	.49	-.40	-.57	-1.16
3			3	-.43	-1.14	-1.25	-1.16
4		T 2	1	-.08	-.23	-.43	-.51
5			2	-.47	.16	-.04	.30
6			3	.19	-.16	-.36	-.62
7	P 2	T 3	1	.32	-.62	-.10	-.35
8			2	.02	-.89	-1.06	-1.16
9			3	.80	-.16	.25	-.43
10		T 4	1	.02	-.89	-.39	-.39
11			2	.19	-.75	-.50	-.70
12			3	.32	-.63	-.39	-.70
13	P 3	T 5	1	1.73	.82	.60	-.78
14			2	.76	-.14	.19	-.45
15			3	1.56	2.34	1.89	.76
16		T 6	1	1.51	1.81	1.82	.77
17			2	1.07	.16	.18	-.70
18			3	.98	1.50	2.25	1.64
19	P 4	T 7	1	-.51	.69	.46	1.00
20			2	-.07	1.03	1.00	1.24
21			3	-.42	.12	-.07	.38
22		T 8	1	-.73	-.71	-.54	.09
23			2	-.64	.73	.63	1.34
24			3	-.33	-.56	-.28	.06
25	P 5	T 9	1	-1.10	-.41	-.57	.24
26			2	-1.04	.56	.34	1.23
27			3	-.96	-.15	-.33	.38
28		T 10	1	-1.20	.65	.68	1.76
29			2	-1.04	-.78	-.90	-.17
30			3	-1.04	-1.04	-1.17	-.47

Note. Quality 1 = mean (std. complexity 1 + std. variety 1 + std. play spaces 1)
Quality 2 = mean (std. complexity 2 + std. variety 2 + std. play spaces 2)
Quality 3 = mean (std. complexity 3 + std. variety 3 + std. play spaces 3)
Quality Added = mean (std. complexity added + std. variety added + std. play spaces added)

Table 13

Standardized loose parts variables for 30 observations

Obs.	Playground	Teacher	Day	Loose Parts 1	Loose Parts 2	Loose Parts 3	Loose Parts Added
1	P 1	T 1	1	1.39	-.58	-.82	-1.16
2			2	1.15	-.63	-.87	-1.16
3			3	1.15	-.63	-.87	-1.16
4		T 2	1	1.39	-.11	-.34	-.64
5			2	.90	1.33	1.15	1.08
6			3	1.15	1.00	.82	.66
7	P 2	T 3	1	-1.08	-1.05	-.72	-1.06
8			2	-1.08	-1.05	-1.30	-1.16
9			3	-.83	-1.00	-.58	-.43
10		T 4	1	-1.08	-1.05	-.82	-.64
11			2	-.83	-1.00	-.92	-.80
12			3	-.83	-1.00	-1.06	-.95
13	P 3	T 5	1	.16	-.21	-.43	-.49
14			2	-1.08	-.90	-.87	-.69
15			3	-.59	.54	.34	.50
16		T 6	1	-.34	.07	-.10	-.02
17			2	-.59	-.90	-.77	-.70
18			3	-.83	-.21	-.34	-.17
19	P 4	T 7	1	1.15	3.29	3.18	3.21
20			2	1.15	.49	.29	.09
21			3	1.15	1.43	1.25	1.13
22		T 8	1	1.15	-.21	1.35	1.23
23			2	1.15	1.80	1.73	1.65
24			3	1.15	-.39	1.06	.92
25	P 5	T 9	1	-.83	.26	.05	.24
26			2	-.83	.17	-.05	.14
27			3	-.83	.03	-.19	-.02
28		T 10	1	-.83	.21	-.00	.19
29			2	-.83	.26	-.05	.24
30			3	-.83	.03	-.19	.02

Note. Loose Parts 1 = standardized loose parts 1
Loose Parts 2 = standardized loose parts 2
Loose Parts 3 = standardized loose parts 3
Loose Parts Added = standardized loose parts added

Table 14

Correlation coefficients among combined playground quality variables (N = 30)

	Quality 1	Quality 2	Quality 3
Quality 1	--		
Quality 2	.45 *	--	
Quality 3	.52 **	.95 ***	--
Quality Added	-.22	.70 ***	.72 ***

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 15

Correlation coefficients among combined playground quality variables (n = 27)

	Quality 1	Quality 2	Quality 3
Quality 1	--		
Quality 2	.08	--	
Quality 3	.20	.92 ***	--
Quality Added	-.57 **	.69 ***	.69 ***

* $p < .05$. ** $p < .01$. *** $p < .001$.

The Loose Parts variables were examined in a similar way. Again, observations 15, 16, and 18 were circled in Figures A7 through A12. These 3 observations were not outlying in each of the plots; thus, they are not considered as outliers in terms of the Loose Parts variables. All Loose Parts variables were intercorrelated significantly (see Table 7). Figure A10 through Figure A12 show that the relationships of Loose Parts 2 and 3, 2 and Added, and 3 and Added were linear.

How do day, playground location, and teacher influence the quality of preschool playgrounds?

In order to examine the influence of day, playground location, and teacher on preschool playground quality, one-way ANOVAs were performed with the Quality variables and Loose Parts variables as dependent variables, and day, playground location, and teacher as independent variables, respectively. Since observations 15, 16, and 18 were considered as outliers in terms of the Quality variables, ANOVAs for the Quality variables were performed both with 30 and with 27 observations. All 30 observations were included in the ANOVAs for Loose Parts.

Day effect on the quality of playground. One-way ANOVAs of the Quality variables as dependent variables and day as an independent variable were examined to determine whether the playground quality variables change across the three times or for the Quality Added variable during the three observation days for the ten teachers (see Table 16). Results showed that there were no differences in playground quality across the three days; that is, there were no differences for playground quality between day one, day two or day three observations across all teachers. The playgrounds were consistent in complexity, variety, and play spaces for the three days.

Table 16

Results of one-way ANOVAs with day as an independent variable and the Quality variables as dependent variables

	30 observations		27 observations	
	F - value	P - value	F - value	P - value
Quality 1	F (2, 27) = .07	.94	F (2, 24) = .10	.91
Quality 2	F (2, 27) = .02	.99	F (2, 24) = 1.11	.35
Quality 3	F (2, 27) = .06	.94	F (2, 24) = .89	.42
Quality Added	F (2, 27) = .01	.99	F (2, 24) = .31	.74

*$p < .05$.

Also, one-way ANOVAs of Loose Parts as dependent variables and day as an independent variable were examined separately four times in terms of Loose Parts 1, 2, 3, and Loose Parts Added (see Table 17). Results showed that there were no differences in the Loose Parts variables across the three observation days for ten teachers.

Table 17

Results of one-way ANOVAs with day as an independent variable and Loose Parts variables as dependent variables

	30 observations	
	F - value	P - value
Loose Parts 1	F (2, 27) = .09	.91
Loose Parts 2	F (2, 27) = .03	.97
Loose Parts 3	F (2, 27) = .20	.82
Loose Parts Added	F (2, 27) = .13	.88

*p < .05.

Playground location effect on the quality of playground. One-way ANOVAs of the Quality variables as dependent variables and the five playgrounds as an independent variable were examined to determine if there were playground location differences in the Quality variables; that is, were mean level of Quality 1, Quality 2, Quality 3, and Quality Added different across the five playground locations for the ten teachers (see Table 18). With all 30 observations included, playground effects were significant for each Quality variable. When 27 observations were used for the analyses the effects were significant for Quality 1 and Added only. The five playgrounds differed in their fixed materials and equipment quality, and in the amount of materials and equipment provided by the teachers.

Table 18

Results of one-way ANOVAs with playground location as an independent variable and the Quality variables as dependent variables

	30 observations		27 observations	
	F - value	P - value	F - value	P - value
Quality 1	F (4, 25) = 52.45	.0001 ***	F (4, 22) = 34.69	.0001 ***
Quality 2	F (4, 25) = 6.27	.0012 **	F (4, 22) = 2.61	.0633
Quality 3	F (4, 25) = 7.05	.0006 ***	F (4, 22) = 2.69	.0575
Quality Added	F (4, 25) = 5.13	.0037 **	F (4, 22) = 7.77	.0005 ***

* $p < .05$. ** $p < .01$. *** $p < .001$.

Also, one-way ANOVAs of Loose Parts variables as the dependent variables and playgrounds as the independent variable were examined in Loose Parts 1, 2, and 3, and Added (see Table 19). Results showed that there were playground effects on all Loose Parts variables. The mean number of portable materials and equipment provided on these preschool playgrounds were different across the observation recording times and for the Loose Parts Added variable.

Table 19

Results of one-way ANOVAs with playground location as an independent variable and Loose Parts variables as dependent variables

	30 observations	
	F - value	P - value
Loose Parts 1	F (4, 25) = 147.98	.0001 ***
Loose Parts 2	F (4, 25) = 5.63	.0023 **
Loose Parts 3	F (4, 25) = 11.63	.0001 ***
Loose Parts Added	F (4, 25) = 8.84	.0001 ***

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

Teacher effects on the quality of playground. One-way ANOVAs of the Quality variables as the dependent variables and teachers as an independent variable were examined. Results are given in Table 20. With all 30 observations included, teacher effects were significant for each Quality variable. When 27 observations were used for analyses the effects were significant for Quality 1 and Added only. The ten teachers differed in the number of materials and equipment they provided among the five playgrounds.

Table 20

Results of one-way ANOVAs with teachers as an independent variable and the Quality variables as dependent variables

	30 observations		27 observations	
	F - value	P - value	F - value	P - value
Quality 1	F (9, 20) = 21.20	.0001 ***	F (9, 17) = 13.67	.0001 ***
Quality 2	F (9, 20) = 3.17	.0151 *	F (9, 17) = 1.98	.1074
Quality 3	F (9, 20) = 3.41	.0107 *	F (9, 17) = 1.66	.1763
Quality added	F (9, 20) = 2.84	.0248 *	F (9, 17) = 3.98	.0069 **

* $p < .05$. ** $p < .01$. *** $p < .001$.

Although the above results of the ANOVAs present significant teacher effects on the Quality variables, it is not possible to determine if those effects are actual teacher effects or playground and program effects since teachers are nested in playgrounds. For the before outdoor play (Quality 1) variable, apparently the teacher effect is a playground effect because Quality 1 represents the original quality of the outdoor play environment and it does not include provision of any items by the teacher. In order to assess the actual effects of teachers, ANOVAs of teacher effects on Quality variables were performed for each playground separately. Results showed that there were no differences in Quality 1 for the 2 teachers that used a particular playground, as expected. There

were no differences in Quality Added between the 2 teachers for each playground, except for Playground 1, F (1, 4) = 10.31, $p < .05$. This means that within the same playground, Quality 1 was not different between the 2 teachers and that Quality Added was not different between the 2 teachers except for Playground 1. Thus, it is inferred that the teacher differences on the Quality Added variable were explained mainly by the playground differences, except for Playground 1. In other words, differences of quality added across 10 teachers seem to be influenced by differences in the playgrounds or child care programs.

Also, one-way ANOVAs of Loose Parts variables as dependent variables and teachers as an independent variable were examined in Loose Parts 1, 2, 3, and Added (see Table 21). Results showed that there were significant teacher effects on all Loose Parts variables. The number of portable materials and equipment available on these preschool playgrounds were different across the observation recording times and Loose Parts Added variable among the ten teachers.

As with the Quality variables, it is not possible to determine if these differences were caused by teacher differences or playground and program differences, so ANOVAs of teacher effects on Loose Parts were performed for each of the five playgrounds. There were teacher effects on Loose

Table 21

Results of one-way ANOVAs with teachers as an independent variable and the Loose Parts variables as dependent variables

	30 observations	
	F - value	P - value
Loose Parts 1	F (9, 20) = 54.08	.0001 ***
Loose Parts 2	F (9, 20) = 4.36	.0029 **
Loose Parts 3	F (9, 20) = 6.80	.0002 ***
Loose Parts Added	F (9, 20) = 5.42	.0008 ***

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

Parts 2, 3, and Added only for Playground 1: Loose Parts 2, F (1, 4) = 9.53, $p < .05$; Loose Parts 3, F (1, 4) = 9.53, $p < .05$; Loose Parts Added, F (1, 4) = 8.71, $p < .05$. This means that within the same playground, Loose Parts 1 was not different between the 2 teachers and that Loose Parts 2, 3, and Added were not different between the 2 teachers, except for Playground 1. Again, it is inferred that the teacher differences on the Loose Parts 2, 3, and Added variables were explained mainly by the playground differences, except for Playground 1. In other words, differences of Loose Parts 2, 3, and Added across 10 teachers seem to be influenced by differences of the playgrounds or child care programs.

How is preschool teachers' provision for outdoor play related to their background?

The relationships between teachers' background and the quality of playgrounds was examined using teachers' education level and teaching experiences. In order to examine teachers' background and teaching provisions for outdoor play, the correlation between teachers' background and Quality Added and Loose Parts Added by teachers were examined. As seen in Table 22, only education and experiences are significantly correlated, that is, more years of education are correlated with more years of teaching experience. Teachers' background and playground quality added

Table 22

Relationships between teachers' background and quality of playground added

	Education	Quality Added	Loose Parts Added
Education		- .16	-.25
Experience	.43 *	.01	.07

Note. Quality Added = Quality added from before outdoor play to end of observation
Loose Parts Added = Loose parts added from before outdoor play to end of observation

* $p < .05$.

(Quality Added and Loose Parts Added) were not significantly correlated, but there was a tendency for teachers with more years of education or teaching experience to add less materials and equipment.

Teachers' Behaviors and Verbalizations

Preliminary data concerning teachers' behavior and verbalization variables

The preschool teachers' behaviors and verbalizations on the playgrounds were examined every 10 seconds for 10 minutes for 3 days into 12 categories, for a total of 1,800 observations for the ten teachers (N = 6 10-seconds intervals x 10 minutes x 3 days x 10 teachers). Among the 12 categories of teachers' behaviors and verbalizations, the 2 primary categories, i.e., teaching strategies and non-teaching strategies, were examined: 83% of the total (1494 cases) were in the teaching categories, whereas 17% of the total (306 cases) were in the non-teaching categories. The 8 teaching categories ranged in frequency from 0 for modeling to 853 for facilitating. Facilitating was the most frequent teacher behavior, representing 47.4% of the total (853 cases). Directing was the second most frequent category and was 18.0% of the total (324 cases). The four non-teaching categories ranged in frequency from 21 for maintenance to 190 for observing (see Table 23).

How do day, playground location, and teacher influence the preschool teachers' behaviors and verbalizations?

Collapsing teachers' behaviors and verbalizations categories. After examining the frequencies of each teacher behavior and verbalization category, the 8 teaching categories were collapsed into two primary categories. While Bredekamp and Rosegrant (1992) consider supporting and scaffolding as mediating teaching strategies, this study found a low frequency of occurrence for these categories. Teachers' supporting behaviors do not change children's ongoing behaviors, whereas scaffolding behaviors challenge children's thinking; thus, scaffoldomg is viewed as more directive than supporting in this study. Therefore the 8 teaching categories were placed into 2

Table 23

Frequency of teachers' behaviors and verbalizations on the preschool playgrounds

Teachers' Behaviors and Verbalizations	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Indirective teaching strategies				
Acknowledge	90	5.0	90	5.0
Model	0	0.0	90	5.0
Facilitate	853	47.4	943	52.4
Support	109	6.1	1052	58.4
Directive teaching strategies				
Scaffold	74	4.1	1126	62.6
Co-construct	30	1.7	1156	64.2
Demonstrate	14	0.8	1170	65.0
Direct	324	18.0	1494	83.0
Non-teaching strategies				
Observe	190	10.6	1684	93.6
Talk with adults	53	2.9	1737	96.5
Maintenance/preparation	21	1.2	1758	97.7
Practical/personal assistance	42	2.3	1800	100.0
Total	1800	100.1	1800	100.0

categories. An indirective teaching category was created as the sum of the acknowledging, modeling, facilitating, and supporting categories, accounting for 58.4% of the total (1052 cases). A directive teaching category was created as the sum of the scaffolding, co-constructing, demonstrating, and directing categories; it was 24.6% of the total (442 cases). The non-teaching category was created as the sum of the observing, talking with adults, maintenance/preparation, and practical/personal assistance categories, accounting for 17.0% of the total (306 cases).

Day effects on teachers' behaviors and verbalizations. The effect of the day differences on teachers' behaviors and verbalizations was examined by using chi-square analysis for association between days and teachers' behaviors and verbalizations, to determine whether teachers' behaviors and verbalizations varied across the three observation days . Results showed that teachers'

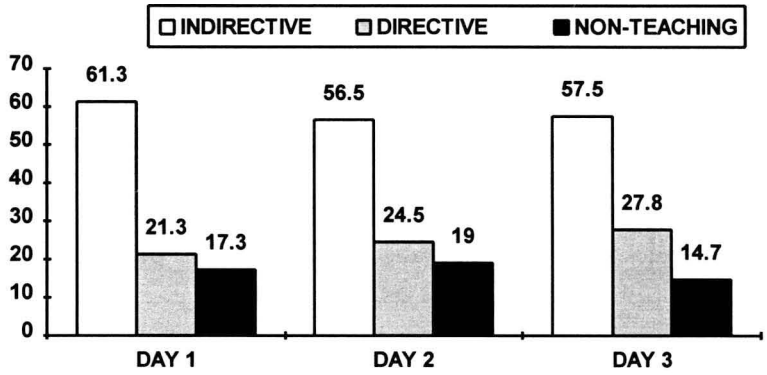

Figure 3. Percentage of teachers' verbalizations by days.

behaviors and verbalizations varied by days, χ^2 (4, N = 1800) = 9.87, p < .05. As seen in Figure 3, the indirective teaching was 61.3% of the total interaction for day one, 56.5% for the second day, and 57.5% of the third day.

Playground effects on teachers' behaviors and verbalizations. The effect of playground differences on teachers' behaviors and verbalizations was examined by using chi-square analysis for association between playgrounds and teachers' behaviors and verbalizations, to determine whether teachers' behaviors and verbalizations varied across the five playgrounds . Results showed that teachers' behaviors and verbalizations were dependent on playgrounds, χ^2 (8, N = 1800) = 178.28, p < .0001. As seen in Figure 4, the pattern of frequencies of Playground 1 is clearly different from other playgrounds. The non-teaching categories for Playground 1 had high frequencies. The teachers' less directive behaviors and verbalizations ranged from 46.4% for Playground 1 to 68.9% for Playground 4. The teachers' directive behaviors and verbalizations ranged from 16.1% for Playground 1 to 33.9% for Playground 5. The teachers' non-teaching behaviors and verbalizations ranged from only 6.7% for Playground 4 to 37.5% for Playground 1.

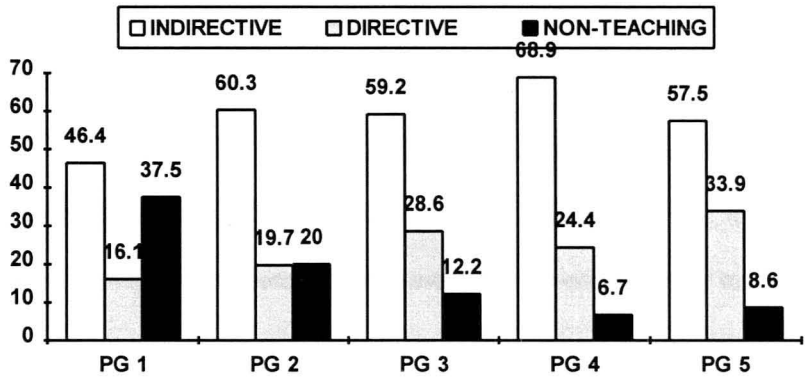

Figure 4. Percentage of teachers' verbalizations by playgrounds.

Teacher effects on teachers' behaviors and verbalizations. Chi-square analysis was used to determine whether teachers' behaviors and verbalizations varied across the ten teachers. Results showed that teachers' behaviors and verbalizations were dependent on teachers, χ^2 (18, N = 1800) = 443.34, $p < .0001$. As seen in Figure 5, there were different frequency patterns for teachers' behaviors and verbalizations across the ten teachers. Teacher 1 showed a clearly different pattern from the other nine teachers with a lower percent of indirective teaching and a higher percent of non-teaching behaviors. In contrast, Teachers 8 and 9 rarely engaged in non-teaching behavior. Teachers' indirective teaching ranged from 18.3% to 74.4% of the interactions. Directive teaching ranged from 15.0% to 35.6% of the interactions. Non-teaching ranged from 1.1% to 66.7% of the interactions. There were significant differences between teachers in their behaviors and verbalizations.

Although the above chi-square results was that teachers' behaviors and verbalizations were significantly dependent on both playgrounds and teachers, it is not possible to determine whether those effects are actual playground effects or teacher effects since teachers are nested within playgrounds. In order to examine the actual effects of teachers, chi-square tests of teacher effects on teachers' behaviors and verbalizations were performed for each playground separately. Results showed that there were teacher differences between the pairs of teachers using each playground:

Playground 1, χ^2 (2, n = 360) = 143.03, p < .0001; Playground 2, χ^2 (2, n = 360) = 9.00, p < .05; Playground 3, χ^2 (2, n = 360) = 10.54, p < .001; Playground 4, χ^2 (2, n = 360) = 18.21, p < .0001; Playground 5, χ^2 (2, n = 360) = 18.76, p < .0001. This means that even within the same playground, behaviors and verbalizations were different between the two teachers. Thus, it is inferred that playground differences on teachers' verbalizations were explained mainly by individual teacher differences. The teachers themselves varied in their behaviors and verbalizations on the preschool playgrounds.

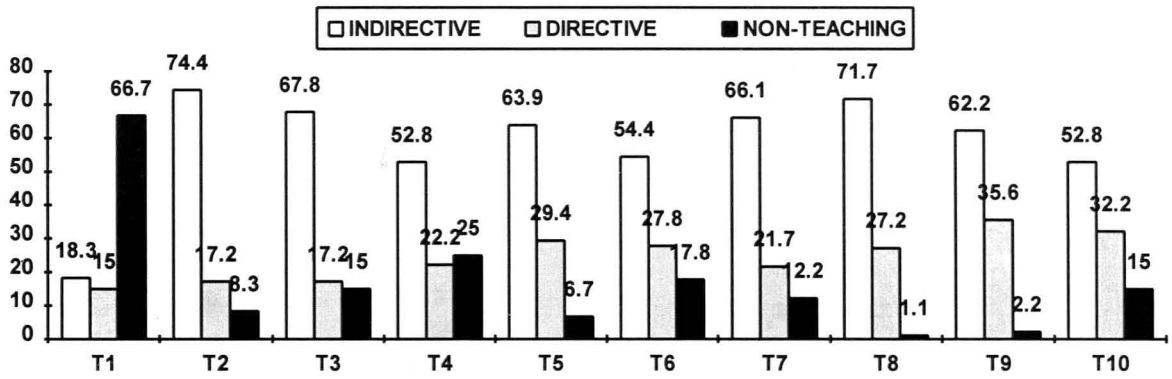

Figure 5. Percentage of teachers' verbalizations by individual teachers.

How are teachers' behaviors and verbalizations related to the quality of preschool playgrounds?

The relationships between the Quality variables and teachers' behaviors and verbalizations.

The relationships between the quality of preschool playgrounds and teachers' behaviors and verbalizations were examined by using chi-square analyses for associations between the Quality variables and teachers' behaviors and verbalizations. Results showed that teachers' behaviors and verbalizations were dependent on all of the Quality variables: Quality 1, χ^2 (2, N = 1800) = 40.98, p < .0001; Quality 2, χ^2 (2, N = 1800) = 25.63, p < .0001; Quality 3, χ^2 (2, N = 1800) = 26.88, p < .0001; Quality Added, χ^2 (2, N = 1800) = 68.64, p < .0001. Histograms of percentage of teachers'

verbalizations for low and high level of Quality 1, 2, 3, and Added are given in Figure 6 through Figure 9, respectively.

As seen in Figure 6, before outdoor play (Quality 1) 62.3% of the interaction on the low-quality preschool playgrounds was indirective teaching, whereas 54.6% of the interaction on the high-quality playgrounds was indirective teaching. Also, 26.3% of the interaction on the low-quality playgrounds was directive teaching and 22.8% of the interaction on the high-quality playgrounds was directive teaching. In addition, 11.3% of the interaction on the low-quality playgrounds was non-teaching, but 22.7% of the interaction on the high-quality playgrounds was non-teaching.

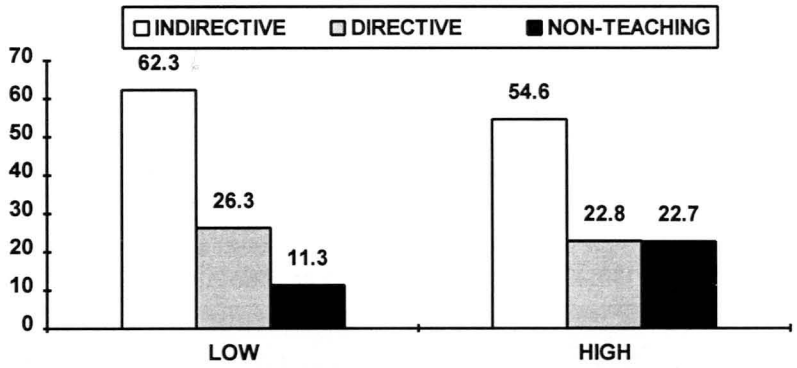

Figure 6. Percentage of teachers' verbalizations by playground Quality 1 for 30 observations for 10 teachers.

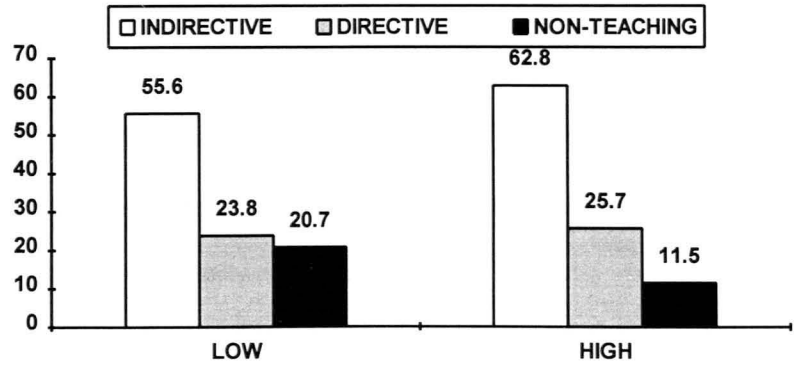

Figure 7. Percentage of teachers' verbalizations by playground Quality 2 for 30 observations for 10 teachers.

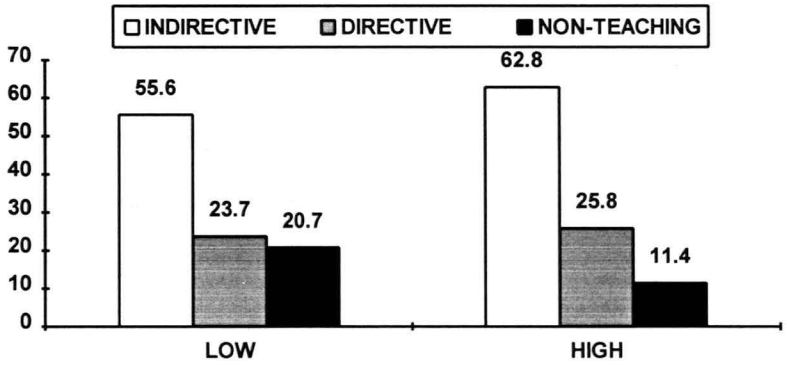

Figure 8. Percentage of teachers' verbalizations by playground Quality 3 for 30 observations for 10 teachers.

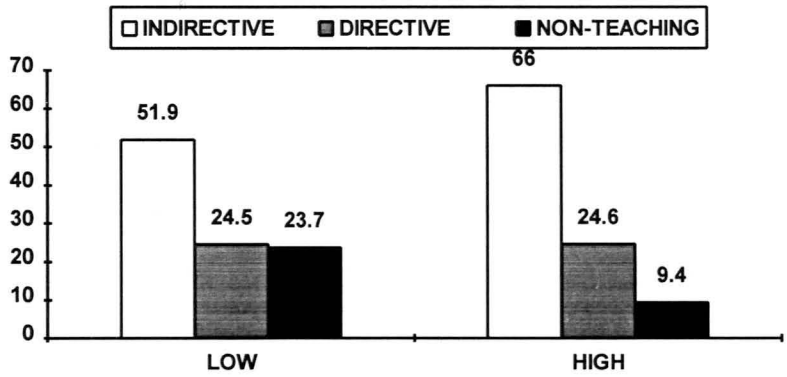

Figure 9. Percentage of teachers' verbalizations by playground Quality Added for 30 observations for 10 teachers.

Figures 7 and 8 show that the shapes of the histograms for the verbalization categories did not differ much from the beginning of the outdoor play time to the end of the observation 10 minutes later for either the high- or low-quality playgrounds.

Since three observations, 15,16, and 18, were viewed as outliers in the analysis of the relationships of Quality variables, the above chi-square analyses were repeated without these three observations. Results were similar to those with 30 observations. All significant differences found in

the analyses with 30 observations remained significant after the 3 observations viewed as outliers were removed. In addition, histograms of the teachers' verbalizations with 27 observations showed patterns similar to those based on 30 observations. Thus, it is concluded that the 3 observations considered as outliers in the quality of playground do not have much statistical influence on the results of the analyses of the relationships between Quality of preschool playgrounds and teachers' behaviors and verbalizations.

Since Teacher 1 showed a clearly different pattern of verbalizations and behaviors from other teachers in this study (see Figure 5), the analyses were repeated with nine teachers to determine the influence of one teacher on the results. Recall that with all 10 teachers included, chi-square analyses for associations between Quality variables and teachers' verbalizations were significant for all Quality 1, 2, 3, and Added variables. By removing the observations for one teacher, only associations between Quality 1 and Added and teachers' verbalizations were significant, Quality 1, χ^2 (2, $\underline{n}$ = 1620) = 30.98, $\underline{p} < .0001$; Quality Added, χ^2 (2, $\underline{n}$ = 1620) = 9.78, $\underline{p} < .01$. Histograms of percentage of teachers' verbalizations by low and high levels of quality variables without one teacher are given in Figure 10 through Figure 13. When comparing Figure 7 to Figure 11, the percentage of non-teaching category with low-quality playground was reduced from 20.7% to 11.4% since Teacher 1 had a very high percentage of non-teaching behaviors. Similar findings were found for percentages of teachers' verbalizations in Quality 3 of low-level of playgrounds shown in Figures 8 and 12, and Quality Added shown in Figures 9 and 13.

It has been shown that the verbalization pattern of one teacher was different from other teachers in this study, and it had significant influence on the results of the analyses of the relationship between the preschool playground quality and teachers' verbalizations. However, verbalization patterns similar to Teacher 1 might be more frequent in typical child care situations. This will be discussed in the next chapter.

The following conclusions include analyses both with 10 teachers and with 9 teachers. There were significant associations between Quality 1 and teachers' verbalizations, and between Quality Added and teachers' verbalizations. Teachers on high Quality 1 playgrounds were more likely to use non-teaching than those on low Quality 1 playgrounds. Teachers who added more equipment and materials were less likely to use non-teaching, and more likely to use indirective teaching than those who added fewer items.

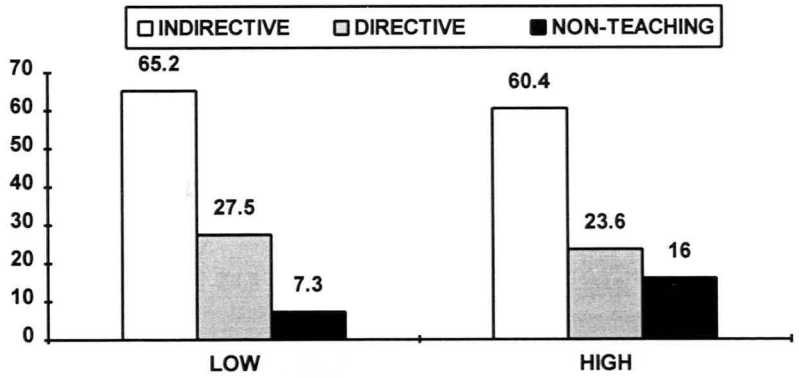

Figure 10. Percentage of teachers' verbalizations by playground Quality 1 for 9 teachers.

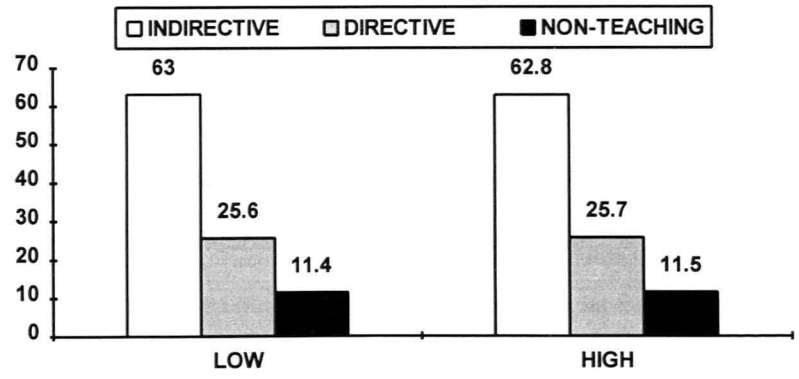

Figure 11. Percentage of teachers' verbalizations by playground Quality 2 for 9 teachers.

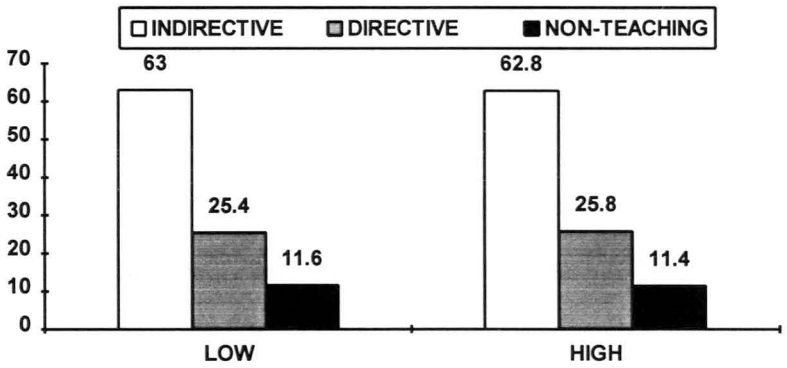

Figure 12. Percentage of teachers' verbalizations by playground Quality 3 for 9 teachers.

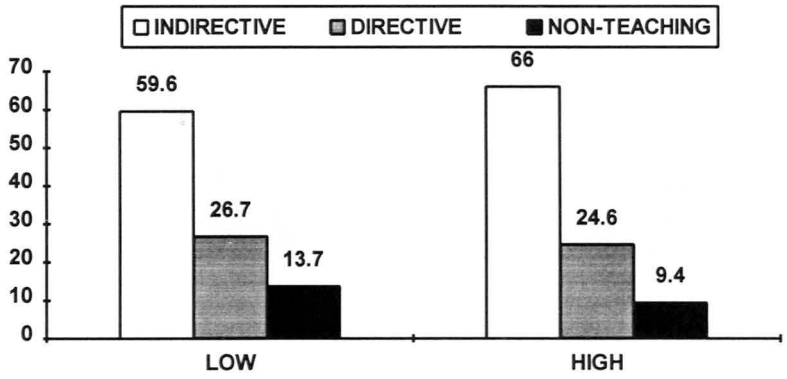

Figure 13. Percentage of teachers' verbalizations by playground Quality Added for 9 teachers.

The relationships between loose parts items and teachers' behaviors and verbalizations.

The relationships between loose parts items and teachers' behaviors and verbalizations were examined by using chi-square analyses for associations between teachers' behaviors and verbalizations and Loose Parts variables for each of the four times, i.e., before outdoor play time (Loose Parts 1), at the beginning of outdoor play (Loose Parts 2), at the end of the 10-minute observation (Loose Parts 3), and Loose Parts Added. Results showed that teachers' behaviors and verbalization were dependent on all Loose Parts variables: Loose Parts 1, χ^2 (2, N = 1800) = 16.56, p < .0001; Loose Parts 2, χ^2 (2, N = 1800) = 47.59, p < .0001; Loose Parts 3, χ^2 (2, N = 1800) = 67.10, p < .0001, Loose Parts Added, χ^2 (2, N = 1800) = 75.75, p < .0001). Histograms in percentage of

teachers' verbalizations for low and high level of Loose Parts 1, 2, 3, and Added are given in Figures 14 through 17, respectively.

As seen in Figure 14, before outdoor play (Loose Parts 1), 26.6% of the interaction on the low-quality playgrounds was directive teaching, while 21.9% of the interaction on the high-quality playgrounds was directive teaching. Also, 14.0% of the interaction on the low-quality playgrounds was non-teaching, but 20.9% of the interaction on the high-quality playgrounds was non-teaching.

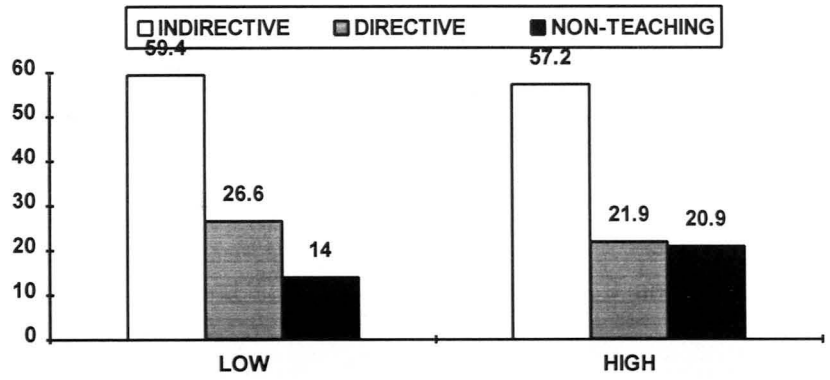

Figure 14. Percentage of teachers' verbalizations by Loose Parts 1 for 10 teachers.

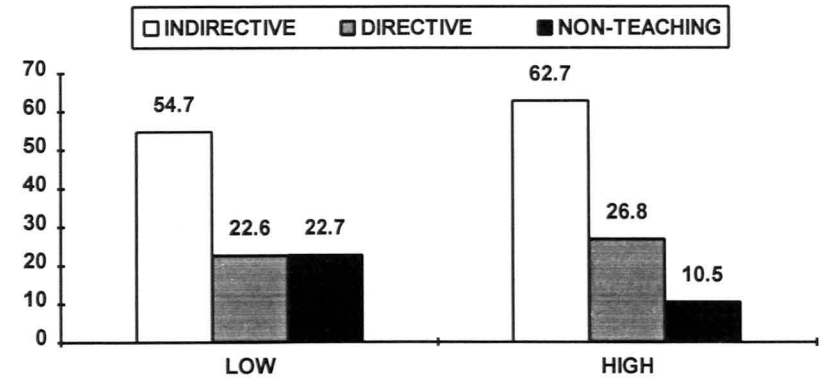

Figure 15. Percentage of teachers' verbalizations by Loose Parts 2 for 10 teachers.

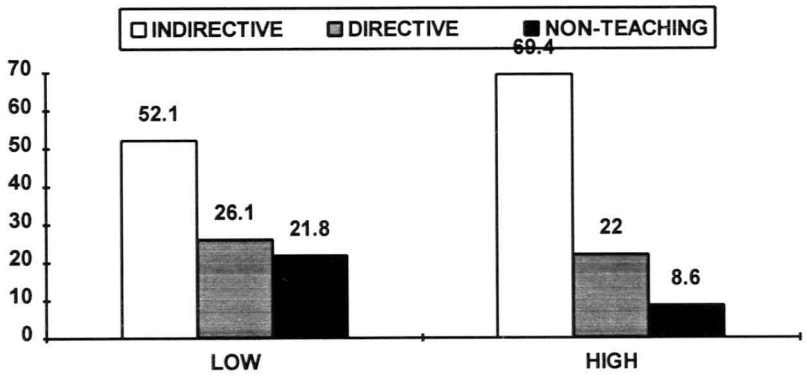

Figure 16. Percentage of teachers' verbalizations by Loose Parts 3 for 10 teachers.

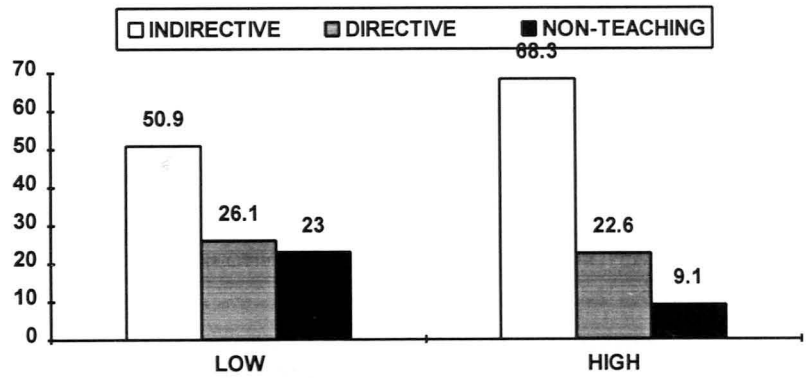

Figure 17. Percentage of teachers' verbalizations by Loose Parts Added for 10 teachers.

Again, since one teacher was considered an outlier with an unusually high frequency of non-teaching behaviors, the analyses were repeated without observations from this teacher. With observations from nine teachers, teachers' behaviors and verbalization continued to be dependent on Loose Parts 1, 3, and Added variables, Loose Parts 1, χ^2 (2, n = 1620) = 21.76, p < .0001; Loose Parts 3, χ^2 (2, n = 1620) = 21.10, p < .0001; Loose Parts Added, χ^2 (2, n = 1620) = 19.95, p < .0001; however, the association between teachers' verbalizations and Loose Parts 2 was no longer significant. Histograms in percentage of teachers' verbalizations with observations from nine teachers are given in Figure 18 through Figure 21, respectively.

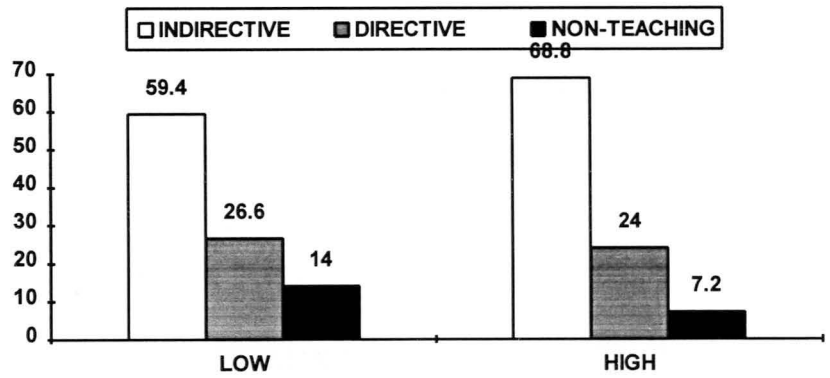

Figure 18. Percentage of teachers' verbalizations by Loose Parts 1 for 9 teachers.

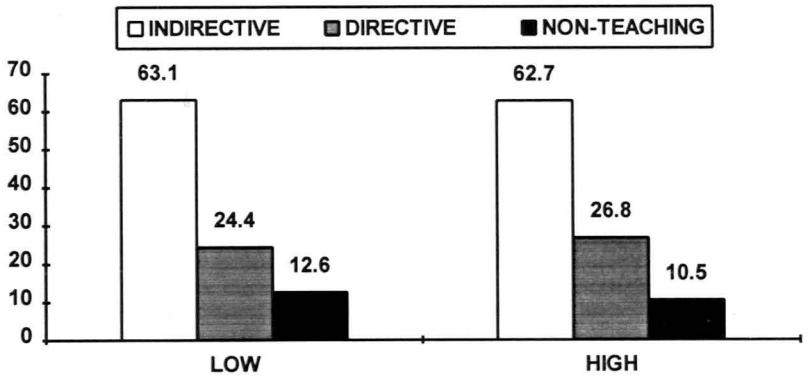

Figure 19. Percentage of teachers' verbalizations by Loose Parts 2 for 9 teachers.

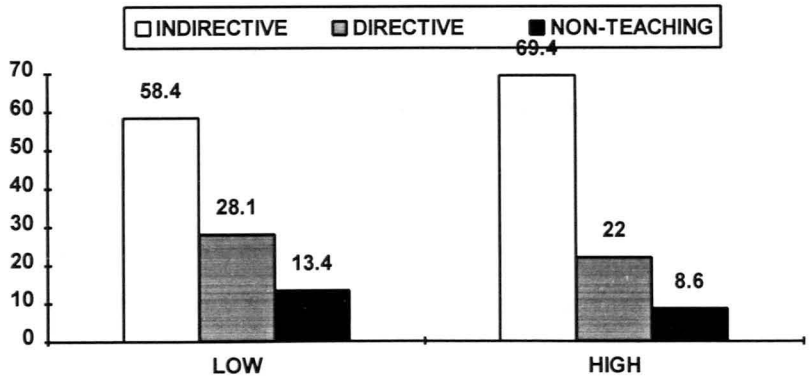

Figure 20. Percentage of teachers' verbalizations by Loose Parts 3 for 9 teachers.

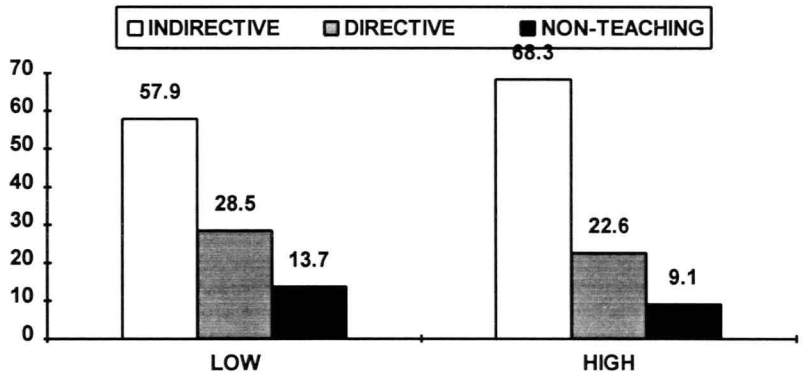

Figure 21. Percentage of teachers' verbalizations by Loose Parts Added for 9 teachers.

Comparing Figure 15 to Figure 19, the non-teaching category percentage for the low-level playgrounds of Loose Parts 2 dropped from 22.7% to 12.6%. As a result, the chi-square test for association between Loose Parts 2 and teachers' verbalizations was no longer significant. Similarly, by comparing Figure 14 to Figure 18, Figure 16 to Figure 20, and Figure 17 to Figure 21, it is shown that one teacher had much influence on the results of the analyses between the Loose Parts variables and teachers' verbalizations. It was found that teachers who added more loose parts items were more likely to use indirective teaching, and less likely to use non-teaching, than teachers who added fewer loose parts items. A similar finding was revealed for Loose Parts 3, that is, teachers on the playgrounds with more loose parts items at the end of the 10-minute observation were more likely to use indirective teaching, and less likely to use non-teaching than were teachers on playgrounds with fewer loose parts items.

Preliminary data concerning play area of teachers' location

The play areas on the preschool playgrounds were placed into the five categories. Among them, preschool teachers were located most frequently in the playground open area (972 cases, 54.0% of the total) and second most frequently observed at the climber with parts area (497 cases, 27.6% of the total) (see Table 24).

By definition, the open area includes asphalt, grass, or pea gravel area, with no fixed equipment or materials within 10 feet other than benches, tables, storage, and deck. During about half of the observations in the open area, the preschool teachers were observed with portable equipment and materials. The remaining half of the observations in the open area, the teachers were playing a game, talking with or observing children, or talking with other adults without portable equipment. The climbers with parts area includes climbing units, climbing trees, and enclosed space, such as a tunnel and play houses, and the teachers were mostly without portable equipment at the climbers with parts area (see Table 25).

Table 24

Frequency of play areas of teachers' behaviors and verbalizations

Play Area	Frequency	Percent
Sand area	161	8.9
Stand-alone swing & slide	162	9.0
Basketball hoop	8	0.4
Climber with parts	497	27.6
Open area, bench, & buildings	972	54.0
Total	1800	99.9

Table 25

Frequency of play areas of teachers' behaviors and verbalizations controlling for portable equipment and materials

Play Area	Portable Equipment and Materials			
	Absent		Present	
	Frequency	Percent	Frequency	Percent
Sand area	4	0.4	157	23.1
Stand-alone swing & slide	162	14.5	0	0
Basketball hoop	0	0	8	1.2
Climber with parts	431	38.5	66	9.7
Open area, bench, & buildings	522	46.7	450	66.1
Total	1119	100.1	681	100.1

How are preschool teachers' behaviors and verbalizations related to playground play areas?

Collapsing the play area categories. The five categories of play areas were sand area, stand-alone swing and slide, basketball hoop, climber with parts, and open area. As seen in Table 24, less than 1% of the teachers were located in the basketball hoop area during the 10-minute observations; therefore, this category was combined into the stand-alone swing and slide category. Thus, four play area categories were analyzed for this study; that is sand area, stand-alone swing/slide/hoops, climber with parts, and open area.

The relationships between play areas and teachers' behaviors and verbalizations. The relationships between the play areas and teachers' behaviors and verbalizations were examined using 12 categories of teachers' behaviors and verbalizations. As seen in Table 26, the frequency percentages for each category differ among the four play areas. In the sand area, the percentage of teachers' directing behaviors was lower than for any other areas. In the stand-alone swing and slide areas, the percentage of facilitating and directing behaviors and verbalizations were higher than for other categories, while the percentage of observing was the lowest of the other categories.

Next, relationships between the play areas and teachers' behaviors and verbalizations were examined by chi-square analyses of association between the play areas and the three teachers' verbalization categories. Results showed that teachers' behaviors and verbalizations were dependent on play areas, χ^2 (6, N = 1800) = 54.32, $p < .0001$. This remained true when nine teachers were examined, χ^2 (6, n = 1620) = 20.58, $p < .001$.

As seen in Figure 22, teachers' indirective behaviors and verbalizations ranged from 53.2% for the open area to 70.0% for the stand-alone swings and slides area. Teachers' directive teaching ranged from 20.5% for the sand area to 26.2% for the climber with parts area. Teachers' non-teaching ranged from 5.3% for the stand-alone swing and slide to 22.4% for the open area. Comparing Figure 22 to Figure 23, the percentage of non-teaching behaviors decreased at the

Table 26

Frequencies of teachers' behaviors and verbalizations according to play areas

Teachers' Behaviors & Verbalizations	Sand Area	Stand-Alone Swings/Slides	Climber with Parts	Open Area, Bench, & Buildings
Indirective Teaching				
Acknowledge	13 (8.1%)	1 (0.6%)	25 (5.0%)	51 (5.2%)
Model	0 (0)	0 (0)	0 (0)	0 (0)
Facilitate	89 (55.3)	104 (61.2)	240 (48.3)	420 (43.2)
Support	9 (5.6)	14 (8.2)	40 (8.0)	46 (4.7)
Directive Teaching				
Scaffold	11 (6.8)	5 (2.9)	24 (4.8)	34 (3.6)
Co-construct	3 (1.9)	1 (0.6)	10 (2.0)	16 (1.6)
Demonstrate	3 (1.9)	0 (0)	3 (0.6)	8 (0.8)
Direct	16 (9.9)	36 (21.2)	93 (18.7)	179 (18.4)
Non-Teaching				
Observe	16 (9.9)	2 (1.2)	47 (9.5)	125 (12.9)
Talk with adults	1 (0.6)	5 (2.9)	5 (1.0)	42 (4.3)
Maintenance/preparation	0 (0)	0 (0)	3 (0.6)	18 (1.9)
Practical/personal assistance	0 (0)	2 (1.2)	7 (1.4)	33 (3.4)
Total	161 (100.0)	170 (100.0)	497 (99.9)	972 (100.0)

climber and open area when observations from nine teachers were used. More non-teaching strategies occurred in the open area than in the other play areas, directive teaching occurred least frequently in the sand area than in other areas, and indirective strategies occurred more frequently at the stand-alone swing and slide areas and sand areas.

How are prechool teachers' behaviors and verbalizations related to their background?

The relationships between teachers' background and teachers' verbalizations were examined using teachers' years of education and teaching experiences. First, chi-square analysis for association between teachers' education and their verbalizations was examined. Teachers' years of education was divided into three categories, that is 12-14 years (high school diploma or associate of arts degree), 16 years (bachelor's degree), and 18 years (master's degree) without regard for the

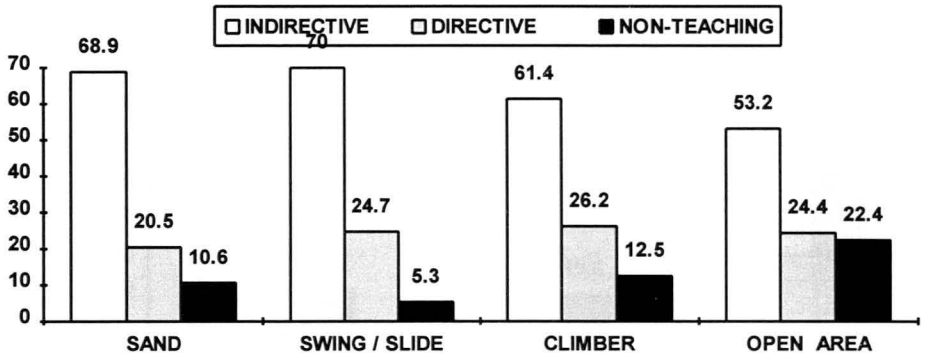

Figure 22. Percentage of teachers' verbalizations by play areas for 10 teachers.

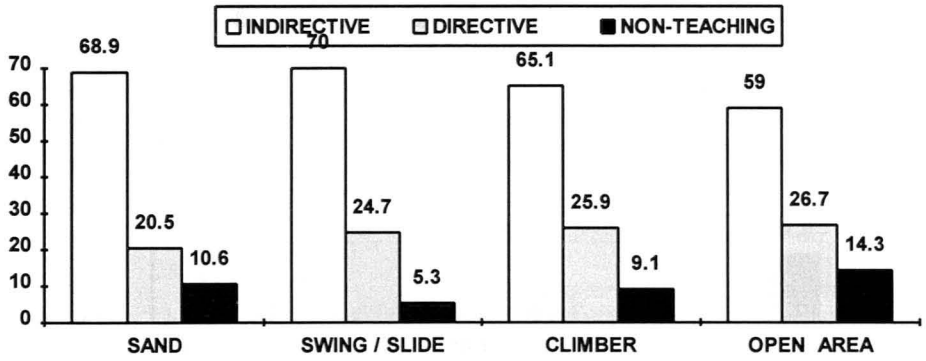

Figure 23. Percentage of teachers' verbalizations by play areas for 9 teachers.

specified major of the degrees. There were two teachers in 12-14 years, six teachers in 16 years, and two teachers in 18 years. Histograms of percentage of teachers' verbalizations are given in Figure 24. With observations from all teachers included, the chi-square value for association between teachers' years of education and teachers' verbalizations was significant, χ^2 (4, N = 1800) = 208.04, $p < .0001$. However, as seen in Figure 24 and Figure 25, these results seem to be influenced highly by one teacher. It is not possible to examine the association of teachers' years of education and their verbalizations with 9 teachers since there are not enough observations in 12-14 years and in 18 years.

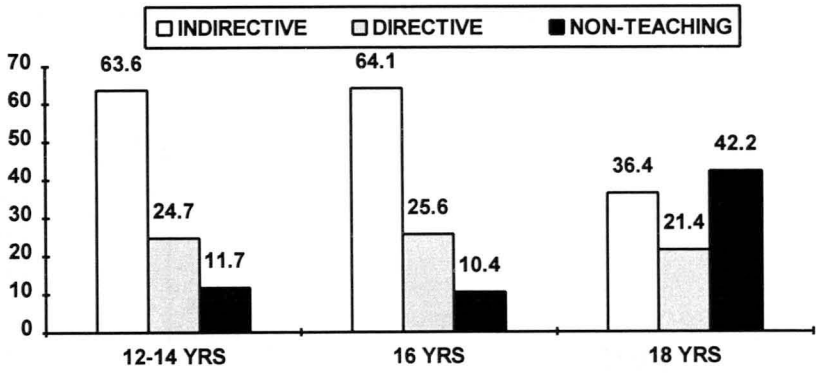

Figure 24. Percentage of teachers' verbalizations by their years of education for 10 teachers.

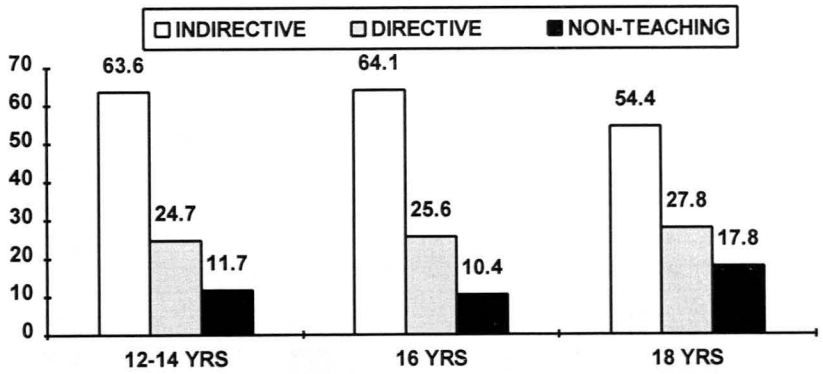

Figure 25. Percentage of teachers' verbalizations by their years of education for 9 teachers.

Next, chi-square analysis for association between teachers' teaching experiences and their verbalizations was examined. Teachers' years of teaching experiences were grouped into two categories, that is 1-5 years and 9-18 years. There were five teachers in both categories. Histograms of percentage of teachers' verbalizations are given in Figure 26 and Figure 27. With all teachers included, chi-square analyses examining the association between teaching experiences and teachers' verbalizations was significant, χ^2 (2, $\underline{N}$ = 1800) = 19.99, $\underline{p}$ < .0001 (see Figure 26). Again,

the results were highly influenced by one teacher. The association between teaching experiences and teachers' verbalizations was no longer significant when the analysis was based on nine teachers.

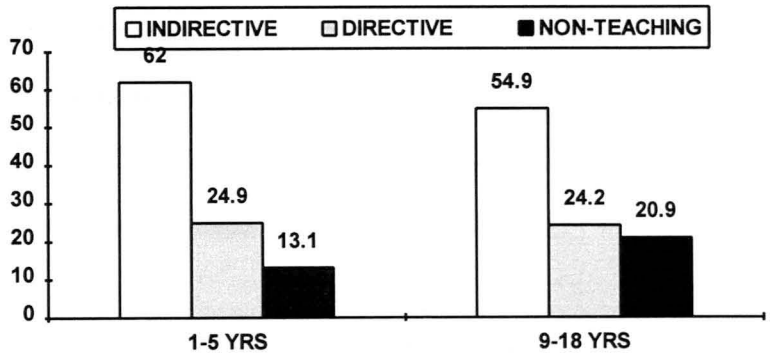

Figure 26. Percentage of teachers' verbalizations by years of teaching experience for 10 teachers.

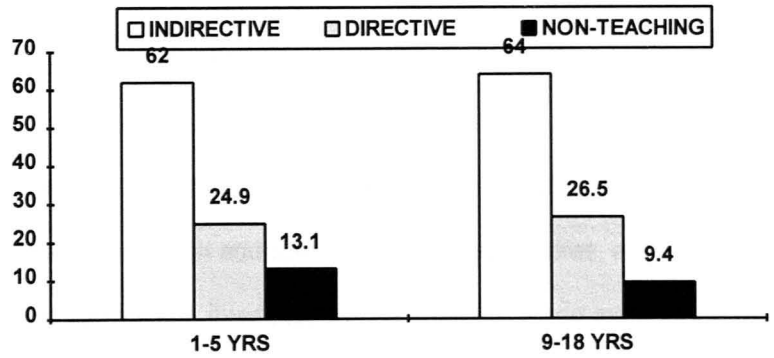

Figure 27. Percentage of teachers' verbalizations by years of teaching experience for 9 teachers.

DISCUSSION

This study examined the nature of the quality of preschool playgrounds, the type of involvement of teachers in preschoolers' outdoor play, and the relationships between the quality of preschool playground and the teachers' behaviors and verbal interactions on the playground with preschoolers. This chapter summarizes the results for each of the questions examined and discusses these findings. Following this, the conclusions, implications and recommendations for future research and practice are presented.

Discussion of the Findings

What kinds of equipment and materials are used on preschool playgrounds?

Five preschool playgrounds located at non-profit and for-profit child care centers in a midwestern university community were observed during September and October mornings and afternoons. Two of the facilities were built especially for young children whereas the three other facilities have been adapted for children. All five playgrounds offered swings and slide type equipment, and climbers with such additions as slides, nets, or tires, and four playgrounds had a sand area. The other permanent, fixed playground equipment and materials were tube rockers, see-saws, a balance beam, basketball hoops, a tunnel with tires, a deck, a wooden castle, climbing trees, and water outlets (see Appendix I). Three playgrounds had water outlets that were designed for providing water play, but none of them had water fountains or faucets that children could use independently. Some children requested the teacher to add water into the sand area during observations.

Teachers added a wide variety of portable equipment, called loose parts, to the playground. Typically, sand equipment, riding toys such as tricycles and wagons, balls and frisbees, tires, bubbles, and hula hoops were added. Other items which the teachers occasionally added were

parachutes, dance materials (scarves) and tape recorder, water tables, a rocking boat, cars, vinyl number stepping mats, ladders, milk containers, art equipment, such as chalk, and brushes, books, building blocks, a stuffed animal, a rabbit with cage, and a play house. Two teachers used the natural environment, such as trees and acorns as an integral part of their curriculum.

Frost (1992) identified the typical playground equipment and activities as wheeled vehicles (tricycles, wagons, pedal cars, road signs, spare parts), sand and water play (shovels, containers, screens, water hoses, funnels, soap bubbles), assorted toys (hula hoops, lemon twist, can stilts), construction (blocks, lumber, saw horse, wood, tires), dramatic (folding chairs and table, sheets of plastic, dress-up clothes, puppets, parachute), nature (animal feed, magnifying glasses, gardening tools, seeds), creative arts (paints, brushes, rhythm band instruments), and carpentry (hammers, saws, screw drivers). From the above playground materials, carpentry activity was not observed at all of the preschool playgrounds in this study.

It can be argued that the equipment and materials used on preschool playgrounds are related to season of the year, weather, and geographical location. Season of the year and weather influences the equipment and materials that teachers provide outdoors. It was revealed from the interviews with the ten preschool teachers that in the summer, fall, and spring, they plan more outdoor play time for children than in the winter. In summer, fall, and spring, they typically make portable equipment, such as riding toys, sand toys, swimming pools, balls, blocks, parachute, water table, tunnel, tube, trampoline, dramatic materials, balloons, hose and sprinkler, teeter totter, hula hoops, chalk, bubbles and books available for outdoor play. In addition, some teachers mentioned that they not only plan equipment for outdoor but also plan games and songs and use of the natural environment, such as trees. In the wintertime, the teachers' plans for outdoor play include playing with snow, snow shoveling, snow coloring, spraying the snow, sledding, melting and freezing activities, pretend ice skating, running, and games.

Further, geographical location of the playgrounds may influence the equipment and materials. For example, drinking fountains might be less common on the preschool playground in less temperate regions with longer winters and be more common in the region which has longer summers.

In addition to the seasonal and regional influences on the outdoor equipment and materials, one teacher mentions that afternoon outside play time uses more materials because their schedule allows for a longer outdoor play time than during the mornings.

From the observations, it was revealed that maintenance condition and location of storage on the playgrounds influenced the teachers' use of portable equipment. One teacher tried to unlock a storage area during the observation, but the key did not work so she gave up and did not bring out the stored portable equipment. Frost (1992) argues that storage facilities on the playgrounds are important because the most valuable, creative materials are those that children can make impact on. Loose parts items are the major content of young children's play (Nicholson, 1971) and the creative applications of most fixed facilities are far more limited, thus, storage facilities for portable equipment are requirement for good playgrounds for young children (Frost, 1992). Further Frost (1992) states:

> The location of storage facilities is critical. If children and/or teachers must carry everything from the classroom for each play period, it is doubtful that a wide range of play activities will be accommodated. Storage must be directly accessible to the outdoors for outdoor environment. ... Several smaller storage bins are usually preferable...because it is easier to organize and locate the contents and less carrying of equipment is required (p.143).

Four of the five playgrounds had outdoor storage and one playground had several storage areas on the playground. Efficient use of the storage for portable materials and equipment for outdoors enhances the children's play and makes it easy for both children and teachers to locate, remove, and return items.

Mature trees are another good option for outdoor play and investigation. The National Survey of Playground Equipment in Preschool Centers (1989) reports 17% of the centers offered trees as play structures. In this study, only one playground offered trees as a play structure, one center prohibited children from climbing trees on the playgrounds, and the remaining three centers had no big trees.

In addition, the drinking fountains serve as a play space as well as water source for children (Jones, 1989), for example, if water is added into sand area, it enhances sand play to make it more interesting and elaborate. A water source that children can select to drink encourages children's autonomy to decide when they want water.

What relationships exist among the preschool playground quality variables?

Teachers with lower-quality playgrounds added more equipment and materials to the playgrounds than did the teachers with higher-quality playgrounds when 27 observations were analyzed. These findings, based on only five playgrounds and ten teachers, indicate that teachers with higher-quality playgrounds do not tend to provide additional play equipment for their children's outdoor play. From the follow-up interview it was revealed that there were differences in the beliefs of teachers who added fewer materials and those who added more items for outdoor play. For example, one teacher explained that she does not have a special plan for outdoor play time, and she just let them go outside with no plans because children like outside play. Some teachers reported that they plan for outdoor play by considering the weather. Other teachers plan for scheduled outdoor play activities a week in advance. The teachers who added more materials to the playground for outdoor play have playgrounds with less fixed equipment, however, it is not clear, from this study, why these differences existed. In future, the relationships between teachers' beliefs and practical activities for outdoors and indoors need to be examined through interviews or questionnaires.

Although some playgrounds offer sufficient play spaces for children, there are other reasons for adding items to the playground. Nicholson (1971, 1974) warns that static environments without loose parts items rob children of their creativity and it might also influence preschool teachers. It may be argued that well-equipped playgrounds may be too perfect and static and not encourage the teacher's planning for outdoors because she is satisfied with the playground and outcomes for children's outdoor play.

In addition, the variables of Quality 2, Quality 3, and Quality Added were positively correlated with each other. Simply put, high Quality Added is likely to influence high Quality 2 and Quality 3, that is, if teachers added more equipment and materials to the playground, it was more likely to influence the playgrounds with higher quality at the beginning of outdoor play and at the end of the 10-minutes observation time.

Interestingly, a higher-quality playground of fixed equipment may not result in high Quality 2 and Quality 3 without the addition of items by the teachers. This demonstrates that higher-quality permanent preschool playground equipment is important but it does not ensure high-quality preschool playgrounds during children's outdoor play time. In other words, higher original quality of playgrounds is not enough to determine the actual quality of playgrounds during outdoor play time. Therefore, amount and variety of teachers' addition of materials and equipment and the number of children on the playground are important factors for improving the quality of playgrounds during preschool outdoor play at child care centers. Teachers can improve the quality of preschool playgrounds by providing materials in such a way that variety and complexity and number of play spaces per child increase. For example, to increase complexity, the teachers added water into the sand area along with shovels and buckets, and to increase variety, they brought tricycles, and created interest areas and play spaces by planning a blanket and books under trees, or by putting blocks on a table. The average number of outdoor play spaces per child (3.1, Time 1; 4.0, Time 2; and 4.1, Time 3) (see Table 3) in this study was high when compared with other studies concerning

preschoolers, the work of Gets and Berndt (1982), who examined the number of play spaces in a gymnasium (0.8 and 1.2) and the work of Dunn (1993), who studied those of indoors (1.2). No studies were found that reported the number of play spaces per child for preschool playground. Designating that only one classroom be on the outdoor playground at a time increases the number of play spaces per child, increases safety (Johnson et al., 1987) and follows accreditation guidelines (National Academy of Early Childhood Programs, 1991).

Relations among loose parts are somewhat different from those among Quality variables. Loose Parts 2 and Added and Loose Parts 3 and Added are highly positively correlated, that is, the more teachers' addition of loose parts items, the more the loose parts items on the playgrounds at the beginning and at the end of the 10-minute observation of preschool outdoor play. Thus, teachers' addition of the loose parts items were an important factor. In addition, Loose Parts 2 and 3 were also highly correlated. It indicates that during the 10-minute observations, the teachers did not add or change the loose parts items. It was expected that all portable equipment would be stored away at the end of each school day, however, some loose parts items were left outdoors until the following day. Those items (Loose Parts 1) were also correlated with Loose Parts 2, 3, and Added. Therefore, for loose parts items, teachers' addition of portable materials was the most influential factor for beginning and during children's outdoor play, but the Loose Parts 1 also influences the Loose Parts 2, 3, and Added variables.

How do day, playground location, and teacher influence the quality of preschool playgrounds?

The differences among the three observation days, five preschool playgrounds, and ten teachers were examined. The playground quality and loose parts items were the same across the three observation days for all of the teachers. This suggests that the teachers were not uniformly influenced by the presence of the researcher or other factors to change the playground setting during the three days of observation. The five playgrounds differed in their permanent materials and equipment quality and in those items that the teachers provided. There were no differences in

Quality 1 between the two teachers who used each playground. There were no differences in Quality Added between the two teachers for four of the five playgrounds. These results indicate that the differences in Quality 1 and Quality Added can be explained mainly by playground differences but not by teacher differences. Therefore, it can be said that the playground is important in determining the Quality Added. It was observed that teachers using the same playground tend to use the materials and equipment in a similar way and, thereby, they influence each other.

In terms of loose parts items, the five playgrounds do differ in their original and permanent materials and equipment quality, in those at beginning of outdoor play, in those at the end of observation, and in those which teachers provided. There was no difference in Loose Parts 1 between 2 teachers for each playground. There was no difference in Loose Parts 2, 3, and Added between 2 teachers for four of the five playgrounds. These results indicate that the differences in Loose Parts 1, 2, 3, and Added can be explained mainly by playground differences, but that teacher differences are limited. Again, it can be explained that teachers in the same playground or program tend to use the materials and equipment in a similar way by influencing each other.

How do the preschool teachers use their teaching and non-teaching strategies on playgrounds?

In this study, 12 categories of teachers' behaviors and verbalizations were examined. Among 12 categories, facilitating was the most frequent strategy (47.4% of the total). Directing was the second most frequent strategy (18.0% of the total). Preschool teachers did not use many different verbal strategies as facilitating was used for about half of the strategies. There are various possible reasons why several strategies were infrequently used by these teachers. Perhaps, the teachers were not familiar with the different kinds of interaction strategies or the teachers use the continuum of strategies in the classroom but not on the playground. For example, the teachers may think modeling or demonstrating are not effective outdoor strategies because outdoor play is expected to be more informal, spontaneous and explorative. Co-constructing may be difficult to use if the teacher-child ratio is not sufficient outside because safety is the primary concern for the outdoor

environment. It is possible that the coding system and operational definitions were not sufficiently sensitive to detect some categories, such as modeling, demonstrating, co-constructing, and scaffolding or that observation periods were not long enough for detecting each category.

For further analyses, teachers' behaviors and verbalizations were categorized as indirective teaching, directive teaching, and non-teaching. A majority (58.4%) of the observations were indirective (acknowledging, modeling, facilitating, and supporting), 24.6% of the observations were directive (scaffolding, co-constructing, demonstrating, and directing), and 17% of the observations were non-teaching (observing, talking with adults, maintenance/preparation, and practical/personal assistance).

How do day, playground location, and teacher influence the preschool teachers' behaviors and verbalizations?

The strategies for the three categories differed between day one, two, and three across all teachers. Bredekamp and Rosegrant (1992) argue that teaching young children is a complex activity and specific teaching behaviors of adults change for each child in a specific situation according to the child's current learning status. Differences in the children present on the playground may be a primary reason for finding a day effect for these observations. The same children did not attend the child care programs during the observation days, perhaps, because of parents' working schedule or the child's health. Each child's needs are different and some children need more teacher attention than others, and these differences influence the teacher-child interaction across three days of observations. Also, the differences in teachers' interaction with preschool children may be caused by the contributions of the teacher assistant, volunteers or parents to the interactions.

Recall that the quality of the playground did not differ between observation days across all teachers, but why are teachers verbalizations and behaviors varied each day but not the playground quality? Behaviors and verbalizations of teachers are more changeable and sensitive to factors that arise each day than the amount or variety of materials and equipment which teachers provide for

outdoor play. Teachers engage in interactions with children throughout each day, whereas preparation of the outdoors is a less apparent social need. Provisions of materials and equipment are a form of preactive teaching according to Goffin (1989), and teachers' behaviors and verbalizations are a form of interactive teaching. Preactive teaching, that is how the teachers set the physical environment outdoors, is less apparent than interactive teaching, that is what the teachers do during outdoor play time. Teachers' provision of equipment, or preactive teaching, may not be as spontaneous, or sensitive in influencing behavior each day.

Teachers' behaviors and verbalizations were dependent on the individual teacher for all playgrounds i.e., each pair of teachers on a playground showed their own individual teaching strategies. In other words, the individual differences among each pair of teachers were the most important factor in determining the differences in teachers' behaviors and verbalization patterns rather than the playground influencing some similar pattern. In sum, teachers' verbalization patterns on the same playground are not necessarily similar and the playground itself does not have much influence on teachers' behaviors and verbalizations.

This is in clear contrast to the result of the quality of playground variables in which the playground had important influences on the teachers' provision of materials and equipment. It might be thought that preschool teachers added materials and equipment for outdoor play looking at their physical environment and judging what is lacking for permanent playground and what is desirable for children's outdoor play. The teachers with lower quality playgrounds added more equipment and materials to the playground environment before the children went outdoors to play than teachers with higher quality playgrounds. Thus, playground quality influences teachers' provision for outdoor play, and the playgrounds influenced the teachers' provisions of materials for outdoor play so the pairs of teachers mutually altered their playground in similar way. In addition, available equipment and materials are the same for each playground and they might influence the teachers' choices of

provisions for outdoor play. Further, the philosophy of the center or director may have an impact on teachers' provisions for outdoor play.

Again, recall Goffin's preactive teaching and interactive teaching. It can be argued that preschool teachers' preactive teaching, that is measured by teachers' provisions of materials and equipment for outdoor environment, is influenced by the playground quality. The proposed model shown in Figure 1 is partially addressed in this study. The teachers changed the playground quality or physical environment through the additions of materials and equipment for outdoors. On the other hand, the playground quality has some impact on teachers' provisions for outdoors, that is the lower the quality of playground, the more the teachers added. Their interactive teaching, that is measured by teachers' behaviors and verbalizations, differed across ten teachers. The teachers' behaviors and verbalizations vary because the individual varies or the children vary; however, from this study it is not possible to understand how the children influence the relationship of the teacher-child interaction in children's outdoor play.

How are teachers' behaviors and verbalizations related to the quality of preschool playgrounds?

Using observations from 9 teachers for analyses, the association between Quality 1 and teachers' verbalizations, and the association between Quality Added and teacher's verbalizations were significant. Teachers' behaviors and verbalizations were related to the before outdoor play quality variable and quality added variable. Teachers with higher quality, permanent equipment playgrounds (Quality 1) were more likely to interact with children using non-teaching behaviors, that is observing, talking with other adults, maintenance, and practical assistance, than those with lower Quality 1 playgrounds. Teachers who added more equipment and materials to their playgrounds were less likely to use non-teaching, and tended to use more indirective teaching strategies than those who added fewer items.

Similarly, teachers' behaviors and verbalizations were dependent on the variables Loose Parts 1, 3, and Added. Teachers with higher Loose Parts 3 playgrounds were more likely to interact

with children using indirective teaching and less likely to interact using non-teaching behaviors than those with lower Loose Parts 3 playgrounds. Teachers who added more equipment and materials were less likely to use non-teaching, and tended to use more indirective teaching strategies than those who added fewer items.

Comparing Quality Added with Loose Parts Added, similar results are found, that is, teachers who added more portable materials and equipment either before children entered the playground or during outdoor play time used more teaching strategies, i.e., both indirective and directive, and used fewer non-teaching strategies than teachers who added less materials and equipment. This indicates that there is a relationship between teachers preactive teaching (provisions or preparation) for outdoor play and the quality of their interactive teaching on the playgrounds. Preschool teachers who actually prepared more for outdoor play time before children began outdoor play or during outdoor play time were more likely to be directly involved in children's play by using more teaching strategies and were less likely to be involved with non-teaching activities than those who were less prepared. These data imply that preschool teachers who provide a more varied, adaptable outdoor environment also are more likely to enhance the cognitive and social environment of the children through their verbal interactions and behaviors. This finding partially supports the work of Brown and Burger (1984), who offered evidence that preschool teachers seldom interacted with children on the playgrounds. It was found that not all teachers view outdoor play time as recess time, but that there is a relationship between the quality of playground and teachers' behaviors and verbalizations. No data were collected for the children present on the playgrounds, so actual outcomes for children and the relationship between teacher-child interactions cannot be addressed.

How are preschool teachers' behaviors and verbalizations related to playground play areas?

In this study, preschool teachers spent the majority of their time outdoors on the open area (54% of the total 1,800 10-second observations). What are some possible explanations? There are several reasons that can be hypothesized. First, all 5 playgrounds observed in this study had an

open area; therefore, the likelihood was increased that all of the teachers would use on the open area than sand and swing/slide areas. Second, the open areas included benches, tables with benches, deck, and storage; thus it has more space than the other areas observed in this study. It was observed informally that at least half of the space of each playground was the open area (see Appendix I). Third, playground open areas serve many functions; they are more versatile and adaptable play areas. Further, Esbensen's (1987) identification of various playground zones suggest that teachers use open areas as a transition zone from the classroom to the playground, and from one type of play equipment to another. Teachers also use the open area as a manipulative/creative zone, focal/social zone, and physical zone by bringing out brushes and buckets with water or riding toys on the hard surfaces, by setting planks and large blocks near road signs, by doing games, such as "duck, duck, goose," or "Mr. Shark, what time is it?" or by talking with children located on the deck, and by adding balls, hula hoops, or a parachute on the grass. In addition, an open area can be used as a natural element zone, for example, one teacher in the present study encouraged preschool children to look at different kinds of trees, leaves, animals, and insects on their playground. Thus, an open area has many functions and possibilities for play spaces for preschool teachers and children.

The frequency of teachers' use of portable equipment and materials was related to play areas. The teachers were more often at the sand area with portable materials, whereas they were less often at the stand alone swings and slides, and climbers with parts with portable materials. On open areas, the teachers used portable equipment and materials about half of the time.

Teachers' verbalizations varied among different play areas. On the sand area, and stand alone swing and slide areas, the teachers were more likely to use indirective teaching than other play areas. On the open area, they were more likely to use non-teaching strategies, that is observing, talking with adults, maintenance, and practical assistance than the other areas. In the sand area, they were less likely to use directive teaching than the other areas. The different associations between teachers' verbalizations and the play areas may be explained by the various types of

children's play that are more frequently observed for each play area. For example, the sand area is a relatively quiet, less active gross motor play, and less hazardous area, and thus, the teachers have more opportunities to interact with children using indirective teaching strategies. In contrast, preschoolers may demand attention in the areas of stand-alone swings and slides; thus, the teachers use less observing, but use more facilitating and directing verbalizations in the stand-alone swings and slides than the other areas. The relationship between particular children and teacher verbalizations is unknown. Further, seasonal factors would be expected to influences teacher verbalizations and behaviors, as well as the children's interactions. Children's ages are another factor to be considered in the future.

Due to the limitations of the present study, it was not possible to examine statistically the relationship between the play areas and teachers' behaviors and verbalizations controlling for the presence or absence of the portable equipment. Thus, it is not clear that portable equipment is intervening in the relationship between the play areas and teachers' verbalizations as shown in Figure 2.

How are preschool teachers' behaviors and verbalizations related to their background?

Using observations for 9 teachers, the association between years of teaching experience and teachers' verbalizations was not significant. This finding supports the work of Whitebook, Howes, and Phillips (1989) indicating that the amount of teaching experience did not predict teacher behaviors in child care centers. It was not possible to examine the association of years of teachers' education and teachers' verbalizations since there were not enough observations in each of the three categories in this study, although Whitebook et al. found that the teacher's level of formal education was the best predictor of appropriate teacher behaviors.

Summary

Results from the present study indicated that teachers with lower-quality playgrounds tended to add more materials and equipment for outdoor play than teachers with higher-quality playgrounds. Preschool teachers who provided more materials for outdoor play time before children went to the playground or during outdoor play time were more likely to be involved in children's play by using both indirective and directive teaching strategies. They were less likely to be engaged in non-teaching activities than those who provided fewer items. Thus, preschool teachers who provided a richer outdoor physical environment through adding equipment and materials were more likely to be involved in children's play using teaching strategies to enhance the psycho-social environment.

The differences in the playground quality which teachers added (teachers' provision for outdoor play) is explained mainly by playground differences. Teachers' behaviors and verbalizations differed for each of the 3 observation days and each pair of teachers on the playgrounds showed their own individual strategies.

Teachers' behaviors and verbalizations differed by the specific playground play areas. The preschool teachers were more likely to use indirective teaching strategies in the sand area and the swing/slide area than the climber or open area. Years of preschool teaching experience did not influence teachers' behaviors and verbalizations.

Implications

From these results, specific recommendations can be made that have important implications for curriculum planning and future research. The implications and future research recommendations will be presented separately for each of these topics.

Curriculum planning

The current study has several implications for preschool curriculum planning. In such planning, it must be remembered that the quality of the outdoor preschool environment changes

dramatically through the teacher's careful provisions and it is preschool teacher's responsibility to offer a high-quality program for young children, both indoors and outdoors (Esbensen, 1987). Traditionally, the preschool classroom, i.e., the indoor environment, has received first priority in planning for materials, equipment and activities, and less attention has been paid to the outdoor environment (Henniger, 1977). Preschool curriculum planning guidelines include limited consideration of outdoor play (The National Association for the Education of Young Children, 1987), and, too often, outdoor play time has been seen as recess time for young children and teachers (Brown & Burger, 1984).

The additional attention and planning given to the outdoor environment could be used to provide a safe, healthy, risk-taking (Henniger, 1994), and challenging environment by offering materials and equipment which promote preschoolers' physical, social, emotional, cognitive, and language development.

In this study, the quality of playground was measured by the complexity, variety of materials and equipment, and number of play spaces per child, and the number of loose parts items. It is desirable for preschool teachers to judge the variety of permanent play things that are available on their playgrounds and to know what equipment and what play opportunities are lacking for the fixed playground. Knowing how to assess, use, and add portable equipment to the playground is the key for planning outdoor play. Permanent outdoor play equipment is often designed to promote physical development of children; however, teachers also need to recognize the importance of children's whole development (Bredekamp & Rosegrant, 1992; Kostelnik, Soderman, & Whiren, 1993; and Spodek & Saracho, 1994). For example, as observed in this study, the teachers added a play house or large box and housekeeping materials outdoor to promote dramatic play, or spread a blanket and books under a shaded area, or arranged small blocks and accessory items on tables to promote constructive play. A gas station dramatic play center was observed by attaching milk containers to tricycles. Sand play was enhanced by adding water, a parachute over a climber made it a house-like

area. While no playground had a drinking fountain, if the teacher added cold or hot drink containers with cups on a table, children's health and safety would be enhanced.

The number of play spaces per child, that is, the number of activities available for each child in a space, can be increased most easily by adding complex units, or by scheduling fewer groups of children in the space (Kritchevsky et al., 1969). Outdoor play time is sometimes shared by 2 or 3 classrooms at the same time; however, it decreases the number of possible play activities per child in a space drastically and increases supervision problems and safety hazards. It is desirable to schedule only one group at a time for outdoor play or to create several playgrounds. A field trip to community playgrounds, when possible, may help stimulate different kinds of play.

Basically, loose parts items should be stored away at the end of every school day. In child care centers, a wide age range of children may use the same playground, and some portable materials left outside, for example, a rope, a ladder, or a swimming pool may present safety hazards for smaller children, without teachers' careful supervision. Therefore, the preschool teachers' appropriate provision and storage of equipment and materials before and after children's outdoor play is critical. Also, curriculum planners' decisions for age appropriate and individually appropriate portable materials for outdoor play is critical because the playground is usually used by several age groups of children. Providing an appropriate outdoor environment according to children's needs and interest is also important.

Future research

In this study, the quality of playground was measured by the complexity, variety of materials and equipment, and number of play spaces per child, and number of loose parts items. Each variable measured a different aspect of playground quality. These measures were appropriate to use for all five playgrounds observed. However, if future researchers use the variable, complexity, to quantify other types of playgrounds, such as playgrounds with a multilevel, multipurpose structure functioning differently, the validity of the current complexity definition is questionable. Since the super

unit is given a rating of 8 as the highest rating score, it will underestimate the actual complexity scores quantifying these more complex structures. It is desirable to have another measure which is suitable for playgrounds with these structures.

Another issue concerning the assessment of playground quality is how to consider the portable equipment and materials that are left outside by the other teacher. In this study, these items were included in the Time 1 variables. Therefore, Time 1 variables were not stable measures of permanent fixed quality but, rather, measures of playground quality before the teacher entered the playground to prepare it for her program. Time 1 variables changed across the days of observation. Using this definition for the Time 1 variables, it was possible for the Added variables to measure the quality of the teachers' addition of materials and equipment for her classroom, not including the portable toys left outside. Because a purpose of this study was to examine teachers' provisions for outdoor play, this definition of Time 1 is reasonable. Future research on outdoor play or quality of playground that is exploring only the permanent, fixed equipment and materials of playground quality should exclude the portable items left outside.

In the present study, three of thirty observations were excluded from the analyses of quality of playground variables and one of the ten teachers was excluded in the analyses of teachers' behaviors and verbalizations variable as outliers. These outliers had substantial influence on the results and it is essential to replicate this study with more subjects. One teacher, considered an outlier, had high frequencies of observation strategies on the playground, and her pattern of teaching behaviors and verbalizations was clearly different from those of other teachers. However, these observations might be very representative of daily preschool outdoor play. It is necessary to have a larger sample size and longer observation periods to determine whether the ten teachers' behaviors and verbalizations are representative of preschool teachers, in similar situations.

Preschool teachers did not use different teaching strategies but used facilitating for about half of the recorded playground observations. Modeling and demonstrating were seldom observed

practically. Perhaps, the time interval of observation was not long enough to truly identify these categories. These possible interpretation raise important questions for future research. First, what preschool teaching strategies are desirable in children's play? This is not an easy question because teacher involvement in children's play is affected by various factors, such as the children themselves (age, needs, interest, learning cycle, cultural background), the physical environment (location indoors or outdoors, the play area, materials and equipment, temperature, season, region, culture), and the psycho-social environment (peers, family, teachers, school). Second, do preschool teachers differ or use the same behaviors and verbalizations in children's play both in the indoor and outdoor environments? Henniger (1977) examined children's play both indoors and outdoors and found both environments were valuable in stimulating various types of play, however, the specific teaching strategies and teachers' preparation for play were not explored. No known research examines preschool teachers' involvement in both children's indoor and outdoor play. This question is worth investigating.

Teachers' behaviors and verbalizations varied among different play areas. The different associations between teachers' verbalizations and play areas may be explained by the various types of children's play. The various types of preschoolers' play are different for each play area and it is reasonable to think that the play area influences the different pattern of interactions between teachers and children. In this study, the relationship between the children and teacher verbalizations is unknown, and this consideration needs to be examined by a study of interaction between children's play and teachers' involvement. Examining the relation between the type of play in which children engage and type of teachers' behaviors, verbalizations and involvement of play is of particular interest. In addition, children's reaction to teachers' involvement in play also needs to be examined. Additional research is necessary to include the variables of children's play and their reaction to teachers' verbalizations. The effects of materials and equipment or play area, the learning condition of children, and peer interactions on teachers' verbalizations are also worthy of further attention.

In the current study, behaviors and verbalizations of two teachers were observed for each playground. As a direct extension of this study, it is desirable to develop more replications of this work with more teachers observed on each playground. In this study, some statistical analyses were not possible due to not having enough observations in some verbalization categories. Therefore, by increasing the number of subjects per playground, number of playgrounds, and number of observation days the following analyses are possible: analyses of association between teachers' background and teachers' behaviors and verbalizations, analysis of association between play area and teachers' verbalization using 12 categories controlling for portable equipment, and any analyses involving 12 categories of teachers' verbalizations.

Finally, additional research is needed comparing the relationships between the quality of playground and teachers' behaviors and verbalization across a broader age range of children and for different socioeconomic groups and seasons, geographic areas, and culture. An understanding of how these different factors would influence these relationships would provide additional important information.

The results of the present study offer preliminary findings examining preschool playground quality, preschool teachers' behaviors and verbalizations on those playgrounds, the play areas of the preschool playgrounds, and the relationships among them. It is hoped that this study will be a cornerstone of broad and deep understanding of teachers' involvement on preschool children's outdoor play.

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ACKNOWLEDGMENTS

I wish to express my sincerest gratitude to Dr. Joan E. Herwig, my major professor, for her expert advice, constant encouragement, and patient consultation throughout the course of this study, and for her advancing my understanding of children's outdoor play, and for her steadfast assistance in the task of preparing this manuscript. Her enthusiasm and willingness to give of her time made me feel secure and provided me with inspiration.

I wish to extend my appreciation to the members of my committee: Dr. Mack C. Shelley II made statistics enjoyable by teaching it at a level that was understandable to me, and his constructive suggestions were invaluable in the result section of my thesis. Dr. Albert King and Dr. Paula McMurray-Schwarz's interest and insightful suggestions were great encouragement to me.

I am also thankful former advisor, Dr. Dahlia Stockdale, for her warm encouragement from the beginning of my graduate work.

Many thanks go to the preschool directors, teachers and children for giving me the opportunity to observe them in preschool playgrounds during their free outdoor play times.

I am very grateful to Brenda DeVries for her assistance in establishing inter-rater reliability for the observation of videotapes, Haeseon Lee, Julie Gilbert-Leed, and Lesli Hicks for their help in transcribing the videotapes, Heather Penny, Anita Russell, Terri-Sue Guillou, and Darlene Keene for their participating in the pilot study.

My research investigation has been partially supported by Family and Consumer Sciences Graduate Research Fund, and I am thankful for this financial assistance.

I am very fortunate to have known special friends who highlighted my life in Ames. Jenny Thornburg, my English teacher, and her daughters, Etta and Willa, have been a constant source of cheer. Mary Sterling made me smile and hopeful.

Finally I am proud of being the daughter of my parents, Masaru and Reiko Aoki. I thank my husband, Jun-ichiro, for his help in computer work and unconditional love.

January 1995

APPENDIX A

FIGURES

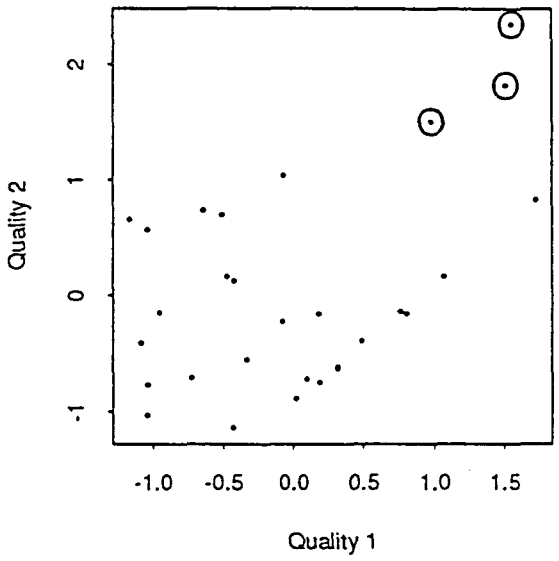
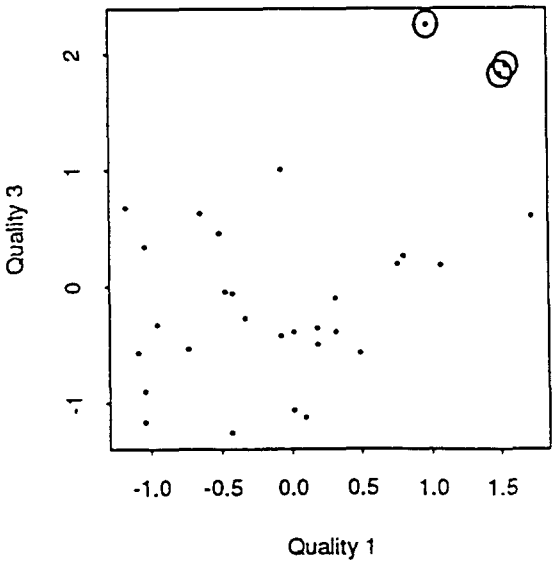


Figure A1. Plot of Quality 1 and Quality 2.



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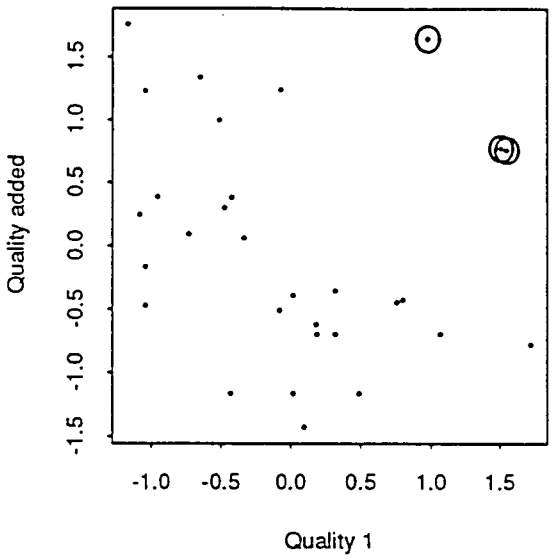

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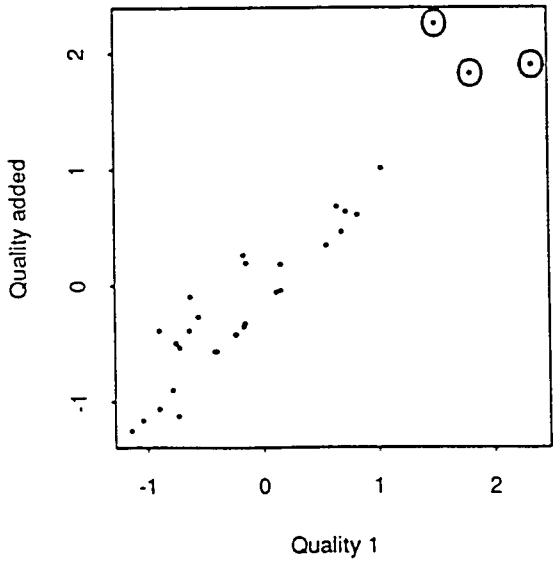

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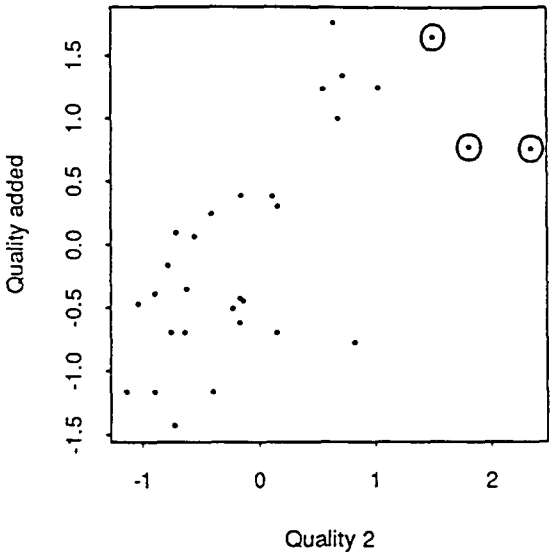

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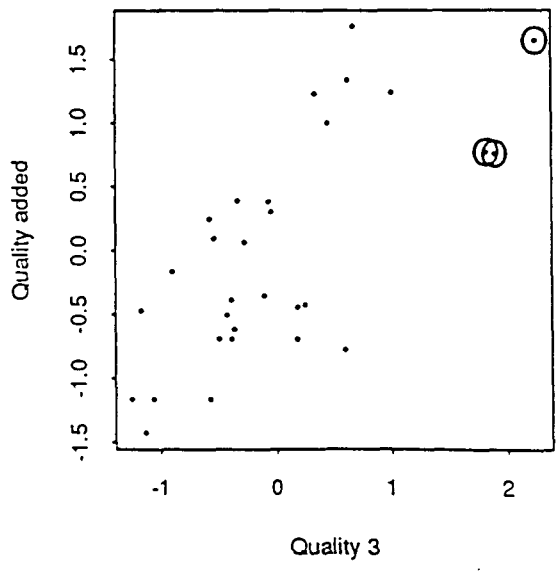

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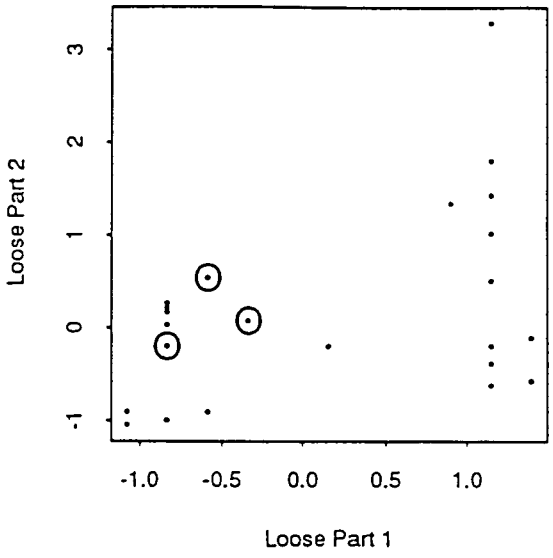


Figure A7. Plot of Loose Parts 1 and Loose Parts 2.

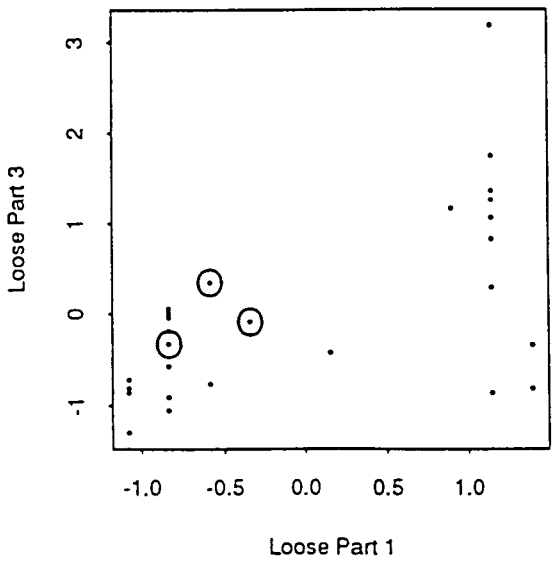


Figure A8. Plot of Loose Parts 1 and Loose Parts 3.

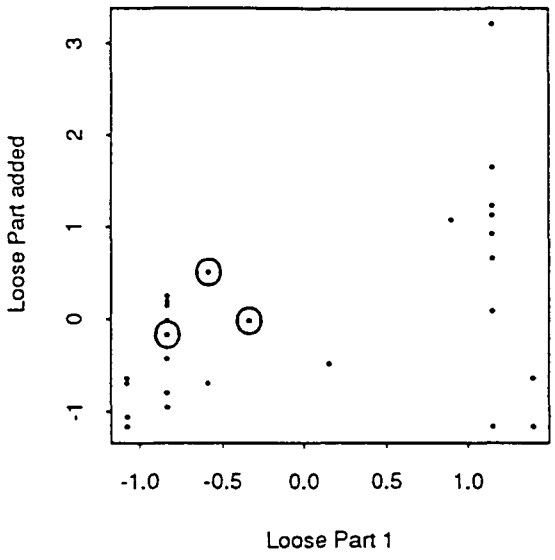


Figure A9. Plot of Loose Parts 1 and Loose Parts Added.

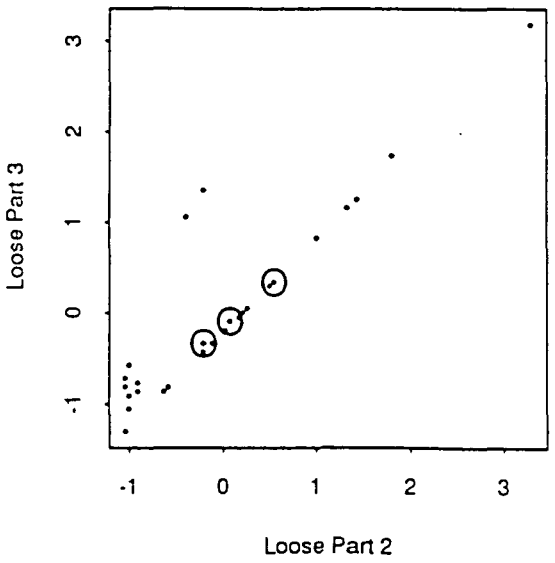


Figure A10. Plot of Loose Parts 2 and Loose Parts 3.

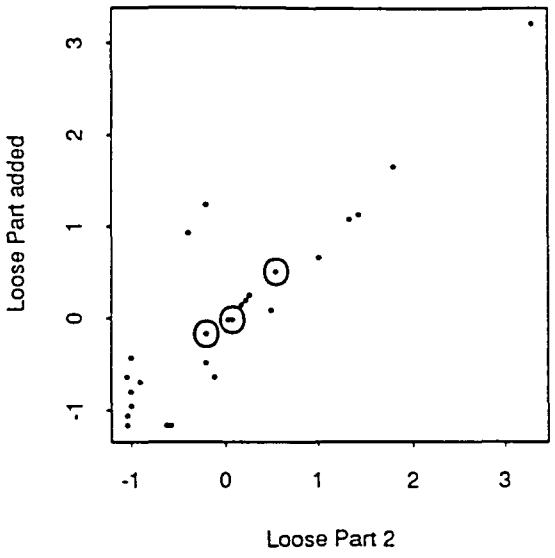


Figure A11. Plot of Loose Parts 2 and Loose Parts Added.

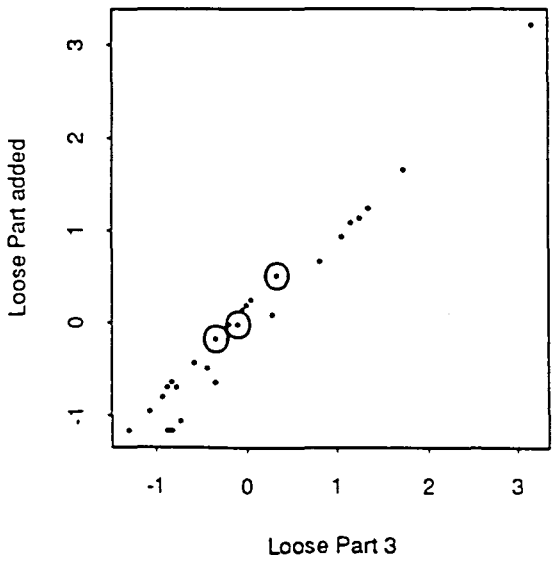


Figure A12. Plot of Loose Parts 3 and Loose Parts Added.

APPENDIX B

CORRESPONDENCE

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Family and
Consumer Sciences
Department of Human Development
and Family Studies
101 Child Development Building
Ames, Iowa 50011-1030
515 294-3040
FAX 515 294-1765

September 1994

Dear Director;

As an Early Childhood Education masters candidate in Human Development and Family Studies at Iowa State University, I am interested in learning about the preschool outdoor play environment and teacher-child interactions on the preschool playground. Many early childhood educators promote the importance of outdoor play for young children in school settings. Curriculum textbooks, professional guidelines and accreditation standards reflect the importance of teacher's roles in this type of play. Few studies have been done concerning this topic. The proposed study will provide insight into our understanding of preschool playgrounds and teacher's roles in preschool children's outdoor group play.

This study involves audiotaping and videotaping head teachers of 3- and 4-year-old children for 10 minutes on 3 different fair weather days during morning outdoor play time using a cordless microphone. Also, it involves a 10-minute interview with the teacher concerning her background and outdoor planning experiences.

I am seeking your permission to include two head teachers of 3 and 4 year olds at your center to participate in this study beginning in late summer 1994 and ending fall 1994. All information will be kept confidential. No program or teacher will be identified by name in the final research report. A copy of the research summary will be sent to all directors and teachers after the study has been completed. Results of the study will be presented in a M.S. thesis, in journal articles, and at professional meetings.

If you have any objection to us contacting the teachers of 3 and 4 year olds in your early childhood program to participate in this study, please let us know by returning the enclosed permission form in the enclosed stamped, addressed envelope by September .

Thank you, in advance, for your support of this study. If you have any questions, please contact us at (515) 294-8878.

Sincerely,

Naoko Fukuchi
Graduate Student

Joan E. Herwig, Ph. D.
Major Professor in Charge of Research

Department of Human Development and Family Studies
Iowa State University
Ames, Iowa 50011-1030
515-294-8878

CHILD CARE DIRECTOR PERMISSION FOR STUDY
OF PRESCHOOL OUTDOOR PLAY

The purpose and the general nature of the research procedures have been explained to me. If the teachers in my early childhood program participate in this study, I understand that any questions regarding the study will be answered. I understand that neither the teachers nor the childcare program will be identified by name and all information will be kept confidential. Finally, I understand that the teachers are free to withdraw from the study at any time and that I am free to withdraw my permission for the early childhood program.

_____ I am NOT willing for my early childhood program to participate in this study.

_____ _____

Director's Signature Name of Early Childhood Program

Date _____

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Family and
Consumer Sciences
Department of Human Development
and Family Studies
101 Child Development Building
Ames, Iowa 50011-1030
515 294-3040
FAX 515 294-1705

September 1994

Dear Head teacher;

As an Early Childhood Education masters candidate in Human Development and Family Studies at Iowa State University, I am interested in learning about the preschool outdoor play environment and teacher-child interactions on the preschool playground. Many early childhood educators promote the importance of outdoor play for young children in school settings. Curriculum textbooks, professional guidelines and accreditation standards reflect the importance of teacher's roles in this type of play. Few studies have been done concerning this topic. The proposed study will provide insight into our understanding of preschool playgrounds and teacher's roles in preschool children's outdoor group play.

This study involves audiotaping and videotaping head teachers of 3- and 4-year-old children for 10 minutes on 3 different fair weather days during morning outdoor play time using a cordless microphone. Also, it involves a 10-minute interview with the teacher concerning her background and outdoor planning experiences.

I am seeking your permission to participate in this study beginning in late summer 1994 and ending fall 1994. All information will be kept confidential. No program or teacher will be identified by name in the final research report. A copy of the research summary will be sent to all directors and teachers after the study has been completed. Results of the study will be presented in a M.S. thesis, in journal articles, and at professional meetings.

If you agree to be involved in this study, please return the enclosed permission form in the enclosed stamped, addressed envelope by September 26. We will contact you by telephone to discuss this study as soon as we receive your approval.

Thank you, in advance, for your support of this study. If you have any questions, please contact us at (515) 294-8878.

Sincerely,

Naoko Fukuchi
Graduate Student

Joan E. Herwig, Ph. D.
Major Professor in Charge of Research

Department of Human Development and Family Studies
Iowa State University
Ames, Iowa 50011-1030
515-294-8878

TEACHER PERMISSION FOR STUDY
OF PRESCHOOL OUTDOOR PLAY

The purpose and the general nature of the research procedures have been explained to me. If I in my early childhood program participate in this study, I understand that any questions regarding the study will be answered. I understand that neither the program nor I will be identified by name and all information will be kept confidential. Finally, I understand that I am free to withdraw from the study at any time.

_____ I am WILLING to participate in this study.

_____ I am NOT willing to participate in this study.

_____ _____
Teacher's Signature Name of Early Childhood Program

Date _____

Please include the following information, also.

Best time to call: _____ Telephone Number: _____

Morning outdoor play time: _____
Beginning time / Ending time

APPENDIX C

OUTDOOR PRESCHOOL PLAYGROUND

EQUIPMENT & MATERIALS RECORDING FORM

Outdoor Preschool Playground Equipment & Materials Recording Form

Teacher Code: Date: / / 94 ( ) Recorder Name:
Program Code: Time: Temperature:
# of Children Present: # of Adults present:

	Time 1 Before Outdoor Play	Time 2 Beginning Outdoor Play	Time 3 End of Observation
Complexity		(+)	(+)
Variety		(+)	(+)
# of Play Spaces per Child	/ =	/ =	/ =
Loose Parts		(+)	(+)

Time 1 Before Outdoor Play	Time 2 Beginning Outdoor Play	Time 3 End of Observation
Complexity: Total _____	__+_____	_+_____
Variety: Total _____	_+_____	_+_____
Loose Parts: Total_____	_+_____	_+_____

APPENDIX D

OUTDOOR PRESCHOOL PLAYGROUND

EQUIPMENT & DETERMINATION OF VARIETY

Outdoor Preschool Playground Equipment and Determination of Variety

* Category used in determining variety.

Large Rockers * Small Rockers *	rocking board, cadle board, teeter-totter, bench glider, sring house, tube rocker
Climbing Units * Hanging & Swing Units *	climbing steps, jungle gym, monkey bars, tree stump, two ramps with bench between, jumping board, hanging bar(s), rings
Wheel Vehicles *	tricycle, pedal car, wagon
Slides *	sliding pole, slide
Swings *	swing, double and single, tire swing, bench swing
Empty House Type (no idea) *	large, hollow empty crate, crawl barrel, tunnel
Empty House Type (idea) *	play house, tent, teepee
Single Props *	sawhorse, movable partitions, board, ladder
House Type *	play house equipment, table with dolls and doll clothes, stuffed animals, theater
Building Equipment *	building blocks, wood crates, sawhorse, pile of bricks
Table Toys *	
Manipulatable Cars, Trucks, Figures *	
Books *	
Digging Area and Equipment *	sand, dirt on ground or table
Animal *	(with or without cage)
Water Pump *	water outlet, water pump
Climbing Tree *	
Swimming Pool and Equipment *	swimming pool
Water Table*	
Art Equipment *	paint, chalk, brushes, paper
Miscellaneous *	ball *, tire *, bubbles *, fishing *, hoop *, basket hoop* merry-go-round *, basket hoop *, parachute*

APPENDIX E

OUTDOOR PRESCHOOL PLAYGROUND EQUIPMENT CHECKLIST

Outdoor Preschool Playground Equipment and Determination of Variety

1=Before Outdoor Play 2=Beginning Outdoor Play 3=End of Observation

Teacher Code:

Date									
Time		1	2	3	1	2	3	1	2	3
Large rocker	see-saw, tube rocker, rocking board									
Small rockers										
Climbing units	climbing steps, jungle gym, rings, monkey bars, hanging bar(s),									
Hanging & swing units										
Wheel vehicles	tricycle, pedal car, wagon									
Slides	sliding pole, slide									
Swings	swing, tire swing, bench swing									
Empty house type (no idea)	large, hollow empty crate, crawl barrel, tunnel									
Empty house type (idea)	play house, tent, teepee									
Single props	movable partitions, board, ladder									
House type	play house equipment, table with dolls and doll clothes									
Building equipment	building blocks, wood crates, pile of bricks									
Table toys										
Manipulatable cars/trucks/figures										
Books										
Digging area/eqp.	sand, dirt on ground or table									
Animal	(with or without cage)									
Water pump	water outlet, water pump									
Climbing tree										
Swimming pool	swimming pool									
Water table										
Art equipment	paint, chalk, brushes									
Ball	ball, frisbee									
Tire										
Bubbles										
Fishing										
Basket hoop										
Merry-go-round										
Hoop										
Music instrument										
Parachute										
TOTAL										

APPENDIX F

TEACHER TRANSCRIPTION FORM

Teacher Transcription Form

Teacher Code: Date: Time: Recorder Name:

Coding Behavior and Verbalization: 12 categories

AC = ACKNOWLEDGE	SU = SUPPORT	DE = DEMONSTRATE	T = TALK WITH ADULT
MO = MODEL	SC = SCAFFOLD	DI = DIRECT	M = MAINTENANCE/PREPARATION
FA = FACILITATE	CO = CO-CONSTRUCT	O = OBSERVE	P = PRACTICAL ASSISTANCE

Coding Area: 5 categories

1 = SAND
2 = STAND ALONE SWING, SLIDE, AND ROCKER
3 = BASKETBALL HOOP
4 = CLIMBER WITH PARTS, CLIMBING TREE, AND ENCLOSED SPACE
5 = OPEN AREA, BENCH, AND BUILDING

Coding Portable Equipment & Materials: 2 categories

0 = ABSENT
1 = PRESENT

Time in 10-sec Interval	Transcription	Coded Interaction	Coded Area	Coded P. E.
00:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
00:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
00:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
00:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
00:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
00:50-01:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
01:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1

01:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
01:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
01:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
01:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
01:50- 02:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
02:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
02:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
02:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
02:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
02:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
02:50-3:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
03:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1

03:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
03:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
03:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
03:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
03:50-4:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
04:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
04:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
04:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
04:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
04:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
04:50-5:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
05:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1

05:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
05:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
05:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
05:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
05:50-6:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
06:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
06:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
06:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
06:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
06:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
06:50-7:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
07:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1

07:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
07:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
07:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
07:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
07-50-8:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
08:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
08:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
08:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
08:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
08:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
08:50-9:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
09:00-10		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1

09:10-20		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
09:20-30		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
09:30-40		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
09:40-50		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1
09:50- 10:00		AC SU DE T MO SC DI M FA CO O P	1 2 3 4 5	0 1

APPENDIX G

TEACHER INFORMATION FORM

Teacher Information Form

Name _____ Age Group _____

Program _____ Total # of Children in your classroom _____ Boys ___ Girls ___

Total # of Children at this childcare site _____ Boys ___ Girls ___

Total # of paid adults who work with your classroom of childcare everyday _____

Total # of paid classroom personnel at this site _____

Highest level of education completed:

1. ____ High School Diploma
2. ____ CDA
3. ____ A.A./A.S. Title _____
4. ____ B.A./B.S. Title _____
5. ____ B.A./B.S. + ____ post degree credits
6. ____ M.A./M.S. Title _____
7. ____ M.A./M.S. + ____ post degree credits

Teacher licensure/s is:

1. ____ None
2. ____ Elementary Ed (K-8grds #10)
3. ____ Prekindergarten/K (#53)
4. ____ Early Childhood (Birth-8yrs)
5. ____ Early Childhood Special Ed (Birth-6yrs)
6. ____ Other _____

Years of teaching experience completed (exclude this year)

1. Day Care (fullday)
   - Infant & Toddlers _____
   - Preschoolers _____
   - Kindergartners _____
   - School-age _____
2. Preschool (1/2 day) _____
3. Kindergarten _____

Total _____

Who plans for the scheduled outdoors play at your center? _____

When do you plan for the scheduled outdoors time? _____

What equipment, materials and activity plans do you typically make available for children's outdoor play time when you are planning in summer, fall, and spring? _____

What equipment, materials and activity plans do you typically make available for children's outdoor play time when you are planning in winter? _____

Is your center accredited by National Academy of Early Childhood Programs? _____

APPENDIX H

CODING MANUAL

CODING MANUAL FOR PRECHOOL TEACHERS ON PLAYGROUNDS
GENERAL INFORMATION

First, this manual will descibe the observational system for coding the behavior of teachers. Second, it will describe the observational system for coding the play areas of the teachers.

The purpose of the observational coding manual is to describe 1) the preschool teacher's interaction with children on the playground during outdoor play time, 2) the play areas of the teacher-child interactions on the playground and 3) the existence of the portable equipment and materials on the playground.

I. Teachers' Behaviors and Verbalizations

The system for coding teacher behaviors and verbalizations includes 12 categories. A continuum of teaching categories ranging from nondirective to directive teaching strategies describing teachers' behaviors will be used for coding teacher-child interactions. The strategies are acknowledging, modeling, facilitating, supporting, scaffolding, co-constructing, demonstrating, and directing. In addition to these teaching categories, non-teaching categories, such as, observing, talking with other adults, maintenance/preparation, and practical/personal assistance with children or adults, also will be examined.

The behavior and verbalization is coded according to what is observed during each 10 second interval. If more than one category of behavior and verbalization is observed, the one requiring the greatest amount of time during the interval is to be coded.

The operational definitions of the 12 categories of teacher behavior and verbalization are presented below.

AC = ACKNOWLEDGE

The teacher gives attention and positive encouragement, notice, and approval of the child's behavior.

Examples: Nodding, smiling, holding the child, signaling okay to the child with a hand signal.
"Ha, ha, ha...." (laugh sounds)
"OK."
"All right."
"Hello"
"Bye-bye"
"Thank you"

MO = MODEL

The teacher displays desirable behaviors for the children in either implicit or explicit forms. Implicit modeling is less directive, and explicit modeling is more directive.

Examples: The teacher speaks courteously and kindly to the children (implicit modeling).

FA = FACILITATE

The teacher temporarily assists to help children get to the next step as the child is ready. The verbal and/or nonverbal behavior of the teacher provides structure to the ongoing behavior of the child, and is designed to keep the child engaged in a child-focused play activity with toys and materials. The teacher keeps the child engaged in ongoing play or teacher-child interaction, but without any attempt to modify, change, or elaborate his/her behavior.

Examples: The teacher offers help by holding the back of the bike for a brief moment until the child gains a sense of balance.

"Do you want a bucket?"
"Do you want to use a chalk?"
"1, 2, 3, 4, ..." counting numbers at the swing.

SU = SUPPORT

The teacher and child together determine when support is no longer necessary and the teacher allows children to participate but with clearly available assistance.

Examples: "Push the bike yourself. I'll be back."
"Grasp this bar with your hands and put your feet on that bar."
"I will be here while you are on the swing."

SC = SCAFFOLD

The teacher sets up challenges and assists children to work "on the edge" of their current competence or by pushing the limits of their current developmental level.

Examples: "How many scoops of sand will fill the bucket?"
"What would happen if I pour water into the sand?"
"How can everyone have a turn?"
"How does this bird differ from the other one?"
"Why is your building like mine?"

CO = CO-CONSTRUCT

The teacher actually does a project or an activity with the child, and the teacher and the child are both learners and teachers simultaneously.

Examples: The teacher builds a block structure with a child, or has a tea party in the house area as equal actors.
The teacher rides on the swing while the child rides on the next swing.
"Lets' go to the swing."
The teacher plays a ball with a child.

DE = DEMONSTRATE

The teacher actively participates while the child observes the outcome of the demonstration. The teacher shows primarily through actions or gestures how something is to be done and shows the processes.

Example: The teacher draws a circle with a piece of chalk while the child is watching her.
The teacher paint building with a brush.

DI = DIRECT

The teacher imposes order, and forces the child to perform a behavior that is unrelated to his/her ongoing play or course of action. The teacher both directs the child's behavior away from his/her ongoing play, and requires that he/she perform or engage in a techer-selected activity. There is a clear sense of coercion and forcing in what the teacher is doing. The teacher verbally and/or physically demands that the child perform a particular behavior.

Examples: "Stop throwing sand."
"Let's not to walk between the swings."
"I will call a name and that's the person who will go under the parachute, okay."

OB = OBSERVE

The teacher is neither talking to the child nor actively directing behavior toward the child, but watching the children play. The teacher is observing what the child is doing. The teacher is observing what the adults are doing.

Example: Sitting on the bench, the teacher is watching what the child is doing.
The teacher walks around on the playground.

T = TALKING WITH OTHER ADULTS

The teacher is talking with another adult. The topics are the information exchange of children, the weather, or other unrelated topics.

Example: The teacher is talking with another teacher or the parent or siblings on the playground.

MA = MAINTENANCE/PREPARATION

The teacher adds materials or cleans unneeded things.

Examples: The teacher brings shovels and buckets to the sand.
The teacher puts water into the swimming pool.

PR = PRACTICAL ASSISTANCE

Routines of dressing, toileting, and comforting.

Examples: The teacher helps the child tie his/her shoe strings.
The teacher is sitting and rocking the child.
The teacher walks with a child hand in hand to reduce the separation anxiety of the child.

II. The Play Activity Areas of the Teacher on the Playground

The system for coding the play areas of the teacher on the playground includes 5 categories:

1. **sand box/ area**
2. **stand alone swing, slide, and rocker**
3. **basketball hoop**
4. **climber with parts, climbing tree, and enclosed space**
5. **open area, bench and buildings**

The play area is coded according to what is observed during each 10 second interval. If more than one category of play area is observed, the one requiring the greatest amount of time or greatest width of area during the interval is to be coded. The examples of the 5 categories of play area (activity) are presented below.

1 = Sand

Examples: sand boxes
sand tables
pea gravel with defined space
loose composite material with defined space

2 = Stand alone swing, slide, and rocker

Examples: swings, double and single
tire swings
bench swings
sliding poles
slides
rocking boards
see-saws
rocking tubes

3 = Basketball hoop

Example: basketball hoop

4 = Climber with parts, climbing tree, and enclosed space

Examples: climbing steps
jungle gyms
balance beams
hanging bars with climbers
nets with climbers

tires with climbers
swing with climber
slide with climber
climbing trees
play houses
tents
large empty crates
crawl barrels
tunnels

5 = Open area, bench and buildings

Examples: no equipment or materials within 10 feet, usually asphalt, pea gravel, cement, grass

benches
tables with benches
buildings/structures
deck with railing

III. The Portable Equipment and Materials

Examples of the portable equipment and materials are as follows:

tricycles
pedal cars
wagons
balls
tires
hoops
bubbles
pools
water tables
parachute
sand equipment (shovels, pails, trays etc.)
art equipment
music equipment

The system for coding the portable equipment and materials includes 2 categories:

0. absent
1. present

If portable equipment is present for 5 or more seconds, then code=1 for that 10 second interval.

0=absent

No portable equipment and materials are used in the play area for 5 or more seconds.

1=present

Portable equipment and materials are used in the play area for 5 or more seconds in a 10-second interval.

RECORDING MANUAL FOR QUALITY OF OUTDOOR PRESCHOOL PLAYGROUNDS GENERAL INFORMATION

The purpose of this manual is to describe

1. **complexity of equipment**
2. **variety of equipment**
3. **number of play spaces per child**
4. **loose parts of materials.**

Equipment and materials will be recorded by determining the complexity and variety of play space, and the number of play spaces per child and the loose parts of materials.

The change in the quality of playgrounds will be analyzed during three observation periods (**Time 1, Time 2, and Time 3**).

Three observation periods will be used for recording the complexity, variety, number of play spaces per child and loose parts.

Time 1: First, the materials and equipment on the preschool playground before the teacher adds items for the day will be assessed.
Time 2: Second, equipment and materials on the playground will be recorded at the beginning of the program, that is, what materials and equipment are added by the teacher before the children go out on the playground.
Time 3: Third, equipment and materials at the end of 10-minute observation period will be recorded.

1. Complexity of equipment

The quantification of outdoor preschool play resources follows the Kritchevsky et al. (1969) guidelines for evaluating the quality of play spaces.

A play unit will be categorized as either a **simple unit**, **complex unit** or **super unit**.

A simple unit will be assigned a value of **1**,
A complex unit will be assigned a value of **4**
A super unit will be assigned a value of **8**.

Then the total scores of the complexity of equipment and materials of the preschool playground for each of the three time periods will be summed. Higher complexity scores mean that there are more play spaces for the children on the playground than is implied by lower scores.

The operational definition for complexity of equipment is "the extent to which they contain potential for active manipulation and alteration by children. Elaborating on this distinction, it is possible to discern three types of play units—simple, complex, and super, which vary both in their relative capacity to keep children interested, and in the relative number of children they can accommodate at one time" (Kritchevsky et al., 1969 p.10).

Simple Play Unit: A play unit has one obvious use and does not have sub-parts or a juxtaposition of materials which enable the child to manipulate or improvise.

Examples: swings
jungle gym
rocking horse
tricycles
balls
hoops.

Complex Play Unit: A play unit with sub-parts or juxtaposition of two essentially different play materials which enable the child to manipulate or improvise.
Also included in this category are single-play materials and objects which encourage substantial improvisation and/or have a considerable element of unpredictability.

Examples: sand table with digging equipment
swing with sand
playhouse with supplies
all art activities such as dough, paints, or chalk
an area with animals such as a dog, guinea pigs, or ducks

Super Play Unit: A complex unit which has one or more additional play materials, i.e., three or more play materials juxtaposed.

Examples: sand box with play materials and water
climber with slide and tire
dough table with tools
tunnel, large crates and tires.

2. Variety of equipment

Equipment and materials also will be analyzed by variety. The total amount of variety will be summed accross these categories.

The operational definition for variety of equipment is "the number of different kinds of units (only in terms of differences in activity, and regardless of whether they are simple, complex, or super)...and is a measure of the relative capacity of the space to elicit immediate interest from children" (Kritchevsky et al., 1969 p.12).

* Category used in determining variety (see attached table).
Large rockers * and smaller rockers *—rocking board, cradle board, teeter-totter, bench glider, spring horse, tube rocker
Climbing units * and hanging and swing units *—climbing steps, jungle gym, two ramps with bench between, monkey bars, tree stump, jungle board, hanging bar(s), rings
Wheel toys * —tricycles, pedal car, wagon
Slides * —sliding pole, slide
Swings *—swings, double and single, tire swing, bench swing

Empty house type (no idea) * —large, hollow empty crate, crawl barrel, tunnel
Empty house type (idea)* —play house, tent, teepee
Single props * —sawhorse, movable partitions, board, play house equipment
House type * —play house (well stocked), playhouse equipment (one piece with props or several pieces), table with dolls and doll clothes, stuffed animals, empty play house (raised and reached by ladder), theater
Building equipment * —building blocks, group of wood crates (manipulable), sawhorses with boards and boxes, pile of bricks
Table toys *
Manipulatable cars, trucks, figures *
Books *
Digging area and equipment *—sand, dirt, water, on ground or table
Animal * (with or without cage)
Water pump *—water outlet, water pump
Climbing tree *
Swimming pool *
Water table *
Art equipment *—paint, chalk, brushes
Miscellaneous — ball (frisbee) *, tire *, bubbles *, hoops *, basket hoop *, parachute *, merry-go-round *

3. Number of play spaces per child

Number of play spaces per child is determined by the total number of play spaces of a playground divided by the total number of children in the area. The ratio of the total number of play spaces and children gives the approximate number of play spaces available to each child.

$$\text{\# of play spaces per child} = \frac{\text{total \# of play spaces of playground}}{\text{total \# of children}}$$

4. Loose parts of materials

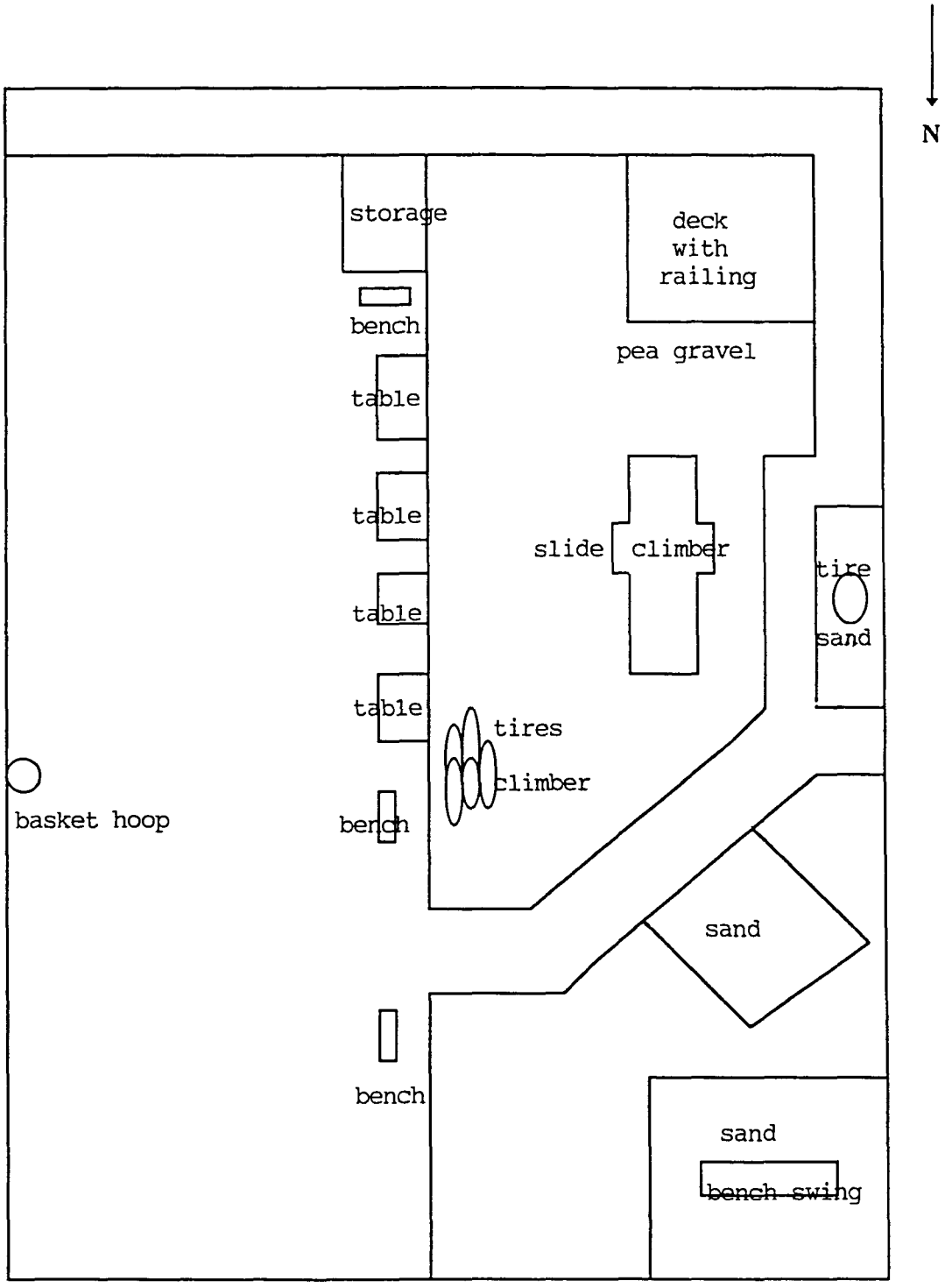
The operational definition of loose parts is unattached, dynamic, interchangeable and manipulative elements and materials available to be used in an infinite variety of ways by children (Nicholson, 1974). Loose parts are movable and portable by a child.

The number of all loose parts of elements will be counted.

Example: 5 balls
6 tricycles
4 buckets and
6 shovels will be scored as 5+6+4+6=21.

APPENDIX I

PLAYGROUND DIAGRAMS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pea gravel
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slide
climber
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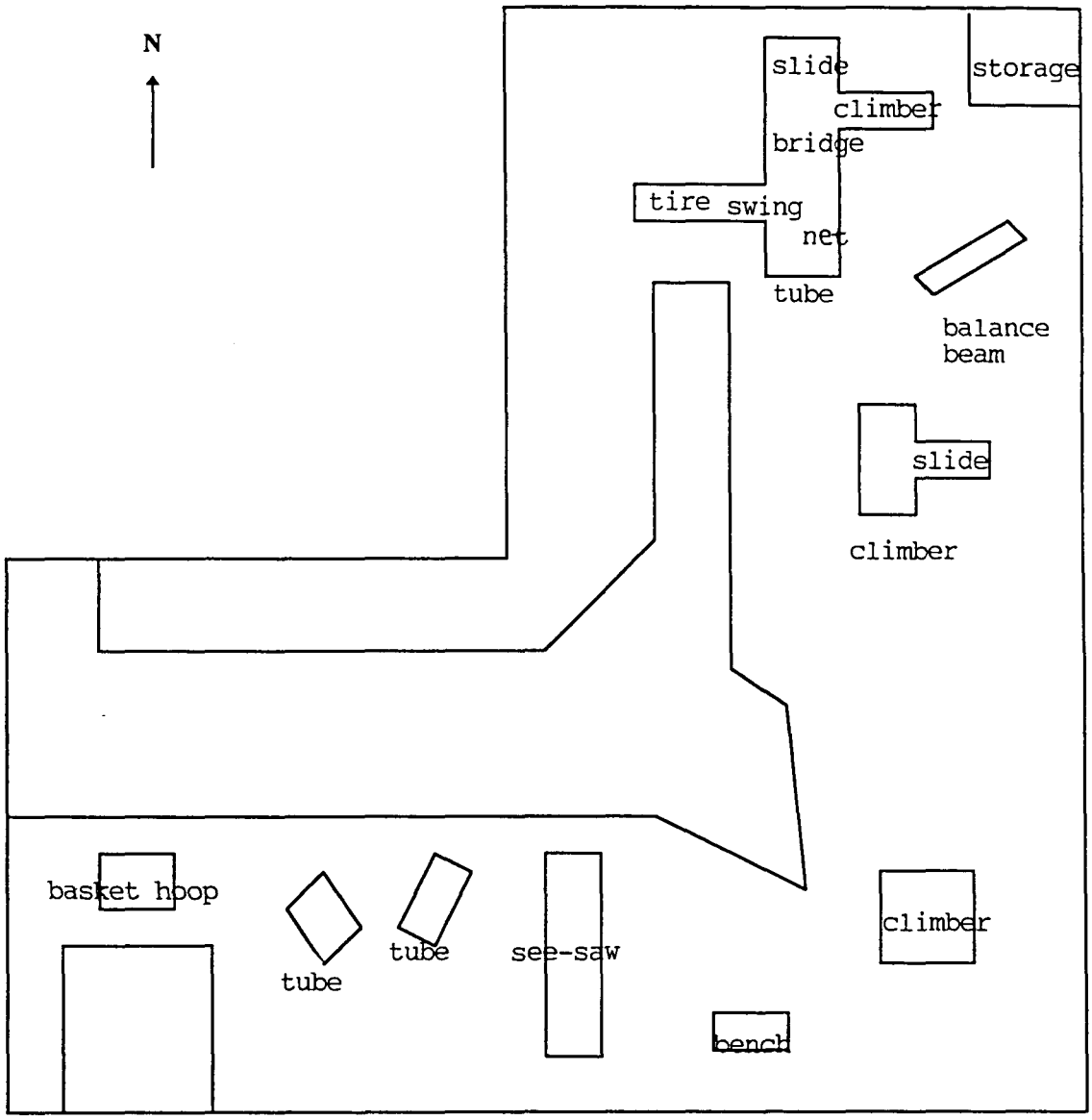
sand
bench
sand
bench swing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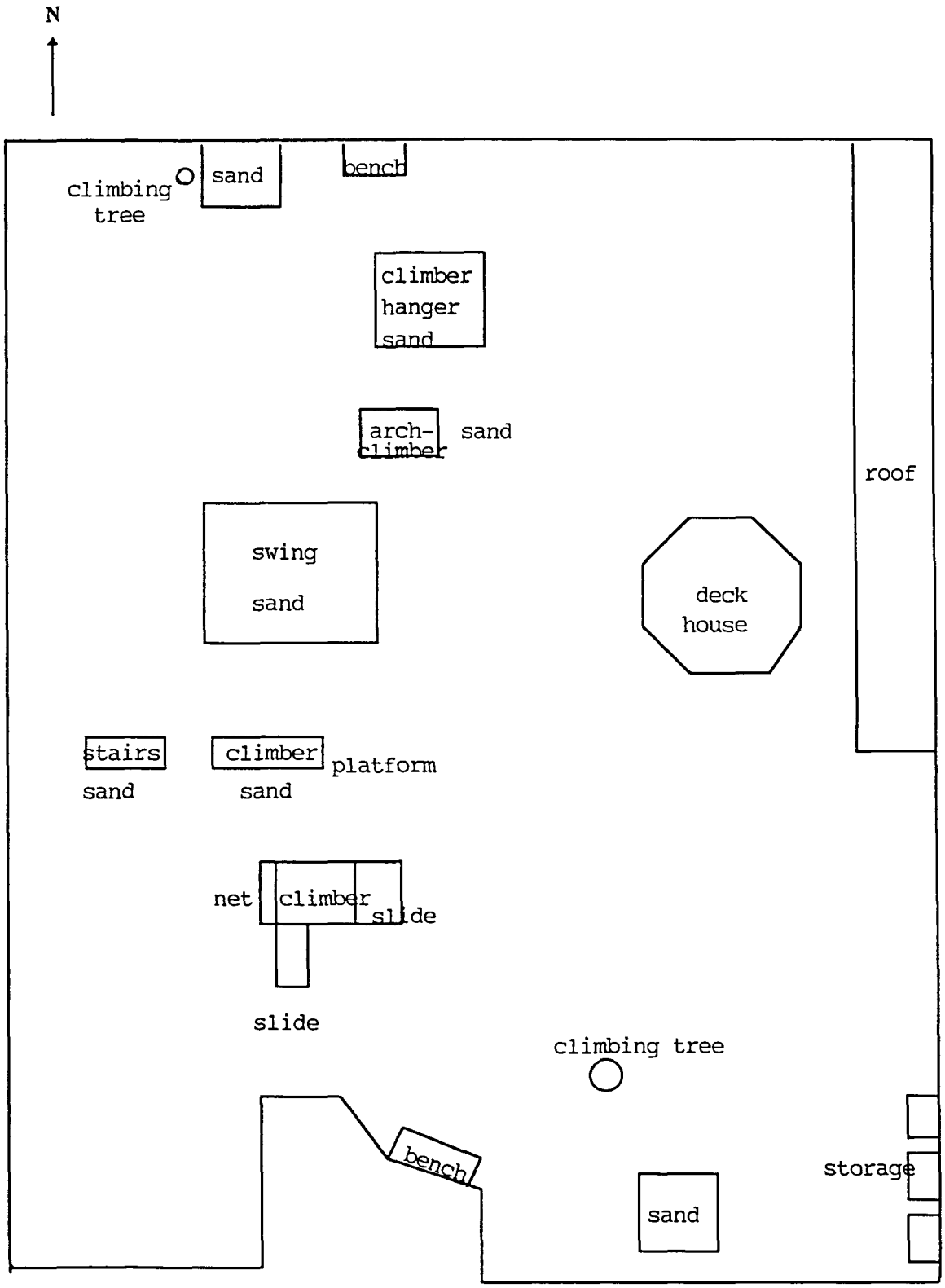
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sand
bench
climber hanger sand
arch-climber
sand
roof
swing
sand
deck house
stairs
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climber
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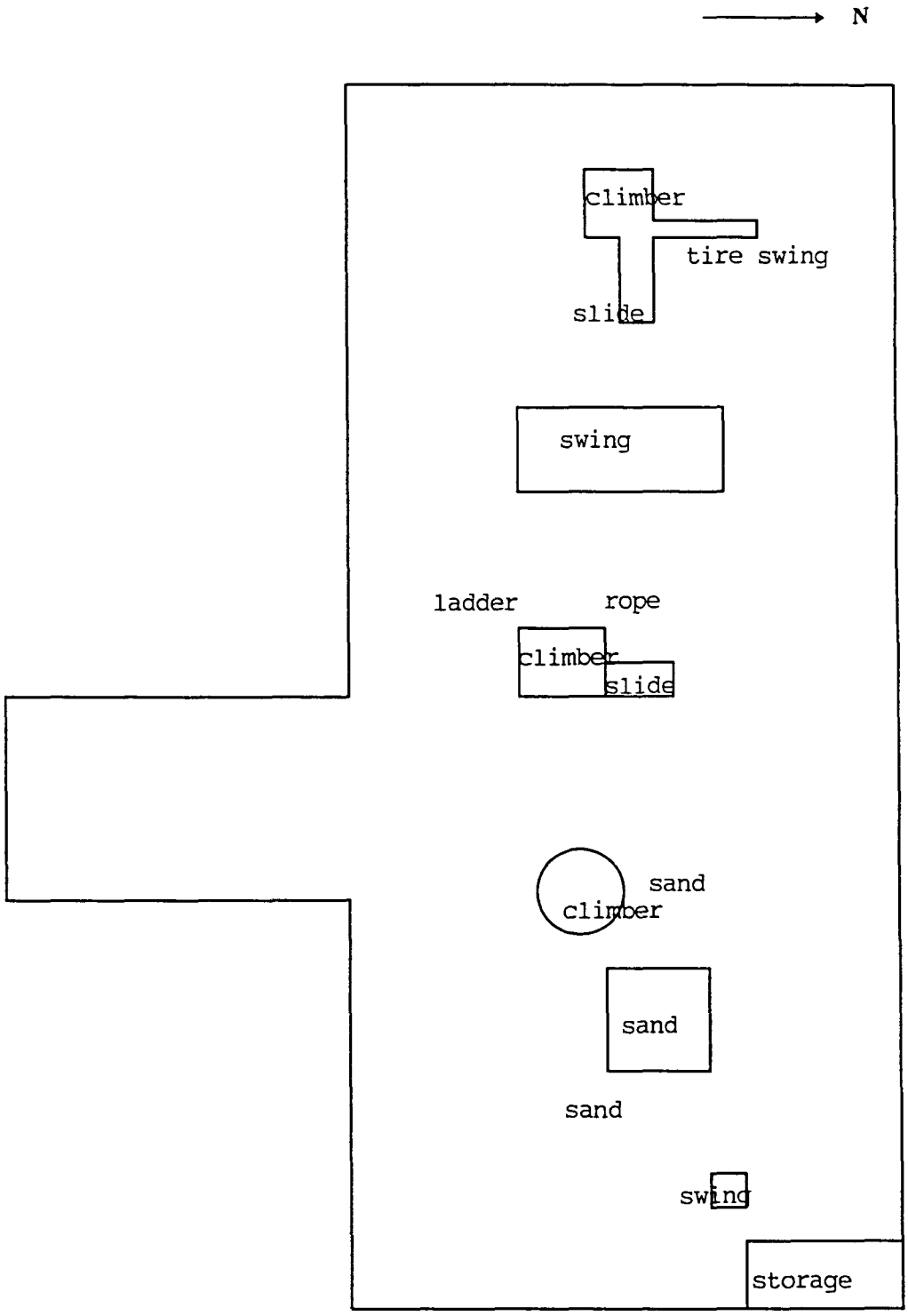
platform
net
climber
slide
slide
climbing tree
bench
storage
sand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tire swing
slide
swing
ladder
rope
climber
slide
sand
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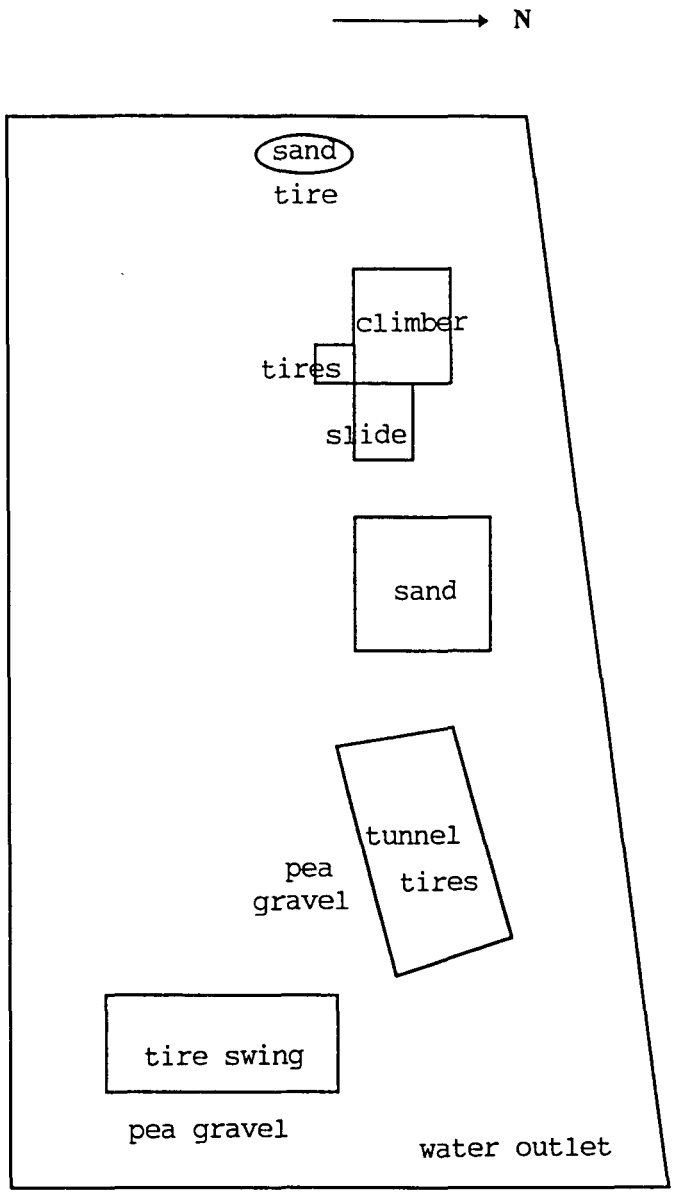
sand
sand
swing
storage


N
sand
tire
climber
tires
slide
sand
tunnel
tires
pea
gravel
tire swing
pea gravel
water outlet

APPENDIX J

CODING MAP FOR DATA

CODING MAP

Card	Column	Variable	Variable Label	Variable Value
1	1	PC	Program code	Assigned number (1-5)
1	2-3	ID	Subject number	ID number (01-10)
1	4	AGEGP	Age group of children	Assigned number (1-5) 1 = 2-4-year-olds 2 = 3-year-olds 3 = 3-4-year-olds 4 = 3-5-year-olds 5 = 4-5-year-olds
1	5-6	NUMCH	Number of children	Raw number
1	7-8	NUMB	Number of boys	Raw number
1	9-10	NUMG	Number of girls	Raw number
1	11	NUMAD	Number of adults	Raw number
1	12	EDU	Education	Raw number (years) 12 = High school 13 = CDA 14 = A.A./A.S. 16 = B.A./B.S. 18 = M.A./M.S.
1	13	LICENS	Teacher Licensure	Assigned number (1-9) 1 = None 2 = Elementary ed. 3 = Prekindergarten 4 = Early childhood 5 = Early childhood special ed. 6 = other 7 = 2+3 8 = 2+4 9 = 2+3+4+5
1	14	TEXP	Teacher experience	Raw number
2	1	PC	Program code	Program number (1-5)
2	2-3	ID	Subject number	ID number (01-10)
2	4	DAY	Day	Day number (1-3)
2	5-6	TEMP	Temperature	Raw number
2	7-8	NUMC	Number of children	Raw number
2	9	NUMAD	Number of adults	Raw number
2	10-11	COMP1	Complexity time1	Raw number
2	12-13	COMP2	Complexity time2	Raw number
2	14-15	COMP3	Complexity time3	Raw number
2	16-17	COMPAD	Complexity added	Raw number

2	17-18	VATY1	Variety time1	Raw number
2	19-20	VATY2	Variety time2	Raw number
2	21-22	VATY3	Variety time3	Raw number
2	23	VATYAD	Variety added	Raw number
2	24-26	PS1	Play spaces time1	Raw number
2	27-29	PS2	Play spaces time2	Raw number
2	30-32	PS3	Play spaces time3	Raw number
2	33-35	PSAD	Play spaces added	Raw number
2	36-37	LS1	Loose parts time1	Raw number
2	38-39	LS2	Loose parts time2	Raw number
2	40-41	LS3	Loose parts time3	Raw number
2	42-43	LSAD	Loose parts added	Raw number
3	1	PC	Program code	Program number (1-5)
3	2-3	ID	Subject number	ID number (01-10)
3	4	DAY	Day	Day number (1-3)
3	5-6	Time	Time intervals	Interval number (01-60)
3	7-8	Verb	Teachers' behavior& verbalization	Assigned number (1-12) 1= acknowledge 2 = model 3 = facilitate 4 = support 5 = scaffold 6 = co-construct 7 = demonstrate 8 = direct 9 = observe 10 = talk with adults 11 = maintenance 12 = practical assistance
3	9	PLAYAREA	Play area	Assigned number (1-5) 1 = sand 2 = stand alone swing 3 = clinmber with parts 4 = basket hoop 5 = open area
3	10	PE	Portable equipment	Assigned number (0-1) 0 = absent 1 = present