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Application of the behavior-person-environment paradigm to the analysis and evaluation of early childhood education programs.

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APPLICATION OF THE BEHAVIOR-PERSON-ENVIRONMENT PARADIGM TO THE ANALYSIS AND EVALUATION OF EARLY CHILDHOOD EDUCATION PROGRAMS

A Dissertation Presented

By

ELIZABETH PHYFE PERKINS

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TO:

My Husband, Homer, for his endless patience and support;

Our daughter, Lily, whose first years were filled with statistics, "comps," first drafts, and eventually, "orals."

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ABSTRACT

An Application of the Behavior-Person-Environment Interaction Paradigm to the Analysis and Evaluation of Early Childhood Education Programs

(February 1980)

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Ever since Hunt (1961), Bloom (1964), and Deutsch (1966) argued that early interaction with a stimulating environment was crucial for human development, a major task facing early childhood educators in the sixties and seventies has been the design, implementation and evaluation of programs designed to provide such stimulation for young children (Weikart, 1972; Karnes, 1972; Stallings, 1975; Bronfenbrenner, 1976). These early childhood programs, although differing in emphases, included prescriptions for the physical environment, the teacher role, and the content and structure of the daily curriculum.

It was the purpose of this study to investigate the interrelationships among these components and the behavior of children in early childhood settings. Thus, the systematic observation of children in naturally occurring educational settings was undertaken in order to develop a practical tool for measuring child environment

interactions and data summary procedures that would retain the comprehensive nature of the observations.

Such an interaction analysis system, if it proved to be practical and reliable, would have implications for the study of early childhood education. Teachers could analyze their classrooms in a focused manner in which behavior could be linked to activity settings and corresponding adult behaviors. Rather than constraining children to adapt to various educational subsettings teachers might search for dysfunctional aspects of both the human and the physical environment of the classroom.

In order to validate the procedures for recording child environment interactions developed in this study, children in two preschools differing in environmental characteristics were observed using the instrument, Children's Behavior in Social Settings. Environmental variables, measured by the scale, were compared in order to verify expected differences in adult behavior, group size, and the utilization of activity areas. The data concerning children's behavior was analyzed according to hypotheses constructed from the literature. Relationships between environment and behavior that were tested and accepted in earlier research studies were used as the basis for predicting differences in children's behavior.

If construct validity could be established in this manner and if one could ascertain the reliability of both the environmental and the behavioral measures then one could being to explore the application of Lewin's (1951) paradigm that human behavior could be analyzed as a function of the person's interaction with the

immediate environment: B = f(PE). Lewin (1931) proposed that environmental forces could best be explored by observing the behavior of children before and after a change in their environment.

The three main objectives of this study included: the development of a reliable observation instrument, Children's Behavior in Social Settings, the construct validation of both the environmental and behavioral aspects of the scale and the application of the behavior-person-environment paradigm to the analysis of early childhood education programs. In order to verify Lewin's hypothesis, children in one preschool were observed before and after an environmental intervention was implemented. Predictions were based on previous research concerning expected changes in children's behavior.

Further research is needed to assess the application of the methodology by early childhood teachers for the purpose of enhancing child-environment interactions. Similarly additional research is called for to determine if the methodology could be used to evaluate such ecological concepts as the "quality of child life" in schools (Gump, 1978) or "the goodness of fit" of children to educational settings (Prescott, 1975), both of which have been proposed as essential considerations in the evaluation of educational programs.

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CHAPTER I

INTRODUCTION

Hunt (1961) and others (Bloom, 1964; Deutsch, 1966) have argued that early interaction with a stimulating environment is crucial for human development. Early childhood educators such as Weikart (1972), Karnes (1972), Gordon (1971), Grey and Klaus (1965) et al., have tried to operationalize the notion of a stimulating environment that would promote the development of young children. Stallings (1975) and Bronfenbrenner (1974) have tried to evaluate the effectiveness of such environments while Kritchevsky and Prescott (1969), Weinstein (1977), and Risley (1977) have taken practical steps to demonstrate that environments can be modified in order to channel behavior in developmentally appropriate ways. Whether the authors emphasize the design of the physical environment, the role of adults, or the schedule of activities most early childhood educational models concern themselves with these components. It is the purpose of this study to investigate the interrelationship of children's behavior, physical design, activity setting and adult behavior in preschool settings.

Although major research has been carried out investigating adult and child behavior in early childhood environments, the methodologies employed in these studies are too complex (Weinstein, 1975; Stallings, 1975), too lengthy (Barker & Wright, 1955), or aimed at answering different questions (Gump, 1977, 1969), and hence, inappropriate

for the study. Since one of the goals of this study is to utilize an instrument that could be adapted for use by early childhood practitioners, the issues of the complexity and the extensiveness of the data collection procedures were of primary concern.

In reviewing the literature it became clear that one needed not only a practical tool for measuring child-environment interactions in naturalistic settings, but also a simple means of summarizing such data while retaining its comprehensive nature. Thus, the purpose of this study was three-fold: the development of a reliable observation instrument, Children's Behavior in Social Settings; the construct validation of both the environmental and behavioral aspects of the scale; and, the application of the behavior-person-environment interaction paradigm (Lewin, 1931) to the analysis of an early childhood education program.

In the attempt to investigate the interrelationships among child behavior, adult behavior, and physical space the work of Kurt Lewin (1931, 1951) was utilized as a conceptual framework for the research undertaken. Lewin asserted that behavior could be analyzed as a function of the person's interaction with the immediate environment: $B = f(PE)$. If procedures for analyzing child-environment interactions in the preschool could be developed, then, one could investigate the applicability of Lewin's premise that environmental forces could best be explored by studying children's behavior before and after a change in the environment (Lewin, 1931). Thus, systematic observation of children at play in naturally occurring educational settings appeared to be a crucial component of the

application of Lewin's (1931) behavior-person-environment paradigm to early childhood education.

A behavior-environment interaction analysis, if it proved to be practical and reliable, would have implications for the study of early childhood education. Practitioners could analyze their classrooms in a focused manner in which behavior could be linked to activity settings and corresponding adult behaviors. It would be in the best interest of such practitioners to be able to ascertain to what extent children were actually utilizing the educational settings prepared for them. Rather than constraining children to adapt to various classroom subsettings teachers might analyze the cues for behavior imbedded in the arrangement of the physical space and the behavior of adults. Thus, one would hope, eventually to encourage teachers to pose their own questions concerning the nature of the interaction of children, adults, programmed activities and physical space.

An extensive review of the literature pertaining to the effects of the environment on young children resulted in the delineation of two sets of environmental variables. The influence of the physical environment was categorized according to concepts of crowding, the arrangement of equipment, and the display, type and availability of materials. The second set of independent variables concerned the role of adults in the classrooms, both directly, as they gave instructions, participated or were uninvolved with children and indirectly as they scheduled events and prepared activity settings. Research involving the effects of adult behavior on children's

behavior, achievement level or verbal output formed the basis for the definition of the human aspects of the preschool environment.

In addition, the work of environmental psychologists such as Proshansky, Ittleson and Rivlin (1970), the ecological psychologists Gump (1978) and Kounin (1979) and the work of the behaviorist Risley (1977) suggested an integration of their work with that of Lewin (1931, 1951). The behavior-person-environment paradigm of Lewin (1931) was utilized as the framework which provides a dynamic model of the interrelationship between environment and behavior. A first step was to develop a practical methodology for recording child-environment interactions in naturally occurring settings. Secondly, if unwanted behavior in one preschool could be analyzed in terms of dysfunctional aspects of the human and physical environment, environmental adjustments could be planned and implemented as a test of the applicability of Lewin's work to early childhood settings. Should the behavior of children change significantly and in the predicted directions then it could be argued that children's behavior in the preschool can be successfully analyzed as a function of their interaction with the environment.

Using this framework, the first phase of the study was designed to identify and measure pertinent environmental elements together with salient aspects of children's behavior. Data collected in two philosophically similar but environmentally different schools were used to test the reliability of the resulting instrument as well as to establish its ability to differentiate independent and dependent variables. Relationships between environment and behavior that were

proposed in other research studies were used as the basis for predicting differences in children's behavior in the two locations. If some construct validity could be established in this manner and if one could ascertain the reliability of both the environmental measures as well as the behavioral measures then one could initiate the second phase of the study.

The intervention study sought to demonstrate that relatively simple changes in the environment would lead to desired changes in children's behavior. Hypotheses, drawn from the literature, were constructed to test the significance and direction of the predicted changes in behavior.

CHAPTER II

A REVIEW OF THE LITERATURE

A review of the literature from the 1920's to the present supports the premise that children do interact with the environment provided to them in various and theoretically predictable ways. Since the purpose of this study was to explore the nature of child-environment interactions in two preschools, those studies that described aspects of children's behavior in relationship to early childhood environmental variables will be highlighted.

The chapter is organized in two parts: the first of which explores relationships between the physical environment and various aspects of children performance including their attention span, social interaction, aggression, achievement and preference for materials. The second part of the chapter reviews the influence of human factors on children's behavior in social settings. Both the direct influence of teachers who command, interact or ignore children as well as indirect teaching functions such as the arrangement and scheduling of activity settings are reviewed.

Although research carried out in naturally occurring play groups is the most relevant, results from some laboratory experiments are included because of their insight into pertinent behavior environment relationships. The significance of this review lies in the diversity of the approaches taken and the number of

environmental variables that have been studied in a systematic manner. Since the first part of this century people have been examining the consistency and the variability of child behavior in preschools and in laboratories.

It is the purpose of this chapter to summarize the avaialable literature as a background for the third chapter which developes the conceptual framework of the study. Thus, Chpater II explores the range of environmental variables that were chosen for investigation in this study.

The Physical Environment

Exploration of the effect of the physical environment on behavior involves the conceptualization of various dimensions of physical space. Fixed and semi-fixed feature space are two categories utilized by Hall (1969) in his study of physical effects called Proxemics. Fixed features include doors, windows, room size, and other permanent aspects together with our human expectations regarding their permanence. Semi-fixed features include furniture, rugs and large pieces of equipment. This category was expanded by Weinstein (1975) to include color, warmth and texture. Hall adopts the terminology of Osmond (1955) when he describes two opposing configurations of semi-fixed feature space. Sociopetal space brings people together as in the arrangement of tables and chairs in a French sidewalk cafe. Sociofugal space keeps people apart as in the placement of long benches in a railway station waiting room. Hall's thesis is that people are affected by the dimensions of fixed and

semi-fixed features and that one's perceptions of, and attitudes toward spatial elements are culturally bound.

The second heading under which various studies are reviewed is that of moveable objects. The amount, variety, type and display of materials in early childhood settings will be examined in reference to children's behavior. Thirdly, the influence of activity settings which may include objects, expectations for behavior, physical space and adult behavior, will be explored. Research pertaining to the effects of these three categories will be considered in the search for significant principles underlying the influence of the environment on child behavior in preschool settings.

Fixed and Semi-Fixed Feature Space

Crowding

There have been various studies of the effect of crowding on the social interaction of young children (Hutt & Vaizey, 1966; Preiser, 1972; Loo, 1972; McGrew, 1972; Smith & Connolly, 1972, 1976; Smith, 1974). With the exception of Loo, Preiser, and McGrew the studies reveal that the level of social interaction, including aggressive acts, increases as space decreases. McGrew (1972) distinguished between two aspects of crowding: social density, increasing the number of a persons in a space, and spatial density, decreasing the amount of space available to a constant number of people. Running behavior was decreased when the space was reduced regardless of the size of the group in the space. But when space

was held constant and the number of children was increased, the incidence of running was not influenced. McGrew found that children moderated their social interaction when social density was increased, perhaps to avoid conflict situations. McGrew concluded that both the variables of space and number of children were significant in relationship to preschool children's behavior. With a reduced density of children (space remaining constant), more solitary activity and fewer aggressive acts occurred. When space was reduced and the number of children was retained, there was less running and more physical contact among children.

Preiser reduced the floor space of a preschool from 35 square feet per child to 22 square feet keeping the amount of equipment and toys constant. The author did not find increases in social interaction or aggression. He did draw the following conclusions regarding the reduction of space:

> The differentiation of activity areas is blurred.
> Children tend to stand rather than sit or kneel.
> Some children decrease their levels of social interaction.
> Single person usage of objects tends to decrease.

Loo (1972) found significantly less aggression, less social interaction, and more interruption of activities in the high spatial density condition for groups of six, four and five year olds. Loo kept moveable object resources constant in both conditions. She compared 44 square feet per child to 15 square feet per child. Loo analyzed her findings in the following manner:

> The effect of spatial density on aggression may differ from that of social density. In a condition where space remains constant while people increase, the new members may be perceived as the cause for discomfort. On the other hand, when

> the number of people remain constant while space decreases, members do not see each other as causes of their discomfort; rather they may perceive they are all pawns to something greater than themselves, their physical environment. In such a condition, it is postulated that aggression between members would be significantly less. . . . Assuming that interaction with other children is conducive to maturity of social behavior, crowdedness over a long time span may retard the development of more mature social behavior in children. (Loo, 1972, pp. 379-380)

Peck and Goldman (1978) in a naturalistic study of children's play behavior with a simple versus complex play structure found that increased social density resulted in significant increases in imaginative play, the sharing of a common play theme and neutral or onlooker behavior. The authors speculate that the addition of more peers in the play structure area stimulated the positive aspects of play by providing more opportunity for sharing of themes and interaction among dramatic sequences. The increase in the onlooker category may be related both to a decrease in social interaction due to crowding (Preiser, 1972; Loo, 1972) and/or due to interest in watching the increasingly imaginative sociodramatic play going on in the space. The number of square feet per child in the crowded and uncorwded conditions are not reported.

Smith and Connolly (1976) in presenting some of their recent research propose a formula for identifying the parameters that have been manipulated in studies of crowding.

N = number of children in the group

R_S = spatial resources

R_p = play equipment resources

D_S = spatial density = $\frac{N}{R_S}$

D_p = play equipment density = $\frac{N}{R_p}$

They suggest that the major crowding studies have manipulated different aspects of the environment and, thus, have achieved conflicting results. Other problems with these studies include the lack of distinction between aggression and rough and tumble play, the confounding influence of novelty in some of the restricted space conditions, and the violation of the independence requirement of statistical analysis which serves to overestimate the size of the significance levels found.

Smith and Connolly carried out three successive studies in naturalistic settings. Group size was varied in each of three conditions in which equipment and space were expanded to keep the same ratio ($D_p + D_S$) constant. In other words, the number of children increased as the equipment (R_p) and spatial (R_S) resources increased. No significant main effects were found except for a decrease in rough and tumble play in the smallest group size/resources condition for only one of the experimental groups. In the second experiment both spatial (R_S) and play equipment (R_p) resources were varied independently with group size being held constant at 24 children. One, two or three basic sets of play equipment were provided to the children at different times during each spatial density conditions: 25, 50, or 75 square feet per child. As there were no significant interaction effects only the results for spatial variation will be presented here. There were no significant effects for levels of

children's cooperative play or aggression, but rough and tumble play decreased significantly ($p<.05$) in the highest spatial density condition (25 square feet per child).

The third experiment varied spatial density using 15 square feet per child or 60 square feet maintaining a group size of 10 in one group, 30 in another and an equipment density (D_p) of one play set per ten children. There was a nonsignificant tendency for less group play in the higher spatial density condition and significantly more aggression ($p<.01$) for one group in the small space condition. Rough and tumble play decreased significantly as space decreased. The authors suggest a possible threshold effect of 25 square feet per child for aggressive behavior. Smith and Connolly conclude that increasing spatial density to 15 square feet per child results in more aggression. However, Price (1971) and Loo (1972) used spatial densities of 15 square feet per child and found a decrease in social interaction. Their negative findings on increased aggression may be due to the inclusion of rough and tumble play (which decreased at 14 square feet per child) in the category of aggression (Smith & Connolly, 1975). Shapiro (1975) found a threshold effect in that uninvolved behavior in a nursery school remained constant (15%) between 30 and 50 square feet per child but increased to 26% below 30 and 20% above 50 square feet per child.

Pollowy (1974) found that as the floor area expanded (no dimensions presented) there was an increase in child-equipment interactions as well as an increase in the use of the floor for

the unexpected use of equipment. Simultaneously, the appropriate use of tables and table top equipment decreased. As a plausible explanation of these results the author suggests that the increase in floor area increased the children's initiative in choosing activities.

Krantz and Risley (1972) varied the spatial density of a constant number of children in familiar nursery activity settings. When the children were crowded onto a 3x4 foot blanket listening to a teacher reading a story their level of attentiveness (and lack of disruptive behavior) fell to 60% from a mean of 87% when they were spaced in a semicircle two feet apart. During a teacher-led demonstration of materials they were coded as attentive only 51% of the time in the crowded condition as opposed to 90% when they were seated around a table.

Fagot (1977) attempting to control for the spurious effect of change of density on children's behavior observed children in five preschools that varied in density from 1.6 m per child to 10.46 m per child. She predicted that positive social interaction and task behavior would be lowered in schools with higher densities. However, the Dutch children in the high density conditions spent almost half their time in positive social interaction as opposed to the 27% of social time spent by American children in less crowded schools. The author concludes that high density does not necessarily result in negative behavior among children but it does have an effect on teacher behavior and classroom structure. Teachers in the crowded schools were more directive, and had more specifically planned curricula.

In a study of the effect of spatial density on Head Start teacher's controlling behaviors, Perry (1977) found that teachers in classrooms with less than 30 square feet per child exhibited more controlling behavior toward children (46.7%) than teachers who had over 49 square feet per child at their disposal (16.2%). In eight of the ten higher spatial density classrooms free play consisted of playing with manipulative materials at tables as opposed to the use of blocks, wheel toys and doll corner in the larger classrooms. Although the author does not record specific differences in resources within the two groups of classrooms, one can infer from the description of free play that the smaller classrooms contained fewer and smaller items than the larger ones. Shapiro (1975) observed children's behavior in 17 preschool classrooms which varied in size from 29 to 52 square feet per child. She found that in the crowded classrooms (under 30 square feet per child) non-involvement of children was the highest, occurring 26% of the time. In classrooms measuring between 30 and 50 square feet per child non-involvement fell to 15% and in large classrooms, over 50 square feet per child, non-involvement rose 20%. The first finding, that of high non-involvement in crowded classrooms echoes the threshold effect suggested by Smith and Connolly (1976) that below 25 square feet of space per child aggressive behavior increases. Since Shapiro included deviant behavior in the category of non-involved, but did not report component scores, it may be that the incidence of deviancy contributed largely to the increase of non-involvement in classrooms having less than 30 square feet per child.

It seems that broad generalizations are not warranted about space variation, per se, except for a possible bottom threshold of 25 to 14 square feet per child for increased aggression, lower social interaction, and increased non-involvement. When social density increases and/or when the competition for equipment resources increase then there seems to be more apparent effects.

The Arrangement of Equipment and the Division of Space

Prescott, Jones, and Kritchevsky (1967) carried out a large study of 50 randomly selected day care facilities in Southern California. Among their findings was that average sized play grounds, 2,000-4,000 square feet, were seven times more likely to be of "high yard quality" than small yards (less than 2,000 square feet). They also found that the shape of the yard was consistently related to its level of organization; including factors such as clear paths, yard boundaries, and amount of surface covered with equipment (Prescott, et al., 1967, p. 274). Square yards had consistently low levels of organization in that a large open "dead" space often occurred in the middle. Irregular shaped and rectangular yards, using the same principle of placing objects around the perimeter, fared better because the middle area resembled a long path, channeling children along to other activities. The author's definition of "high quality" space leads into an analysis of Hall's (1966) second category, that of semi-fixed features. All yards were rated according to the level of organization (defined above), special problems, and three items concerning their equipment: degree of complexity,

variety, and amount. Maximum crowding of yards was related to low yard quality.

> Space quality clearly predicts differences in teacher behavior and children's responses. High quality space is associated with sensitive and friendly teachers, interested and involved children, non-routine encouragement, and high numbers of lessons in consideration and creativity. Low space quality tends to have neutral and insensitive teachers, children who are less involved and less interested, increased guidance and restriction and lessons in rules of social living tend to be high. . . .
>
> We feel that our data have shown not only that space strongly influences behavior in day care centers, but also that space itself is subject to influence by other factors, and that by and large the staff has little or no awareness of either influence. (Prescott et al., 1967, pp. 330-331)

The organization of equipment within a fixed space has been the subject of various authors (Fitt, 1974; Sheehan & Day, 1975; Day & Sheehan, 1974; Irwin & Bushnell, 1976; Mangurian, 1975; Kritchevsky & Prescott, 1969; Dodge, 1978). The size of play spaces within a room tends to regulate the size of the group and thus may draw children of varying social abilities and inclinations. Fitt (1974) found that a classroom arranged in several large areas contained groupings of from five to eight children often involved in noisy boisterous activities. Whereas a separate classroom arranged in small learning areas was typified by groups of two and three children, engaged in quieter interactions. There was more large muscle movement in the former and more task involvement in the latter.

As Proshansky and Wolfe (1974) have noted there are two major ways that the physical design affects the learning process

in classrooms: (1) the physical arrangement communicates a symbolic message of what is expected to happen, (2) there are functional consequences resulting from the arrangement of the furniture (e.g., several seats around a small table encourage conversation as opposed to rows of individual desks).

Although the design of semi-fixed features is often a concern of early childhood practitioners, there is little organized material relating the arrangement of equipment to children's behavior. Day and Sheehan (1974) related the integration of the physical space, materials arrangement and adult-child interactions in nurseries and day care settings to seven growth producing categories of child and teacher behaviors. Positive elements of organization included the use of several small rooms, provision for privacy, accessiblity of materials, frequent adult-child interactions, and the compatibility of adjacent learning areas. However, no specific research was reported that related such environmental variables to frequencies of child behavior. Dodge (1978) suggests that the design of semi-fixed feature space and the display of materials will elicit various behaviors and feelings in children, but again there is no research reported.

Sheehan and Day (1975) recommend the presence of both open and enclosed spatial areas to provide for the needs of children in day care. Open space does not allow children to escape noise and stimulation, whereas small spaces allow for privacy, introspection and retreat. These authors noticed particular children wandering or in irritable and aggressive moods in centers that contained no

private areas. In a large open-space classroom known for its noisy boisterous character, the authors added six foot dividers and low shelves for frequently used materials. They reported a subsequent drop in frantic behavior, more cooperation and less noise. Irwin and Bushnell (1976) suggest that interest areas be spread out on a noisy-quiet, active-passive continuum. They suggest that rooms can be arranged so that the amount of waiting and readying behavior is diminished. Mangurian (1975) describes a "structured open plan" which makes use of strong visual cues that continue to organize the space when the moveable partitions are withdrawn. Without the partitions a free flowing open environment is available to all the children. Moveable walls contain shelves and display areas. Structural steel beams support swings or divider curtains easily. He suggests that the children and teachers can control such an environment rather than be controlled by it.

In the interests of exploring children's preference for the arrangement of equipment Pfluger and Zola (1974) arranged for a group of nursery school children to move their classroom equipment into an adjacent hall. The children then brought in and arranged the items they wished to play with. After several weeks most of the equipment was returned to the classroom, but with some notable differences. First, all the semi-fixed features were arranged against the walls leaving a large open area in the center. Secondly, the piano and the tables and chairs were never returned to the room. The children enjoyed the freedom of the floor space for carrying out art and construction projects as well as for informalizing

the snack procedure. Major foci of activity in the new arrangement were the trucks, blocks and housekeeping areas. Children brought materials from various curriculum areas to form complex dramatic play settings such as a hospital or a space ship. Pfluger and Zola conclude that the children created a truly "child centered" room arrangement in which their activities were not constrained by an adult designed environment.

The clarity and size of paths among activity centers has been emphasized by Kritchevsky and Prescott (1969) and Pollowy (1974). Pollowy found that an increase in the ease with which children could visually identify learning areas was accompanied by a concommitant increase in the number of child-equipment interactions. There is no further definition of what constituted the "easy identification of learning areas" but perhaps the guidelines of Kritchvsky provide an operationalization of the concept of clarity. Paths may be too narrow, thus inviting an inappropriate flow of activity, may be visually obstructed at the child's eye level, may awkwardly detour around a sandbox (thus encouraging children to take a "short cut"), may lead children to a "dead" space or simply may be nonexistent. The authors describe the behavioral consequences of each. They advocate the formation of clear paths as an environmental means of channelling children's energy into appropriate activies and the prevention of disruptions of ongoing activity.

In terms of conclusive research on the arrangement of semi-fixed feature space, work has been done with adults in mental health institutions (Osmond, 1955; Sommer, 1959, 1969; Ittleson, Proshansky

& Rivlin, 1970). Following Osmond's (1955) work on the arrangement of furniture to encourage social interaction, Sommer (1959) found that people occupying seats at corner table spaces talked more than people seated along side or more than 5 feet apart across from each other. Sommer's work (1969) indicates that furniture arrangement is a potentially effective means of influencing social interaction among people. One implication of such research may be relevant to the common early childhood practice of arranging an entire class of children in a large circle for group discussion time. Although Sommers found participants preferred opposing seats rather than alongside seats for conversational purposes, when more than five feet exists between opposing seats people avoid them. Thus, a large circle of children 15 feet in diameter may not support the developmental goal of language development usually attributed to "circle time."

Norum, Russo and Sommer (1967) investigated the seating preferences of pairs of preschool children when they were given, variously, a co-active, a cooperative or a competitive task to complete. Pairs of children entered an adjacent room in the preschool where there was a 30 by 66 inch table with six chairs two at each side and one at each end. Pairs completing the cooperative task tended to sit side by side. During the competitive task they sat next to each other around a corner. And in the co-active task they chose the most distant seating arrangement of one at each opposite corner. Very few children sat directly acorss from one another. But girls tended to sit side by side, the most intimate condition, significantly

more often than boys did ($p<.05$). The authors conclude that the task-induced relationship between the children affects the proximity of their chosen seating patterns. Srivastava and Good (1968) found that interaction occurs more often in spaces that have a functional reason for people congregating there (e.g., a nursing station or a window that provides contact with the outside world). Eastman and Harper (1971) acknowledge the support of lack of it that the physical environment can offer for certain activities. They advocate that designers not only plan to support all the anticipated activities of potential users thus maximizing behavioral freedom but also plan the environment to channel behavior, thus encouraging some behaviors while limiting others. For preschool children, these objectives for behavioral planning, are most appropriate because this age child needs a protective environment yet one that allows freedom to exercise new skills and interests.

An example of behavioral planning is evident in a comparison of two third grade integrated day classrooms (Zifferblatt, 1972). The dependent variables of task attention span and number of correct problems were higher in one class and the incidence of non-task talking and non-task movement was lower. The organization of semi-fixed features supported the desired behaviors in the successful classroom. Desks were arranged in clusters of three or less in separate areas (vs. one cluster of 12 desks), thus restricting visual and verbal distractions and providing for small group interaction over tasks. There was a private cozy nook that children used for quiet study or personal retreat. There were comfortable areas set

aside for chatting and socializing thus channeling this behavior in an appropriate way and avoiding the "contamination" of work areas. The function of each of the environmental provisions is, of course, speculative (Zifferblatt, 1971) as no controlled research was carried out. However, this study suggests the importance of providing spaces for a full range of behavior.

Provision for privacy has been advocated by various educational authors (Day & Sheehan, 1974; Proshansky & Wolfe, 1974; Prescott, 1978). Sommers (1969) has explored man's need to regulate his interaction with the world and Zifferblatt (as noted above) cites the provision of a small cubby-like private space as one of several variables that promoted task involvement and higher educational achievement in one classroom. Prescott (1978) in a comparison of home day-care and two types of center based day care, notes that the child may easily find private space in the home but not in the classroom. The provision of private spaces was associated with the presence of softness. Indicators of softness included:

> child/adult cozy furniture: rockers, couches, large pillows, etc.
> large rug or full carpeting
> grass on which children can play
> sand for children to play in
> dirt for digging
> animals to hold and fondle
> single sling swings
> play dough
> water play opportunities
> very messy materials such as mud, finger paint clay, shaving cream
> laps, adults holding children
>
> (Prescott, 1978, p. 16)

Homes had high softness ratings. Closed structure day-care centers (in which teachers make most of the decisions) contained three or

fewer of the above indicators. These centers also ranked lowest in provision for privacy. Although the observed child behaviors cannot be linked solely to the presence or absence of privacy and softness, it is of interest to note that closed structure settings registered much lower frequencies of children being physically active, giving orders, selecting and choosing, asking for help, giving opinions and playful intrusions, than either open structure settings (medium) or home care. Home care settings had the highest frequencies of the "thrusting behaviors" just listed as well as the highest softness and privacy ratings. It seems self-evident that young children may need a chance to rest and to control or limit their interaction with the world when they feel the need, not just at nap time. However, no research that isolates the provision for privacy or lack of it has been located that demonstrates the behavioral consequences for preschoolers. Campbell (1972) reports that preschoolers did not choose to use private spaces for solitary activity. He reported that their attention span on such activities was longer if they could look up and see other children playing.

However, several authors, Kohl (1970), Mack (1976), and Gramza (1970) have explored children's preference for privacy. Gramza manipulated the degree of encapsulation or "closedness" of play boxes from two sides up to 5 or 6. Children preferred complete enclosure in varying sizes of boxes. In examining the attributes of closed space with one side open that might attract children, 32 inch cubes were constructed of opaque, transluscent, and clear plexiglass. Children consistently preferred the opaque and transluscent boxes

lending support to the idea that the attraction of enclosed space includes a visual limitation as well as a physical boundary. Herbert Kohl (1970) in a discussion with elementary school students about how to improve the classroom environment found that they wanted private work spaces where they could think, work, or have a private conversation.

Mack (1976) gave 9, 10 and 11 year old children permission to create private space in the classroom. They used cardboard and paper to close off areas utilizing: a large metal TV stand, a corner of the room, a closet, a storage cabinet, the area underneath tables, the tops of tables and a large packing box. Children reported relief, increased ease of concentration and the ability to complete assignments.

These informal reports are in accord with Canter and Kenny (1975) who suggest that privacy is the right to regulate the input and output of information to and from oneself. He sees this attempt to regulate as the basis of all human behavior in relationship to spatial features.

Other variables in the physical environment that have been associated with successful child care include the provision of sufficient workspace (Proshansky & Wolfe, 1974; Weinstein, 1977: Prescott, Jones & Kritchevsky, 1972), an appropriate noise level (Proshansky & Wolfe, 1974; Cohen & Lezak, 1977; Weinstein & Weinstein, 1978), and the juxtaposition of learning areas to allow appropriate cross-fertilization (Proshansky & Wolfe, 1974; Day & Sheehan, 1974). Cohen and Lezak explored the effect of noise on the perception of social

cues in adults in a laboratory setting and found that high noise levels inhibited social but not task-related cues. Weinstein and Weinstein (1978) assessed the effect of naturally occurring background noise on the reading achievement scores of fourth graders in their own home rooms. The authors found no averse effects of noise on achievement except that children tended to work more slowly in the noisy condition. In an impressive attempt to measure preschool environments, Harms and Clifford (1978) have prepared the Day Care Environment Rating Scale. This scale was developed from work done on the Day Care Environment Inventory (Harms & Cross, 1977). There are seven major variables which include: personal care of children, furnishings and display for children, language/reasoning experiences, fine and gross motor activities, creative activities, social development, and adult needs. Although only one category deals with physical space and formal research has not been carried out that relates the ratings for furnishings and display to children's behavior, the scale is one of the few attempts to measure environments for young children (cf. Prescott et al., 1967).

Although much more research is needed to relate aspects of fixed and semi-fixed feature space to behavioral outcomes in preschool settings the following design principles are tentatively offered:

- -Crowding of children below 25 square feet per child for an extended period of time should be avoided. It may increase aggressive behavior and inhibit social interaction and involvement.

- -If one must increase the number of children or decrease the amount of space adequate equpiment must be provided for the number of children present to promote positive social behavior.

-Square yards are more difficult to organize well than are rectangular or irregular shaped yards. However, all yards can be arranged well.

-The level of organization of a play space can be measured by judging the clarity of paths (to children), the avoidance of dead space, the ratio of uncovered space to equipment-filled space and the presence of clear boundaries around activity areas.

-Clear paths may result in less disruptions and more goal related behavior.

-Arranging physical space in early childhood settings so that it provides for a range of children's behavior includes the following principles:

  -Privacy seems to be a normal need of children in full-day group situations and the provision for privacy may increase desired behaviors.

  -The provision for softness as in home care may allow children to snuggle and comfort themselves when adult laps are in short supply.

  -Low noise levels may allow attention to social as well as task related cues in the environment.

  -Small enclosed areas encourage quiet activity and small group interaction.

  -Physically bounded small work spaces may reduce visual distraction and increase work-related behavior in classrooms.

  -Large spaces allow for active boisterous play, large group activities and higher noise levels.

  -The arrangement of seating spaces can encourage conversation or inhibit it.

-Juxtaposition of activity settings along a continuum from noisy to quiet and from active to subdued, may help children avoid distracting each other.

-Semi-fixed feature space may be arranged so that the functional consequences of the physical design support the behavioral goals set for the children.

The Amount, Variety, Type and Display of Materials

Nicholson's Theory of Loose Parts states:

> In any environment both the degree of inventiveness, and the possibility of discovery, are directly proportional to the number and kinds of variables in it. (Nicholson, 1974)

Various studies have been carried out relating materials to young children's behavior. Some studies looked at children's preferences for toys (Bridges, 1927; Thomas, 1929; Bott, 1928; Hulson, 1930; Farwell, 1925; Herring & Koch, 1930; Mojer & Gilmer, 1955; Cockrell, 1935) and the type of social interaction that occurs when certain toys are used (Updegraff & Herbst, 1933; Van Alstyne, 1932; Hulson, 1930; Kawin, 1934; Murphy, 1937; Markey, 1935; Green, 1933; Qullitch & Risley, 1973). The effect of the amount of play materials on children's behavior has been investigated by Johnson (1935), Smith and Connolly (1973), and Doke and Risley (1972). Access to play materials has been studied by Montes and Risley (1975) and Pollowy (1974). Shure (1963) found that children's behavior differed depending on the learning center in which they were located. On the practical side, Kritchevsky and Prescott (1969) analyze materials according to the level of complexity and the "amount to do per child." These authors and Proshansky and Wolfe (1974) call for easy access to materials by children (also, Dodge, 1978) and a chance to follow through on activities without disruptions or distractions.

Holding Power, Attention Span and Social Value of Materials

Bridges (1927) observed 3-year-old children during free play

with Montessori apparatus and found that graded cylinders, bricks, and color pairs were chosen most often with bricks being used for the longest amount of time followed by the cylinders. In her 1929 study of four-year-olds, Bridges found that dressing games, cylinders, inset tracing and wooden insets were most popular. She concluded that materials that were colorful presented self-evident problems and yet allowed for variation were chosen frequently and sustained the interest of the four-year-olds. However, Bott (1928), observing 14, two-, three- and four-year-old children in a nursery school found that raw materials (e.g., clay, sand, blocks) and locomotor toys had the greatest appeal to all the children. Pattern toys gain in appeal as a child grows older while mechanical toys have little value at any age. Herring and Koch (1930) observed children alone in their homes with five toys and found that toys do vary in their power to attract children (average number of times toys used) and hold their attention (average amount of time per child spent with a toy). The truck was most attractive followed by the top, the acorns, tinker toy, box, and then the book. But the acorns had the highest holding power followed by the tinkertoy, truck and the book. Older children had longer attention spans. Children in a preschool setting maintained an average attention span of 5.3 to 6.5 minutes (Bridges, 1929) as opposed to 1.5 to 2.5 minutes in the Herring and Koch restricted setting. Farwell (1925) after observing 271 children during 30 minutes of free choice for fourteen days concluded that floor blocks, clay, watercolors, alabastine paint and sewing are the most popular with kindergarten, first and second graders. Drawing and paper

construction are not very interesting, although there is more interest in them at each successive grade level.

Moyer and Gilmer (1955) attempted to maximize the attention span of children by providing them with specially designed toys in a non-distracting environment. Only one toy was provided to one child at a time. The authors conclude that toys must satisfy the developmental needs of the child at a particular age. One toy, the "people wagon," had a mean attention span of 15.6 minutes for three-year-olds which increased steadily to a mean of 31.9 minutes for six-year-olds. However, two other toys, the "circus wagon" and the "chips and wagon" held the attention of two-year-olds the longest, with average spans of 26.5 minutes and 34 minutes respectively. The authors claim that "our data show there is no regular increase in attention spans of children from year to year for toys specifically designed for maximum holding power" (Moyer & Gilmer, 1955, p. 200). Kounin (1979) in a naturalistic study of the ecology of the preschool environment differentiated between the attention span of children and the "holding power" of activity settings furnished with distinct categories of materials and props. He found few significant correlations between the duration of involvement of each youngster (e.g., his or her attention span) across different activity areas. However, he did find that particular areas had high holding power in that children tended to remain in them. Art, roleplay, sand and books held children's interest the longest. Clothing, displays, and vehicles involved children for the shortest amounts of time.

Several studies in the thirties looked at children's behavior when they were playing with specific types of toys. Updegraff and Herbst (1933) compared the social interaction among two- and three-year-olds when they were provided with blocks and with clay in a laboratory situation. The combined sociability index was higher for clay as was the frequency of cooperative behaviors. There were more instances of conversations unrelated to the material (clay) and more watching and imitating. More conflict occurred with blocks for the three-year-olds but also more mutual activity related to the material. Markey (1935) found cooperative behavior high when children played with blocks.

Hulson (1930) observed children in a preschool over a one-year period and ranked eighteen kinds of play materials according to the number of times chosen, the number of minutes used, the duration of usage (the holding power of the item) and its social value (defined as the number of children playing together). Blocks and sand ranked first and second respectively on all counts. Watching others was the third most popular activity with its social value being low. McDowell (1937) studying two- and three-year-old children during their free choice period, found that materials used in constructing other objects were used the most frequently by the children.

Van Alstyne (1932) observed 112 children in seven nursery and kindergarten classes as they played with twenty-five kinds of play materials. She assessed the popularity of the toys, their holding power, their social value, and their constructive vs. manipulative usage. The social value index included the amount of conversation

that occurred, the amount of parallel, passive and active cooperative play that occurred and the number of children engaged in play with a particular material. Raw materials, those that are open-ended and can be used in many ways, occupied children from 33 to 35 percent of the time. And within this category, blocks were used from one-third to one-half of the time raw materials were coded, with clay, painting and doll corner following in popularity. Raw materials elicited the longest attention spans. Throughout all age groups (three to five years) there was little interest in pattern toys (e.g., usage of the toy is determined by the physical construction of the toy). There were definite social value differences among the materials. Dishes, hollow blocks, doll corner, big wagon, parallel bars, telephone, wooden blocks, colored cubes, ball, crayons, and clay all elicited conversation among children from 30 to 48 percent of the time. Passive cooperation was associated with clay, crayons, scizzors, painting, beads, puzzles, books and balls. Active cooperation occurred most often on the parallel bars (for 2 and 3 year olds only) and with the wagon, dishes, hollow blocks, wooden blocks, doll corner, colored cubes, and dump trucks. Van Alstyne found a positive relationship between age and the length of attention span, amount of conversation and amount of passive and active cooperation. Over 50 percent of children of all ages tend to play by themselves when engaged with material. Ninety percent of the play of two-year-olds and 70 percent of the play of five-year-olds involve no active cooperation. There is a dramatic correlation between age and the constructive (versus manipulative) use of materials. Between 3½

and 4½ years, there is a rapid rise in the constructive use of seven raw materials: blocks, clay, scizzors, hollow blocks, crayons, and colored cubes. Van Alstyne found that children were engaged with materials for 98% of the time they were observed, lending credibility to the importance of the materials in early childhood programs. The author suggests that the following factors may influence play behavior: amount of adult stimulation, prominent placement of materials, the ratio of toys to number of children, the amount of previous experience and the length of the play period (60 minutes as opposed to 45 minute periods elicited a 2-minute increase in the average attention span). Since there was such a wide range in children's preferences for a material (from 0% to 60%), and since attention spans varied from one to forty-five minutes, the author concludes that a wide variety of materials be made available to satisfy a range of individual needs. Since younger children played with twice as many toys as five-year-olds, she concludes that two- and three-year-olds may need a greater variety of toys than older children.

In similar, but less extensive observational studies, Murphy (1937) reported that cooperative behavior was more frequent when children used swings, tricycles with a place for a rider, and wagons; and Green (1933) found that dramatic play materials in the doll corner elicited the most cooperative behavior among preschoolers.

More recently Rosenthal (in Kounin, 1979) found that various materials elicited significantly different potential for social interaction. Children were found working alone more than 50% of the time when using puzzles, vehicles or putting on clothing.

Whereas, groups of six or more were found most often (less than 25% of the time) in the art, large blocks and music areas. Sand, science props, climbers and books frequently involved children in groups of two or three. However, no measure of social interaction was reported, rather the population density of an area is taken as an index of the potential for social interaction.

Most of these studies reinforce the idea that children interact with different materials in qualitatively and quantitatively different ways. They are attracted to some materials more frequently and they seem to stay with some activities for longer periods of time. The social interaction among children appears to vary with the materials.

The Variety and Complexity of Materials Related to an Overall Index of Space Quality

Different play materials have different potentials for play. Prescott et al. (1967) and Kritchevsky and Prescott (1969) in two related publications have suggested an analysis of play equipment based on the level of complexity, the variety and the amount to do per child. Simple materials have one obvious use and do not have subparts (for example, swings and tricycles). Complex play units have subparts or involve the justaposition of two different types of material which allows the child to improvise and/or manipulate (e.g., play house with furniture, water table with equipment). Super complex units involve three or more types of materials (e.g., adding water and measuring equipment to the sandbox, having boxes and boards for

use with the jungle gym). The more complex the unit, the more choices there are for the child to make in the course of his play and the more potential there is for group play. Complexity is seen as sustaining attention, and fostering dramatic play and social interaction. Variety is the measure of the number of different kinds of things there are to do. Variety is seen as facilitating free choice in programs where children are expected to play on their own for some length of time each day. The amount to do per child is a calculation of the number of play spaces per child. This figure needs to be larger than one per child if the children are expected to choose their own activities at their own speed. Other play spaces must be available to a child when s/he has finished an activity. Otherwise adult direction is necessary to move children to and from the few available play spaces. Kritchevsky and Prescott suggest scheduling smaller groups of children or adding complex and super units as a means of increasing the number of available play spaces per child. The authors suggest that the variables of complexity, variety and amount to do per child as applied to an analysis of materials in early childhood settings are related to children's behaviors such as attention span, group participation, dramatic play, non-disruptive free choice of activities and goal directed behavior.

Ellis (1974) reports a study in which one of two available eight foot climbing structures was made more complex in two successive stages. The first alteration consisted of attaching footholds which initially stimulated more activity on the structure. However, the children soon returned to the simpler structure. Ellis

speculates that the footholds actually reduced the number of climbing behaviors possible and thus "simplified" the structure. The initial increased activity is attributed to the novelty of the change. The second variation involved ropes, platforms and ramps which then sustained the increased activity of the children beyond the novelty period. Thus, stimulus complexity is seen as an important parameter in analyzing the potential of materials to sustain children's play.

A figure representing yard quality (Prescott et al., 1967) was computed by combining the following scores: level of organization (described earlier) degree of complexity of equipment, variety of equipment, special problems and amount to do per child. This composite score for quality of physical space was then related to children's behaviors and other variables. High quality scores were positively related to high ratings of interest and involvement on the part of children. In addition, there was a direct relationship between the percent of yards that were crowded, the lowness of their quality of space ratings, and a lack of interest and involvement on the part of children. This finding is confirmed by Shapiro (1975) who found that crowded space (below 30 square feet per child) was disorganized. There were no clear boundaries between activity areas and children were "uninvolved" more than one-quarter of the time.

The Amount, Type and Display of Materials

In an experimental manipulation of materials Quillitch and Risley (1973) provided seven-year-old children alternatively with

six social toys and six isolate toys in a free choice situation. With the group size held constant there were dramatic differences in the amount of time children played together (social play) or played alone (isolate play) in the two conditions. It was found that social play occurred 16% of the time when the children were provided with isolate toys and 78% of the time when they were given the social toys. The social toys include: Don't Cook Your Goose, Don't Break the Ice, Don't Spill the Beans, Pick Up Stix, Checkers, Playing Cards. The six isolate toys are: Gyroscope, Crayons, Tinker Toys, Jig Saw Puzzle, Farmer Says, Talking Book, Play Doh. Thus, Quillitch and Risley have provided an example of the influence of the type of material provided on the social behavior of children.

Another area that has been investigated is the effect of the amount of materials on the behavior of children. Johnson (1935) observed three groups of children on three different playgrounds before and after a modification in the amount of toys and equipment. In the more extensively equipped condition (e.g., three foot wide slide, rocking boat, six tricycles, six wagons, six kiddy cars, twelve trucks, outdoor building blocks, two large boxes, saw horses, planks, kegs, spades and balls) children played more with materials, had more bodily exercises, fewer social contacts, and less undesirable behavior (e.g., tease, cry, quarrel, hit). A reduction in equipment resulted in less exercise, more social contacts and more teasing, crying and quarrelling. Doke and Risley (1972) found that children maintained a high level of participation (e.g., using any of the materials in an appropriate manner or exhibiting any of 17

designated behaviors) when they were required to follow a rigid schedule of activities, only if there was an abundance of materials in each required activity.

Smith and Connolly (1973, 1976) and Smith (1974) varied both the type and amount of toys available to preschool children as well as the amount of space. Variation in the type of play resources produced some interesting findings. When children were provided with only apparatus (e.g., tables, chairs, Wendy house, baby carriages, climbing frame), they significantly increased their verbal and physical interaction. There was more cooperative and less parallel play. Smith (1974) was intrigued by the increased unusual use of equipment such as positioning the tables end to end as a platform for walking baby carriages and the lining up of chairs to form a pretend train. In a comparison of the two experimental conditions, the apparatus only situation resulted in more looking at other children, smiling, laughing, walking, pushing, pulling, sliding, climbing, and pedalling. In the toys only condition, there was more watching adults, being in a large group with an adult, and more object manipulation. The "toys only" condition involved the presence of beads, dolls, teddy bear, dress up clothes, tea set, drum, cymbals, bells, doll house, easel and paints, sand pit and toys, book-case, books, blocks, telephone, twenty chairs and three tables.

In a comparison of the control situation of both toys and apparatus with the "toys only" condition, children in "toys only" engaged in more object manipulation, less active physical play, less eye-rubbing, nose picking, hand fumbling, etc. The authors speculate

that perhaps the "toys only" condition represents a decrease in stress and indecision for the children and thus results in a decrease in stereotypic and automanipulative behaviors. It is interesting to note that the control situation revealed less aggressive behavior and thumb sucking than either experimental condition.

When the authors decreased the total amount of equipment (both toys and apparatus) in an earlier study, the frequency of stress behaviors such as thumb sucking increased. In a more recent study (Smith & Connolly, 1976) a decrease in equipment led to increased aggression similar to Johnson's (1935) findings. There were no significant differences in the level of cooperative play but rough and tumble play increased significantly in one group under the condition of fewer toys and apparatus. It seems that reducing the amount of toys per child does lead to increased aggression and that varying the type of equipment may affect the social interaction among the children. The number of children (increased social density) does not increase aggression as long as the amount of equipment increases commensurately. Since the majority of conflicts in preschools occur in relationship to materials (Smith & Green, 1975) it seems logical that a reduction should lead to increased aggression during free play situations when the most frequent activity is the use of toys and equipment.

The way in which materials are displayed has been considered an important factor in the behavior of preschool children (Kritchevsky & Prescott, 1969; Dodge, 1978; Borphy, Good & Nedler, 1975; Montes & Risley, 1975). For example, Dodge asserts that messy and crowded

displays of materials do not encourage constructive use or care of materials. She advocates simplicity, labeling of shelves, sparseness of display and the organization of materials to teach concepts such as number, sequence, classification or color. However, there is little research available to substantiate such intuitively reasonable guidelines for arranging materials. Pollowy (1974) found that equipment distribution or layout that restricts child access or activity increases the supervisory involvement of adults.

In a study by Montes and Risley (1975) the environment of a day care center was rearranged so that children had three weeks of "free" access and three weeks in which they were required to request the use of equipment from a teacher. The authors found that children engaged in more cooperative behavior, dramatic play and complex language interactions during the limited access periods.

Ellis (1974) has replicated two findings concerning the color and location of materials in preschool settings. He cites the principle of centricity, the tendency of children to play with an item that is centrally located. In a semicircular array of four piles of blocks he found that children tended to play with the outermost sets. However he did not find a preference for one color of blocks over another. This work supports the notion that the position and display of materials is an important design parameter.

The effects of materials provided to children in early childhood settings have been studied extensively. It seems appropriate to summarize the main findings at this point rather than to extract principles for the selection and presentation of materials. That

the amount, type and display of materials do influence children's behavior seems clear. The studies covered in this section shed some light on the behavioral consequences of the presentation of materials in early child settings.

- -The choice of materials provided to children is important for holding children's attention, facilitating social interaction, and eliciting cognitive play modes.
- -Raw materials (clay, sand, blocks) seem popular with preschoolers; sand and clay elicit solitary and parallel play as well as a functional cognitive level of play. Blocks can facilitate parallel-constructive or cooperative-dramatic play about equally.
    - -The doll corner or role play area elicits the most cooperative and dramatic play.
    - -Puzzles are characterized by solitary or parallel constructive play.
    - -Tricycles, wagons, and swings appear to encourage cooperative behavior.
- -The variety of materials may encourage purposeful activity and a sufficient number of play spaces per child appear to be necessary to enhance the flow of children from one activity to another during free choice periods.
- -Complex and super complex play units can foster cooperative play as well as sustain the play activity of groups of children.
- -An abundance of materials facilitates positive behavior in children who are required to follow a rigid schedule of activities.
- -Changing the kind of materials can result in changes in social interaction, unusual use of equipment, amount of object manipulation, and level of cognitive play.
- -The presence of college and art materials may tend to inhibit dramatic and symbolic play.
- -Alterations in storage areas, work spaces, size of areas and the inclusion of private space have resulted in changes in children's behavior in an educational setting.

-Accessibility and display of materials may influence the degree of adult supervision and the amount of waiting and disruptive behavior of children.

-Children's preferences for materials vary with age.

The Influence of Human Factors on Behavior

> It would be naive to assume that the physical design of a classroom could serve by itself to structure the social activity that takes place in it. Where physical factors may be expected to have potency is in combination with [human] social ones. (Canter & Lee, 1974, p. 167)

Various studies have looked at the relationship between adult behaviors and children's behaviors. The findings are sometimes contradictory but more often they support the concept of a preschool teacher who is encouraging (Anderson, 1943; Reichenberg-Hackett, 1962; Prescott et al., 1967) uses positive types of instruction (Johnson, 1938; McClure, 1936; Moore, 1938; Smilansky, 1971; Rosen, 1974; Wylie, 1930), is involved with children's activities (Salisbury & Ivey, 1949; Thompson, 1944; Swift, 1964; Stallings, 1975) rather than using direct leadership of groups (Anderson, 1943; Muste & Sharpe, 1947; Prescott et al, 1967; Huston-Stein et al, 1977; Fagot, 1973), and is child centered in her approach (Reichenberg-Hackett, 1962; Landreth et al., 1943; Anderson, 1943; Prescott et al., 1971). Yarrow (1968) has suggested that the human environment in early child care can be analyzed in terms of the following characteristics of adult behavior: affection, depth of relationships,

sensitivity to individuals, consistency and predictability, responsiveness and degree and type of mediation between child and environment.

Although such an assessment of adults seems warranted, the high inference nature of such variables strongly inhibits instrumentation. The following review will survey studies that relate the behavior of adults to that of young children. Jersild and Fite (1939) define direct teacher effects as ". . .the personal contact which they have with the children and the techniques they use in handling (or leaving alone) the various difficulties which arise. . ." Indirectly, adults prepare the environment, schedule the progression and content of activities, and set up limits of acceptable and unacceptable behavior.

This section will review the direct effects of adult behavior, the effects of teacher designed activity settings, and finally, research related to the five levels of adult behavior selected as an independent variable in the study.

Teacher verbal behavior has been studied in naturalistic and laboratory settings. Johnson (1935) concluded that positive, unhurried, specific and encouraging types of instructions are more effective as measured by the increased number of children who carried out the instructions. Wylie (1930) found that a majority (74%) of preschool children resisted negative commands but complied with positive ones. McClure (1936) concluded that encouragement and emphasis on success are more effective types of instruction but that ease and desirability of the task may be more important in determining the child's

response to instructions rather than the type of command. Moore (1938) looked at the distribution of commands, suggestions and requests in a nursery and kindergarten. She found that the number of commands decreased but suggestions and requests increased with the age of the children. The child's response to suggestions was faster than to commands but the author does not describe the type of situations in which the teachers resorted to commands, a factor that could easily influence children's response time. It would be interesting to know what percent of all teacher utterances were instructions, as well as what situations were associated with what type of instruction. Myers (1940) looked at the effect of adult conflict in giving commands on the level of constructive play of children. Conflicting commands forbidding a child to play with a toy resulted in significant decrease in the constructive aspects of the child's play.

Several studies have looked at larger categories of teacher behavior. Anderson (1943) investigated the notions of dominative and integrative behaviors of adults in relationship to the frequency of the same sets of behavior in children. Domination involves a rigidity of responses and the attempt to impose one's will on another. Integrative behavior is defined as flexibility, finding the commonality among differences and including the wishes of another in working toward a goal. The results of this complex study generally support the idea that higher levels of dominative behavior in adults are associated with high domination in preschool children.

Thompson (1944) compared children in two matched groups of children who experienced the same teachers adopting differing

instructional roles. The groups used the same equipment, room and basic curriculum. However, with one group, the teachers were asked to maintain a restrictive attitude: being impersonal and becoming involved with children only when necessary or when specifically requested. In the other group the teachers were instructed to operate in an extensive fashion: to develop a personal friendship with each child, becoming involved in the child's use of equipment and relationship with other children in a manner appropriate to each child's individual needs. Observations of the children's behavior resulted in significant differences between the two groups favoring the greater involvement of the teacher. Increases were noted for the following variables: ascendance, social participation, leadership and constructiveness. Differences in intellectual growth or reduction of nervous habits were not found.

Reichenberg-Hackett (1956) found that differences in children's happiness (as measured by levels of cooperation, sociability, spontaneity, self-expression, creativity, mood and enjoyment of achievement) were related to differences in teacher behavior, especially management techniques. In 1962 the same author reported another study in which teachers in ten nursery groups were observed and their behavior categorized according to levels of encouragement-discouragement, type of activities teacher joined or watched, type of teacher approach to child, what lessons she taught and values she communicated either formally or informally. Reichenberg-Hackett found a wide variation in all the variables among the ten teachers. The ratios of teacher encouraging to discouraging behavior ranged

from 9:1 to less than 2:1. Children in the classes ranking high in encouragement vs. discouragement carried through on activities longer and demonstrated more independent behavior than lower ranking classes. The author reports that these classes had a higher level of adult-child verbal inteaction on a wide range of topics and the child was presented with more alternative activities. The ratio of hostile to sympathetic behaviors of children varied inversely with the encouragement-discouragement ratios of the teacher's behavior, echoing the findings of Anderson (1943). In brief, the author concludes that the teacher is the most potent force in determining the nature of the preschool experience for children. These studies of Reichenberg-Hackett, Anderson and Thompson are important because they use observational techniques in order to relate observable independent variables in the preschool to observable behaviors in children. It is interesting to note that Thompson found no significant intellectual test differences although he did find differences in observable behaviors. A similar situation was reported by Shapiro (1973) in a comparison of Bank Street followthrough classes and traditional classes. Although the children were clearly receiving different treatments and were exhibiting very dissimilar patterns of classroom behavior there were minimal differences found in the test scores of the two groups. Shapiro hypothesized that the traditional teacher-directed curriculum fostering convergent thinking may even have favored the control group in the test-taking situation.

Following some of the ideas of Reichenberg-Hackett, Prescott, Jones and Kritchevsky (1971) carried out a descriptive study of

teacher behavior in relationship to center facilities, administrative philosophy, and program goals. They found that teachers who ranked high in encouragement and low in guidance and restriction, were also rated as sensitive and friendly. Children in these centers were high in interest and involvement based on a 5-point global rating scale. Free choice format was common; the environment offered a range of appropriate opportunities; the administration permitted the staff flexibility in programming.

Tizzard et al. (1972) mounted a complex study of residential nurseries similar to the one by Prescott, Jones and Kritchevsky (1971). The authors found relationships among restrictive administrative structures, the role of adults, the quality of staff-child-interaction, the activity of the children and their verbal comprehension scores. In brief they found that decentralized child care institutions allowed adults to be more flexible and to make more programmatic decisions. Staff in these more autonomous centers conversed with children on more diverse topics, displayed higher mean sentence lengths ($p<.02$); engaged in significantly more social activity such as reading, playing, and talking with children; made more informative remarks ($p<.01$); gave more explanations with commands ($p<.05$); used negative commands less ($p<.05$); and answered more remarks made by the children ($p<.05$). Finally the children in these centers were assigned more active roles during adult-child social interactions ($p<.05$) and they answered more remarks made by staff ($p<.05$). In terms of the Reynell Verbal Comprehension Scale, which assesses the child's understanding of language without requiring production, the

authors found significant correlations between the group score and the frequency of staff's informative talk, social activity with children, number of times they answered children's remarks and the amount of time the child was in active rather than passive play. Individual comprehension scores showed a positive correlation at the .001 level with the amount of adult informative talk directed to them. Other results included the fact that the amounts of: adult informative talk, all talk and adult-child social interaction are highest when only one adult is present as opposed to two adults and is not affected by increases in child-staff ratio. In other words, the addition of another adult lowers the incidence of these positive staff behaviors. Trained child care staff talked to children significantly more than untrained adults ($p<.001$); and regardless of training, whoever was in charge for the day talked more, used more informative talk and played more with the children (all $p<.001$).

The author foreshadows Kagan's (1978) conclusion that institutionalization of children per se does not result in intellectual retardation. However, they make a strong case for asserting that the level of language development is dependent on the quality of staff talk and the quality of staff-child interaction. These, in turn, tend to be high in autonomous child care centers. The fact that this study was carried out in residential day nurseries, where home effects could not be expected to interact with caregiver effects, has perhaps isolated or highlighted the potency of the adult role. If the study were replicated in a range of day care programs it is uncertain whether such clear-cut effects would be obtained.

Bemis and Luft (1970) looked at kindergarten and first grade pupil's behavior and achievement gain scores in relationship to teacher behaviors. They found that talkative teachers have significantly more shy pupils; nurturant teachers have significantly more affiliative students; and uncooperative teachers (those who do not help pupils) have significantly more disruptive, bored, or hyperactive pupils. The authors argue that the children may have already learned to accommodate their behavior to cues given out by the teacher. Unexplained by the authors was the fact that significant cognitive gains occurred in classrooms with "uncooperative" teachers and hyperactive students.

Huston-Stein et al. (1977) looked at the relationship between classroom structure and the naturally occurring behaviors of children in thirteen Head Start classrooms. The index of classroom structure was an observation instrument that measured the incidence of child participation in teacher-led instruction. The following child behaviors were found to be significantly correlated with a low level of classroom structure: prosocial behavior to peers ($p<.10$), helping peers ($p<.05$), imaginative play ($p<.05$), total aggression ($p<.05$), attention at circle time and responsibility for cleanup time (both $p<.05$). This study echoes that of Muste and Sharpe (1947), where the author found more prosocial and aggressive behavior in the less structured university laboratory school than in a highly regimented day care situation. It seems that allowing children the freedom to interact and to make choices can increase some positive behaviors but can also leave children open to more conflicts over

materials and each other. Conclusions from these comparative descriptive studies highlight the importance of verbal and social interaction of children with adults, the double edged effects of decreasing teacher-led instruction, the value of encouraging and friendly teacher behaviors together with an integrative, flexible teaching style.

Other studies have related positive aspects of teacher behavior to situational variables. Pollowy (1974) found that the supervisory involvement of adults increased wherever equipment distribution restricts the child's activity or access. Zifferblatt (1972) in a comparison of a successful and unsuccessful integrated third grade classroom, found that task attention span was longer, number of correct problems larger, and non-task talking and non-task movement was lower in the successful room. The corresponding teacher remained at her desk only one-fifth of the time, emitted considerably fewer behavior restrictions, had arranged desks in small clusters screened by dividers, had set up an informal conversation area and provided a private cozy recess in the wall where children could spend time alone. Not only was the teacher's behavior different but another aspect of the teacher role that of designing the environment to promote program goals is evident in this study. Laudreth et al. (1943) looked at variations in teacher behavior in relationship to location and age of the child. The study confirmed that the author's expectation that teachers would vary the type of contact (physical vs. verbal, negative vs. positive, and goal content) depending on whether children were younger or older and whether they were in the play yard, the patio or the bathroom locker area.

Foster in 1930 measured the distribution of teacher time among children in a nursery and two kindergarten classes. The incidence of physical care, play-related, social-emotional and conversation behaviors of teachers was recorded for both groups. As could be expected, younger children took more of the teacher's time, including more of both child and teacher initiated time. Children without previous kindergarten experience took up more time than those who had had preschool experience. And as children grew older they experienced a steady growth in child initiated teacher time and a decrease in teacher initiated time. There were clear ecological effects on teacher behavior. During nap-time, practically all attention was teacher initiated. Boys required the most time at nap but girls attracted the teacher's attention more during lunch. During freeplay, girls required more child initiated time and boys more teacher initiated. Foster concluded that as children matured teachers needed to initiate fewer contacts because the children were more able to ask for help and that overall, boys required more teacher initiated time than girls. It is important to consider the possibility that her second conclusion merely reflects the feminine status quo of the nursery school and thus the <u>teacher's</u> need to initiate more contact with boys.

Another study that compared teacher-child interaction was carried out by McKinney (1978) comparing a total of 13 compensatory preschool and kindergarten classes. The author found that low achieving children in preschool received significantly more "positive strokes" from teachers but that the situation was reversed in

kindergarten. Significantly more physical adult-child contact in peschool was found and more interaction with materials occurred in the preschool rather than in kindergarten. Preschool children initiated more contacts with adults. But the teacher interacted significantly more with children in kindergarten while the teacher aid was more involved with children in preschool. This study pointed up differences in educational treatments of children that are directly the result of adult behavior.

Several recent studies (Kounin, 1977; Stallings, 1975; LeLaurin & Risley, 1972; Fagot, 1973) have looked at specific teaching strategies and child outcomes. Kounin observed children in first, second, third and fourth grade classrooms using two dependent variables: the degree of involvement in assigned work and the occurrence of misbehavior (e.g., deviancy). He found four categories of teacher behavior related to classroom management that correlated with high pupil task involvement and low deviancy rates. One termed "withitness" is applied to teachers who demonstrate they know what is going on throughout the classroom. "Overlapping" occurs when the teacher attends to two events simulataneously without losing the flow of either one. Transition smoothness and planning for learning variety in assigned seat work were other indicators. The first three categories are probably the most relevant to studies of preschool education, especially that of transition smoothness. A study by Berk (1976) found that the time preschool children spend in transitions averages from 20% to 35% of the total time and is the one activity in which they spend the most time.

In the same vein as Kounin, Fagot (1973) also used task involvement as a dependent measure and found that high task involvement occurred in the preschool in which the teacher offered more praise, less criticism, and directed children's behavior less often. In two related studies Fagot found that high task involvement occurred in the classes in which the teacher criticized less, gave fewer directions, showed less physical affection, and responded more to children's questions. In addition, the teachers set up a program in which there was a new activity introduced each day. The picture emerges of a successful teacher who encourages independent activity, plans a variety of activities, is involved with the children, but does not need to direct their behavior. Task persistence was positively correlated with individual instructions by adults in Stallings' (1975) evaluation of followthrough classrooms. In addition she found that cooperative activity was positively related to the incidence of adult involvement with two children. Individual attention of adults to children and higher ratings of friendliness toward children were both positively related to more independent activity by children.

Given the large percentage of time children spend in transitions, a study by LeLaurin and Risley (1972) found that "zone" staffing (in which an adult supervises an area) as opposed to "man to man" staffing (in which an adult is responsible for several children) increased the levels of engagement with planned activities.

The Effect of Activity Settings

Evidence for the effect of the behavior setting on children's behavior has been offered by Emmerich (1977), Barker (1968), Doke and Risley (1975), Gump et al. (1957), Gump and Sutton-Smith (1955), Gump (1964, 1969), Morrison and Oxford (1978), Kounin and Gump (1974), and Kounin and Doyle (1975) as well as by many of the studies mentioned earlier. Doke and Risley compared day care students' involvement in planned activities during 15 minutes of "formal" activities in which all children were required to participate and 15 minutes of "informal" free choice periods. The authors found that children were consistently more involved in "informal" activities. However, the difference in subject matter between the "formal" and "informal" conditions confounds the findings. The authors suggest that aspects of "formal" activities that discourage task involvement include waiting while the teacher talks to one child or while s/he distributes the same materials to all the students. Whereas informal activities allow the children to choose among available materials and to proceed at their own pace. Emmerich (1977) compared teacher directed small group time (similar to the foregoing "formal" activities) and free play (similar to the "informal" condition). He found initial differences and changes over time in children's personal-social behavior that were associated with each condition. Free play elicited significantly more cooperation, compliance and affiliation with peers than did small group time. In addition, there was significant growth during a 16-week period in the free play condition for the following

measures: autonomous achievement, gross motor activity, and fantasy activity. These same measures decreased over time in the small group formal activity period. The author suggested that the small-group setting may actually encourage affiliation among children at the same time that the format severely restricts child-child interactions, thus setting up a conflict that results in reduced cooperation and compliance.

Gump (1969) examined the behavior of third grade students as they moved through a daily program of educational activities. Rather than emphasizing teaching style or personal characteristics he "focuses instead upon the ways in which the teacher generates a learning environment" (Gump, 1969, p. 200). He found that teacher-directed small group sessions had significantly more ($p<.025$) involved students (92%) than teacher led large group segments (81%); and he found that self-paced, non-teacher directed segments had the lowest involvement (73%). In addition, involvement of students was lowest in the "start up" or "transition into" phase of each activity segment, while the teacher behavior, "dealing with deviancy" increased during these same transitions.

Taking a careful look at the creation of educational activity settings by preschool teachers, Kounin and Gump (1974) studied 596 lessions taught by 36 teachers recorded on videotape. The lesson was conceived of as a signal system that varied in terms of continuity, intrusiveness and insulation. Children's on-task behavior constituted the dependent variable. The most successful lessons had a single continuous signal system that was "insulated" from distractions.

Kounin and Gump (1974) describe such a system:

> Let us consider the case of an individual construction lesson. The teacher provides each child with scissors, paste, a sheet of paper, and magazine pages showing pictures of food and suggests that each child make a collage of desserts. After a child begins such an activity, the major and persisting external signals come from the changing conditions of his materials. He selects a picture, but it must be cut from the page; the remaining space on the paper and the pages of pictures signal selecting another dessert, and so on. A continuous signal system occurs as one action and its immediate result provide impetus and guidance for the next action. This signal system and all individual-construction lessons thus provide continuous signals; they should induce high involvement provided each child has appropriate materials and is capable of grasping the goal and of carrying out the necessary participatory actions. The signal source here, resting as it does on the results of each child's own actions on his own materials, produces a tight, closed behavior environment circuit. This closed circuit insulates the lesson and shields each child from foreign inputs (distractions, other children's deviances) which may serve as stimuli to inappropriate behavior. Such a format, in addition to continuity, contains a high degree of <u>insulation</u>. (p. 557)

Such construction tasks had the lowest <u>off-task</u> behavior followed by sequenced signals from a single continuous source such as listening to the teacher or a record. The lessons with the highest off-task scores included teacher-led recitation; role play, group construction, and group discussion (characterized by multiple and shifting signals from children); and singing and body movement characterized by high intrusiveness of props). Although some teachers can "handle" activities like group discussion or singing better than others, Kounin and Gump's research begins to analyze

why these activities are difficult to manage if the goal is on-task behavior.

Kounin and Doyle (1975) following up on this inquiry, looked at pairs of high and low task involvement lessons taught by the same teachers within the same signal system format (e.g., teacher reading, teacher demonstration and individual construction). In the analysis, the degree of signal continuity descriminated significantly between high and low task involvement of children in the same type of lesson taught by the same teacher. However, teacher reading and teacher demonstration formats involved a different signal system from that of individual construction. In the former, the continuity of the teacher's signal emission was paramount and the amount of child recitation allowed significantly descriminated high and low task involvement lessons. In order to tease out the distractors in the individual construction format, the authors scored lessons according to continuity distractors and continuity enhancers. These variables successfully distinguished between high and low task involvement whereas amount of child recitation did not. This study concluded that teachers must attend to different aspects of their roles in order to enhance various activities. In individual construction teachers need to provide sufficient materials and be sure each step calls forth the next step in the project. In teacher-led formats teachers must employ a constant signal emission system avoiding the pitfall of numerous or lengthy child inputs.

Morrison and Oxford (1978) looked at a kindergarten class in order to see if continuous central signal emission and individual

projects would produce more task-oriented behavior than whole class recitation. They found that students were significantly more passive, distractable and non-task involved in class recitation than in the other two conditions. This finding was interpreted as supporting Kounin and Gump's theory that continuous signal emission, whether from teachers or well organized materials produces more on task behavior.

One study investigated the effects of scheduling activities in different sequences. Krantz and Risley (1972) found that the involvement level of children was higher during group story time and transition into it was shorter when the story had been preceded by naptime as opposed to outdoor play.

Wright (1943) looked at the effect on children's behavior of interrupting a free play session that included many desirable toys by interposing a wire fence and letting the children play only with a standard set of toys. He found that the level of constructiveness of play decreased significantly when children were in the restricted situation. Although teachers do not roll out wire fences in normal day care centers they do end activities and begin others. Some of these transitions may appear as frustrating to the children as Wright's manipulation seems to have been. The timing and nature of a shift from one activity to another is an important aspect of the teacher's role.

Looking at the qualities of different day camp activity settings Gump and others suggested more detailed explanations of differences in children's behavior in different settings. Boy campers exhibited significantly more hostile acts in the dining hall

than in cookouts and more aggression in cookouts than in swim (Gump, 1964). In a comparison of boy campers' social interactions (sharing, helping, asserting, demanding, and attacking) Gump and Sutton-Smith (1955) found significantly more interactions occurring during swim than in crafts. Gump, Schoggen and Redl (1957) assert that

> Certain features of the activity-setting which support or provoke the behaviors and experiences that occur within it are clear. When props and performances are so organized that the valued actions are delayed or in short supply, an activity setting is likely to produce competitiveness whether it is in cookouts or boating. And a setting which requires performances directed at individual tasks is likely to produce lowered interaction whether it is crafts or library reading time. (p. 43)

Barker (1968) looked at differences between undermanned and large optimally manned school settings. In the smaller and incompletely staffed settings students engaged in more and more varied program actions and maintenance actions, fewer vetoing actions and more deviation countering actions. In brief, students participated more in smaller situations where they were needed to perform functions that otherwise would be carried out by staff in the larger better staffed settings.

Recently, Kounin (1979) speculated about the qualities of preschool activity settings that influence the length of time children remain involved in them. Settings with the lowest indices of holding power (clothing, displays and vehicles)

> all have a restricted range of constituent standing behaviors that are typically executed in a repetitive fashion without yielding clear indications of something being accomplished or altered as a result of the child's action. (pp. 3, 4)

However, other settings with higher holding power (art, role play, books and sand) seem to either offer a variety of expected behaviors or result in a clear sense of progress or an actual product.

Doyle (in Kounin, 1979) found that activity settings differed widely in the amount and type of social interaction among children inhabiting them. The highest levels of sociality occurred in preparation-clean up (70%), role play and large muscle "multiple-niche" (e.g., equipment with places for two or more children). While audiovisual displays, small model props, "single-niche" large muscle settings, and puzzles maintained the lowest levels of social interaction, as low as 9% for puzzles. In addition, Doyle found that friendly cooperative prosocial behaviors occurred most frequently in role play, multiple niche large muscle, prepare-cleanup and water play. Such behavior was seen the least in science props, displays, art and puzzles.

Houseman (in Gump, 1978) found that social interaction involving any kind of conflict occurred significantly more often on the climber (large muscle "multiple niche") in the kitchen housekeeping area and with large blocks.

Houseman identified factors that precipitated conflict. In the block area the blocks are communal property as is the floor area. Conflicts arose because children wanted the same blocks or space. In addition a group might build a structure and "defend" it against those who had not participated in its construction. Whereas, activities that direct the child toward individual tasks, such as art, clothing and snacks or lunch had a very low rate of conflict-oriented social interaction.

Sherman (in Kounin, 1979) in an analysis of the occurrence of group glee in different preschool activity settings concludes that ". . . social interdependence is a necessary condition for glee." The rate of glee was three times higher in formal lesson settings than in free play periods. In addition, the most glee occurred (1) in lessons, which are high in intrusive elements, (2) in large (5-9) rather than small groups (3-4), and (3) in mixed sex groups rather than in same sex groups.

Thus, the teacher's choice of activity settings can become a major influence on the behavior of the children in her care. S/He can attend to the availability of materials, and the sequencing of activities. By being aware of the effect of the behavior setting on behavior s/he can intervene to prevent problems, reduce the density of children or otherwise arrange the environment to support the behaviors s/he desires.

The Independent Variables Chosen to Represent the Influence of Human Factors on Behavior

In this study a five point scale was used to code adult behavior at the same time child behavior was coded. This procedure allowed one to look at child and adult activity together within each segment of the environment.

The categories representing adult participation were:

(1) uninvolved, attention directed elsewhere;

(2) watches, helps briefly;

(3) participates in activity with children, is engaged in conversation with target child;

(4) mediates a quarrel or potential disturbance;

(5) leads activity, directs behavior, reads aloud, plays record player.

These are modifications of a scale used by Berk (1976) in an observational study of four types of preschool programs. The author observed children's behavior, group size, percent of time in different activities, whether activities were initiated by adults or children, and the role of the adult. The adult was coded as not in the activity, watcher/helper, participator or active leader. However, Berk's study differs from this one in that the data concerning these variables were not related to each other. In other words, it would have been interesting to know the type of adult role that predominated when a certain activity was going on or to know how the children behaved when the adult behaved in a certain way. A major purpose of this study has been the development of an observation system that allows one to examine the relationships among the behavior of adults and children and their location or activity involvement.

Assumptions concerning the presumed effect of each adult role on child behavior will be discussed next. Category one, "uninvolved, attention directed elsewhere," should be low in an ideal classroom. A high incidence of "uninvolved" adult behavior was expected to be linked to less positive child interaction patterns. For instance, in the block area where space and materials must be shared or negotiated children may get into conflict or maintain a solitary or parallel level of play when adults are not involved. It was hoped that some adult would be aware of the total classroom (Kounin, 1977)

at all times and thus (1) uninvolved would not be coded very often. Reuter and Yunik (1973) found that children in a nursery school with a high adult-child ratio (12:1) scored higher on sociability with peers and duration of social contacts but they do not state whether the adult was observing or uninvolved. The desire for a low frequency (10% ± 5%) is based partly on the Thompson (1944) study in which teachers remained aloof or restrictive and children scored low on measures of social participation, leadership, constructiveness and ascendance. A laboratory study by Hartup and Himeno (1959) found that preschool children left alone in a room with toys exhibited more aggression in subsequent doll play than did children with whom an adult remained and interacted. Elardo (1973), looking at the ecology of day care stresses the pre-eminence of high quality adult-child interactions.

> Perhaps one of the most harmful philosophies, especially harmful for disadvantaged children, calls for minimum interference in the child's activities. . . . The feeling is that if an adult simply guards the child against emotional damage some kind of natural growth force will take over and assure the child's maximum development. (Elardo, 1973, p. 7).

Gewirtz, Baer and Roth (1958) contrasted preschool children's behavior during easel painting in the presence of an adult. When the adult sat nearby passively watching the child (high availability condition) the children emitted a mean frequency of attention seeking behavior that was lower than when the adult was engrossed in paper work, although seated nearby (low availability condition). These studies point to the negative aspects of the isolation of children from adult contact. It was interesting to note that Berk

(1976) found that the frequency of the category of uninvolved behavior ranged from 12% to 53% with a median around 30%.

The second category, that of watching/helping was expected to occur fairly often (25-35%). Brophy, Good and Nedler (1975, p. 21) suggest that teachers need to be good observers of child behavior: "Observing the children and assessing their progress in mastering stated goals are two crucial aspects of the teacher's goal." The category itself does not distinguish between idle gazing and attentive observation but it does give an indication of whether teachers are organizing their work so that they have time to observe. Berk obtained a mean percentage for the category of watches/helps of 35% with a range from 21% to 47%. Young children need adult assistance because of their level of physical, emotional and intellectual development. Using scissors, getting one's smock buttoned, hanging up a painting to dry are all familiar tasks that may call for adult assistance in the preschool. When adults are not observing or participating for example, it is possible that children may be uninvolved or merely waiting.

The third category, that of adult participation, was considered to be a crucial one. Berk (1976) found that adults participated minimally in children's activities. Zero percent to 1.5 percent of all adult behavior fell in this category. Thompson (1944) demonstrated the positive effect that warm involved, as opposed to removed, teachers can have on the social and play behaviors of young children. The participatory involvement of adults is characterized by mutual

give and take in an activity. It does not include adult-directed games or lessons.

Anderson's (1943) notion of integrative behavior is similar to participation in that the interests of another are explored in the mutual attempt to work toward a common goal. The more the teacher worked with children in an integrative manner the higher the children scored on measures of classroom participation (e.g., seeks help, voluntary social contributions, answers spontaneously). The author asserts a mental hygiene assumption that is applicable to this study: that integrative behavior with evidence of working together with children is the behavior of highest value for teachers. Thus, the ratio of domination to integration should be as low as possible. If one takes category 4, participation, as a measure of integration and category 6, directs, leads activity, as a measure of domination, then the results Berk (1976) obtained show an extremely high ratio of about 30:1. This study examined such a descriptive ratio as part of the analysis of differences in the two comparison preschools.

The work of Smilanski (1968, 1971) on adult intervention for the purpose of teaching role-play skills to disadvantaged preschoolers supports the concept of the participatory adult. She distinguished between facilitating play (assuming an attitude of realness and empathic listening so that the individual initiates his or her own growth and learning) and didactic teaching. Smilanski reported that children whose sociodramatic play was facilitated in the first manner improved their ability to take interactive roles in fantasy

play. Rosen (1974) had teachers act as role models and ask leading questions of youngsters engaged in sociodramatic play. After forty days these experimental children exceeded the controls on measures of group problem-solving behavior, on effective cooperation in solving problems as a group, and on an index of role taking skills. The literature appears to support the positive outcomes for children when adults interact with children in a child-centered, non-directive manner.

Category 4, mediates among children, is an aspect of teaching that many teachers are concerned about. In addition, it seems that the beahvior of an attending adult is significant in determining the amount of aggression in a group of young children (Siegel & Kohn, 1959). In an experiemtnal play situation children engaged in more aggressive acts in the presence of a permissive adult than they did when no adult was present. It seemed that lack of intervention on the part of the adult was not seen as neutral behavior but rather was interpreted as permission to engage in such aggression. When the adult did mediate in an aggressive situation certain behaviors were more successful than others, e.g., directing and separating, interpreting the feelings of one child to another, explaining property rights and suggesting solutions (Appel, 1948). Another aspect of the Appel study was that in the absence of adult intervention in an aggressive encounter the initiator was likely to be successful 64% of the tiem. When the adult intervened, however, the percentage fell to 26% (Appel, 1948). Thus, adult intervention had a highly significant outcome on the outcome of aggressive

encounters in nursery schools ($p<.001$), in day nurseries and in play groups (both $<.01$).

It was expected that mediation would obtain a low frequency (1-3%) and would occur more frequently in the block area and outdoors.

The fifth category that of leading activities or directing behavior averaged 31% of all teacher behavior in the Berk (1976) study with a range of 23% to 37%. Preschool teachers do a lot of instructing and directing. However, several studies point to the negative aspects of this behavior (Doke & Risley, 1975; Fagot, 1973). As mentioned earlier, Doke and Risley compared the level of task involvement of children engaged in alternating 15 minute segments. One type was a formal adult directed activity in which children were required to remain in an area, attend to a presentation and/or manipulate materials (if any) in a specified and uniform manner. The other type of segment, informal, was characterized by the free choice of materials and how such materials were used. The adult either distributed materials (e.g., watched/helped) or interacted with individual children (e.g., participated). The authors found more active involvement in planned activities during the informal condition. However, the findings were confounded by the inherent attractiveness of the content of the differing types of segments. The authors suggested that the problem with adult-directed group activities is that children have to wait while the adult interacts with one or two children. Fagot found that the classroom where teachers directed behavior less, among other things, had the higher rate of task involvement.

Two somewhat specialized cases of teacher direction are important to note, because they demonstrate the importance of the context of adult leadership. Shores, Hester, and Strain (1976) found that teacher structured dramatic play significantly increased child-child interaction for a group of handicapped youngsters as opposed to conditions of teacher involvement or non-involvement. In the teacher structured condition the adult assigned dramatic play roles to children who then carried out their play without adult involvement. Featherstone (1974) found that specific children sought out small group activities in which the adult directed their contributions and remained stationary. They appeared to need the security of such settings.

Thus, the issue of adult direction is not a simple one. One's philosophy of education is involved in the consideration of the adult role in the early childhood education setting. In Piagetian and developmental interactionist views of early childhood the child is seen as an active learner, physically and mentally.

> Since learning is an active process, and knowledge is constructed rather than "acquired," the child must be provided with an environment which furthers his own natural tendency to act on and with objects, to explore, manipulate and experiment. He must be allowed, indeed encouraged, to take initiative, to pose problems, and to generate solutions for himself, even when the problems may seem trivial to an adult and/or the solutions may be "wrong" from an adult point of view. (Franklin & Biber, 1977, p. 11)

The teacher in a Piagetian curriculum takes on the role of guide and stimulant, asking questions that may lead the child to his own solutions. In a developmental interactionist school, the teacher

shall be a helper, source of useful information, and someone to be trusted (Franklin & Biber, 1977). Since development itself, is conceived as a function of organism environment interaction, adults can enhance learning by facilitating such interaction. In the preschool, this means a predominance of watching-helping, participating and mediating rather than direct leadership or lack of involvement. In order to stimulate and guide children's autonomous learning, adults must participate with the children. Although participation can function as interference (Reichenberg-Hackett, 1962), this study will only discriminate among categories of participation, brief assistance, and direct leadership in teacher-child interactions.

The issue of the role of adults in early childhood settings is a complex one. The actions of adults together with their management of child-child interactions constitutes the human aspect of the environment. All of the studies reviewed support the notion that the role of adults in early childhood education can have an impact on the children. Some of the crucial aspects of the immediate behavior of successful teachers include: their ability to be encouraging, warm and friendly, involved with individuals and small groups, and attentive to two issues simultaneously. Adults need to keep the momentum going, effect smooth transitions, use positively worded instructions, minimize direct leadership of large groups, and maximize a child-centered approach as opposed to one in which adults make most of the decisions. When planning activities, adults need to consider the cues in the setting that will be salient to children. Independent construction activities should be organized so that the

steps are self-reinforcing with sufficient materials available if task involvement is to be fostered. Children who are taught by adults who possess some of these traits have been found to be, variously, high on measures of task involvement, language comprehension, social participation, constructive use of materials, spontaneity, creativity, sympathy, independence, and lower in dominative and hostile behavior.

Although some of these prescriptions sound contraditory, the confusion lies in the matter of context. Direct leadership as a major mode of classroom organization seems to have negative effects. However, once the teacher has decided on a group story or circle time then s/he should become a vigorous leader, emitting continuous stimuli for attention and restricting frequent or lengthy child recitation. Another seeming contradiction in the review of the literature is the finding that closed structure classes (in which adults make most of the decisions) are often associated with low levels of antisocial behavior, whereas open structure (child decision-making) classes tend to have higher levels of interpersonal conflict. This polarity can be explained by the fact that when children are allowed to interact freely and choose their own activities more conflicts as well as higher incidences of positive social, emotional, and cognitive behaviors are observed. In contrast, adult dominated centers have low frequencies of many behavior including aggressive ones.

The role of adults in early childhood settings is a complex one involving differing patterns of interaction with children as

well as the indirect influence of the teacher's arrangement of the environment. It is often difficult to separate out the effects of one from the other. As Prescott et al. (1971) noted — friendly encouraging teachers tended to have high quality space and interested involved children. Taken as a whole, these studies support the hypothesis that adult behavior influences the behavior of children in preschool settings.

This review has examined research relating the physical and human environment of the early childhood educational setting to the dependent variable of children's behavior. This criterion was selected, rather than gains in intellegence or achievement because of a belief in the importance of the child's interaction with the world as the major means of child growth and development. The chapter intended to support the position that at least some of the variability in children's behavior in the preschool is linked to the environment. Adopting such a point of view may encourage teachers and administrators to look for sources of desired and undesirable child behavior in an area they can affect, namely the educational setting. Although children come to school with various agendas, the environment they encounter does help shape their interaction with it.

This chapter stressed the influence of physical and human factors on children's behavior. However, it is important to note that the author does not adopt the position of environmental determinism. Children definitely affect the environments around them. For example, they make pathways where they want them, even if the

path leads right through a busy block area. Both Barker (1955) and Lewin (1931) were aware of the force of the person in the equation B = f(PE): behavior is a function of the interaction of the person with the environment. However, early childhood education with the help of Freudian and developmental psychologies has tended to focus on the individual child's personality and growth in school settings. The present study hopes to redress the imbalance by integrating the measurement of human and physical factors, with the observation of children's social emotional intellectual and task related behaviors in preschool settings.

CHAPTER III

TOWARD A CONCEPTUAL FRAMEWORK

> I propose the familiar Lewinian formula—B = f(P,E), or Behavior is a function of the Person and the Environment—as a paradigm, or coordinating principle, for the study and application of interactions (Hunt & Sullivan, 1974). B-P-E analysis requires first identifying each of three components—Behavior, Person, and Environment—in the specific situation. A B-P-E analysis of a psychological experiment would specify the Behavior (or dependent variable), viewing it as jointly determined by the Person (kind of subjects), and the Environment (treatment or independent variables). (D. Hunt, 1975, p. 217)

In this chapter, the applicability of the Behavior-Person-Environment interaction principle to the analysis of preschool programs is discussed. Following this section an ecological and environmental framework for child study is outlined. A rationale for the behaviors chosen as the dependent variables is followed by a discussion of the major questions to be answered by the study.

The Interactionist Position in Child Development

This study is concerned with the influence of environments on the development of three, four and five-year-old children. J. McV. Hunt (1961, 1969) stressed the role of early interaction with the environment in determining the rate and nature of

development, both mental and physical. He made two important contributions to the field of early education. His analysis of appropriate curricula for young children led to the notion that learning environments should allow for sufficient experience in antecedent activities. This implies that prior experience determines how soon and how masterfully a particular target skill is attained. By formulating the "problem of the match" for early childhood educators, teachers were called upon to arrange environments so that the children would meet with experiences that were sufficiently incongrous with their previous learning. The correct match, according to Hunt, should be neither too strange nor too familiar, thereby, stimulating an "optimal" interaction between child and environment. Following this line of thought, he proposed that such child-environment interactions form the basis of intellectual development. Thus, Hunt speculated that if one controlled the experiences and materials that children were exposed to, one could influence their intelligence. Hunt held the position that the child's interaction with the environment rather than his or her heredity functions as the stronger force in determining later intellectual potential.

In a further exploration of the relationships between environment and development, Kagan et al (1978) spent two years studying two groups of infants, those raised in a day care center and those raised in their own homes. These authors conclude that there is little evidence to support the prediction of future characteristics from behavior measured during the first two years. They continue

to support the influence of environment but with the caveat that if one supports the idea of development as an interactive process then it is sensible to expect instability of traits over time as the child interacts with more, and more varied settings. "We are led to suggest, therefore, that if a psychological structure established in early childhood is to be maintained for a long period of time, and some are, it must be supported by the current environment" (Kagan et al., 1978, p. 144).

In order to conceptualize the nature of the relationship between development and environment, one might explore Kurt Lewin's (1931, 1951) paradigm that human behavior can be seen as a function of the person's interaction with the immediate environment:

$$B = f(P,E)$$

The unique characteristics of the child together with the physical aspects of the situation are mediated by the psychological reality of the child. The child's psychological reality, is determined by his/her past success or failure, the momentary condition of the child, the social "facts" of the situation, physical "facts" including functional possibilities and appearances, the firmness of the boundary between the child's sense of self and the environment, and finally the field forces existing for the child during the interaction (Lewin, 1934). His notion of field forces or valences is especially appropriate to the study of children's behavior in preschools.

> Objects are not neutral to the child but have an immediate psychological effect on its behavior: many things attract the child to eating, others to climbing, to grasping, to manipulating, to sucking, to raging at them, etc. These imperative environmental facts—we shall call them

> valences[7]—[Footnote #7: These valences are not to be confused with what is generally understood as "stimulus" as the term is used in speaking of stimulus-response process. The effect of valences corresponds dynamically much more nearly to a command, a summons, or a request.]—determine the direction of the behavior. Particularly from the standpoint of dynamics, the valences, their kind (sign), strength, and distribution, must be regarded as the most important properties of the environment.
>
> (Lewin, 1931, p. 101)

Valences are thus determined by the physical properties of objects in conjunction with the child's momentary needs and psychological state. The forces in the child's "field" derive their strength from the fact that the object satisfies the child, is a means to such satisfaction, blocks the child, or is rivaled by other field-forces. Valences change with the age and developmental level of the child as well as with the psychological state of the child. For example, the physical properties of stairs include the fact that they go up somewhere and can be climbed (depending on age) but not thrown about. The psychological "reality" of the child may be that although she fell down the stairs yesterday, she has an immediate "need" for the toys that are upstairs in her room. This example demonstrates one of the three possible constellations of field forces that create conflict. The event (object plus activity) has both a positive valence (desire to climb) and a negative valence (fear of getting hurt). When the negative valence or barrier becomes strong enough the child goes out of the field. The time at which withdrawal takes place, depends on the psychological reality of the child. Active children go out of the field sooner than passive children. How many toys are downstairs, how timid a child is, what

kind of comfort the child received after the fall, all can affect his/her momentary state and thus the behavior in the conflict situation. The other conflict situations involve a child who is between two positive forces or between two negative fields. The latter is common when a child does not wish to put a puzzle away but also does not want to be scolded for not doing so.

An analysis of preschool environments using the theory of field forces provides a logical structure for relating children's behavior to the physical environment and the social milieu. Lewin states that environmental field forces can be defined by their effect on behavior. Inference of the existence of a field force is legitimate only when the behavior of many participants in the same setting is similar. In order to demonstrate the influence of a particular milieu on behavior Lewin suggests a manipulation of the setting and subsequent observation for changes in behavior. This methodology for inferring the effects of environment on behavior provides a theoretical structure for the analysis of children's behavior in preschools.

However, if the purpose of studying child environment interaction is to ultimately provide for an optimum level of interaction and since the nature of such interaction has been held to be crucial for full development (Hunt, 1969) is it logical to validate the importance of environments by predicting future intelligence or achievement? According to interactionist theory, one cannot predict future performance ". . .unless one specifies the circumstances that the child will encounter and cope with in the interim" (Hunt, 1969, p. 70). Later environments must support psychological structures

developed in early childhood (Kagan, 1978) if they are to remain functional for the child.

Since one cannot control future environments, what prognosis can we make concerning children's future development? This is a crucial question both for the significance of the current study and for the educational community at large. Lewin offers a rationale for our attention to the immediate environment of young children in the following quote:

> Up to now we have been describing the effects of the present situation upon development. These effects cease with a change in the situation. Nevertheless, the operation of the environment always has, as a consequence, a more or less marked change in the individual himself, and thus changes his "basis of reaction" to all later situations. . . (Lewin, 1931, p. 123)

Thus, one can take the position that providing an optimal match between child and environment enhances current development and provides a psychological "basis for reaction" to later experiences.

The Ecological and Environmental Framework in Observational Child Study

It is the purpose of this section to conceptualize the preschool environment in terms of ecological and environmental psychology. A behavior setting is a term used by ecological psychologists (Barker, 1968; Gump, 1974) to conceptualize the location of behavior in terms of the physical milieu and the expected patterns of activity or behavior. For example, in the preschool, one familiar behavior setting, is the block corner. It may consist physically of shelves with unit blocks, a rug and assorted trucks. The standing pattern

of behavior involves both adult expectations and children's actions as well as cues given out by the arrangement of the physical milieu. Children are expected to build with blocks in the corner but they also may knock down the structures of others, engage in conversation or drift in and out of the area at random. One of the concerns of this study was to analyze children's behavior in terms of the cues for behavior that could be identified in the environment. These cues might emanate from both the human and the physical milieu of each learning area.

> The conviction of the ecological psychologists is that people live out their lives in a sequence of environmental units; experience in these settings is life. If the quality of experience is good, life expands; if it is bad, life diminishes. The position sounds philosophical but it relates to the practical matter of environmental assessment. If we believe that residual changes in persons are the environmental effects to look for, we will test environments by their capacity to change personality traits or intelligence. If we believe that what people do and experience are important, in themselves then we will not rely upon personality (or I.Q.) measurements. We first will look at what happens in a particular environmental unit searching for such ongoing human values as: involved postures, smiles, friendly chats, explorations, or assumptions of responsibility. We will first ask: "What is this behavior setting cluster generating for its inhabitants—now?" (Gump, 1974, pp. 274-275)

Such a position isneeded in the field of early childhood education where not only have programs been examined for changes in IQ and achievement scores at the end of the child's exposure to them but indeed such effects are being sought 10 years later (Bronfenbrenner, 1976).

Proshansky, Ittleson and Rivlin (1970) set forth several assumptions concerning the nature of the influence of environments or behavior. These form the theoretical rationale for the linkage of children's behavior to the location in which it occurs. Proshansky et al., assert that setting specific behavior patterns can be identified because the general trend of human behavior is consistent over time in the same setting. However, records of one person's behavior within one location reflect continuous diversity. For example, the ecology of certain physical settings such as churches is not difficult to conceptualize. Pews lined up facing the front of the church, not only limit the behavior possible but also become associated with a standing pattern of "church going" behavior: that of walking down the aisle, filing into pews, kneeling, standing, or sitting. Church settings are coercive of human behavior. But we need to do more than just notice the effect of certain physical designs, we need a set of principles or theory that explains the relationship between the environment and human behavior.

Proshansky et al. assume that the number of people and the number and placement of objects are factors in the setting and that changes in these components may change the characteristic pattern of behavior in the setting. This assumption is crucial because it supports the general hypothesis of the study that changes in the physical and human environment will alter the pattern of behavior of the participants. Thus, the size of the group, the arrangement of the space and the materials are expected to affect the behavior of the children.

In terms of change, the authors state that when change in an area discourages a formerly characteristic behavior, that pattern will move to another more conducive location. For example, if we attempt to discourage noisy boisterous play in one area of the classroom, we may expect to find such behavior surfacing elsewhere. Besides the impact of objects and human factors on behavior, administrative actions can affect behavior patterns. Teachers plan the sequence, the time allotted, the size of the group expected and the curriculum content of each activity and learning area. The factors of group size, scheduling and program format are examined as independent variables in this study. Proshansky et al., speak of the interdependence of all environmental factors so that one should expect a reciprocal and circular chain of relationships when one aspect of the environment is altered.

This assumption is crucial in the formation of hypotheses concerning changes in children's behavior subsequent to environmental manipulation. This author does not suggest that one variable results in a specific behavioral change. Instead, hypotheses were formed on the basis of the literature reviewed. All environmental changes in an area, plus changes in contiguous areas, were assumed to be interdependent in their influence on children's behavior. Specific environmental effects were not the subject of this study but rather the general principle that relatively simple differences in the physical and human environment of early childhood educational settings may be interpreted as significant factors in an analysis of preschool children's behavior.

Proshansky et al. state that behavior is derived in part from the past and present experience of individuals. From this assumption they conclude, as does Lewin (1931), that a particular setting may not elicit the same behavior from different persons. This study anticipated that the active native of preschool children and the influence of past experiences would contribute to the variability of behavior within settings. Although the study did not examine individual differences, the contribution of the individual's "life space" to resulting behavior forms a principle component of the theoretical structure of the study.

> Most, if not all, of the assumptions point to the need for investigations that are willing to discard the relatively simple cause-and-effect paradigm that typifies some of the more laboratory-oriented behavioral science research. (Proshansky, Ittleson & Rivlin, 1970, p. 37)

Ecological Studies of Children's Behavior

A group of early education studies have assumed an ecological approach to the investigation of young children's behavior. Tizzard et al.(1976), Rubin and Bryant in Rubin and Seibel (1979), Berk (1976) all looked at differences in behavior across programs. Shure (1963), Rosenthal (1973), Karlson and Stodalsky (1973), Shapiro (1975), Rubin (1976), Rubin and Seibel (1979) examined the influence of particular settings or sets of materials on children's behavior in early childhood settings. Weinstein (1977) examined the effects of changes in the physical environment on the behavior of children in an open classroom.

Laura Berk (1976) carried out an observational study of five early childhood programs. She compared teacher's expectations to obtained percentages of the following categories: child involvement in type of activity, child behavior categories, group size that child plays in, teacher leadership pattern and degree of child-initiated activities. She found a wide range of discrepancies bewteen actual classroom practices and teacher expectations. In addition, she related aspects of the educational environment to the variables of passive and active child behavior, teacher leadership pattern and child-initiated activities.

The Montessori program was the only one in which child-initiated activities predominated over teacher-initiated ones. Children were often manipulating (28%), readying (16.6%), exploring/wandering (15%), and working/listening (12.7%). The franchise day care predominated in passive child behaviors of: watching/listening (33.2%), non-active and waiting behaviors (6.8%), followed by readying (15.5%), and wandering/exploring (11.5%). Active leadership was the main teacher leadership pattern (34.9%) as opposed to the Montessori mode of not in activity (53.5%). In all centers, transitions took up a large percentage of children's time ranging from as much as 35% in the Montessori program to 20% in the community day care.

Tizzard et al. (1976) looked for differences among three types of programs: traditional nursery, language emphasis nurseries, and preschools staffed with untrained personnel. They coded three aspects of play behavior: level of use of material, complexity of play organization and level of social participation. The information

regarding children's behavior by play material was not reported. Most findings relate to relationships among the educational orientation of the center, and sex, I.Q., language score and age of the child. The primary findings revealed that children in the language emphasis programs had better verbal comprehension scores. The provision of creative activities such as collage, finger painting and other art activities was negatively correlated with the amount of symbolic play observed among the children. In the traditional nurseries where a number of these activities were provided there occurred the least amount of symbolic play and the greatest amount of "appropriate" play. Tizzard et al. identified the following characteristics of the nursery group experience which they feel contribute to the relatively short average attention span obtained (less than five minutes) and the simplistic levels of play observed: a great range of alternatives, lack of pressure to persist by staff, and the distraction of numerous children.

Prescott et al. (1975) in the Assessment of Child Rearing Environments: An Ecological Approach examines the relationship between center structure and children's behavior. The author carefully defines attributes of both closed structure centers characterized by clarity, dependence and restriction as well as open structure centers typified by ambiguity, independence, experimentation, variety, and personal teacher approach. Children in closed settings spend more time responding to their environment and attending to restraints imposed on them. They attend more to adults, receive more adult input, and recognize cognitive constraints more whereas, children

in open structure classrooms have a significantly higher rate of all thrusting behaviors as defined earlier in the discussion of softness.

> These findings led us to a concern for the goodness of fit between child and center. Our definition of a good fit for an individual child in a day care program is that the adults in the center and the activities which they provide enable a child to experience himself as competent and likeable and provide him with opportunities for enthusiastic and sustained involvement. . . . A child who has a good day care placement will be low on the following modes of behavior:
>
> stereotyped behavior
> tentative behavior
> not attending to external stimuli
> is physically active
> selects, chooses (. . .high frequency means a child is not settling into an activity)
> receives pain frustration (especially from adults but also from children)
>
> (Prescott et al., 1975, pp. 59, 61) [Emphasis is the author's]

The authors maintain that good placements can be made in both open and closed structure environments. Case studies of children who are non-thrivers in their current placement are analyzed in terms of recommendations for placement in either more open or more closed settings.

Elements indicative of quality in any kind of center are delineated. Children should: spontaneously initiate and terminate activities more than 30% of the time, not be limited in their mobility more than 50% of the time, remain in structured transitions less than 20% of the day and at least five components of the softness rating (defined earlier) should be present. For closed structure settings, the major detriment to quality is the imposition of

restrictions on children's movement and activity that cannot be counterbalanced by the positive aspects of the curriculum. Thus, the authors advocate that closed centers be somewhat "open" in that requirements for conformity to rigid behavioral expectations be relaxed to some degree. Quality open structure centers are characterized specifically by: low adult-child ratios in activity segments, incidences of children receiving help, a low proportion of unfinished activities, play areas with a variety and abundance of things to do, and teachers who "open-up" the alternatives inherent in an activity segment. In analyzing low quality open structure centers the authors found that individualization, teacher responsiveness to children and space quality commonly obtained very low ratings.

The concept of "double structuring" of the environment is suggested in order to encourage choice making by children:

> . . . .the teacher constantly structures both (1) by her input, and (2) by providing an environment which facilitates getting started behavior and regulates intrusion by the use of insulated play areas with clear cut boundaries. (Prescott et al., 1975, p. 65)

This excellent study of the ecology of preschool environments analyzes elements of quality child care to an extent that cannot be adequately summarized here. However, one of the authors' contributions to early childhood education is their assertion that quality in educational settings can be assessed by looking at the behavior of adults and children together with the quality of the physical environments.

Kenneth Rubin (1977) describes several studies of children's free play behavior in which he utilized a combination of the levels of social participation devised by Parten (1933) and the levels of cognitive play elaborated by Smilansky (1968). Not only does Rubin contribute observational categories that are highly relevant to the investigation of child environment interactions but he also reports some interesting relationships among free play behavior, materials used, age and measures of cognitive development. Rubin looked for the incidence of five levels of play (functional, constructive, dramatic, socio-dramatic, games with rules) when the child was engaged in solitary, parallel, associative or cooperative play. He found differences in levels of play and social participation according to the presence of the child in various activities. Children using playdough engaged in solitary or parallel play 65% of the time using a functional mode 75% of the time. Sand and water play were coded as 80% solitary or parallel play and 90% functional play, whereas painting and crayoning scored 82% solitary or parallel and 78% constructive play. Use of puzzles had a similar social play profile but constructive play increased to 84%. Social interaction was scored 55% of the time for children engaged in house play and 75% of their play was dramatic or sociodramatic. Cars and vehicles stimulated dramatic play 32% of the time and social participation 50% of the time. One finding that emphasizes the teacher's role in influencing the social and cognitive value of preschool activities is the fact that reading and number activities involved associative or cooperative activity 63% of the time. Rubin attributed this

finding to the fact that the teacher stimulated conversations and structured both activities as cooperative efforts.

Rubin and Seibel (1979) studied changes in children's activity preferences over a three month period. Time spent on puzzles and playdough decreased significantly while play with construction toys and with sand and water increased. These results were confounded by a physical design change that occurred. A wall was removed allowing full morning usage of the workbench, sandbox and waterplay table. These activities had been restricted to one-half that amount of time in the earlier observations. Changes in play categories over time included the emergence of constructive play over both functional and dramatic play in the block area during the second observation period. When the children engaged in dramatic play with blocks it was primarily cooperative whereas constructive block play was characterized by solitary and parallel play. The authors conclude:

> It would appear as if the degree of "freedom" [in free play] is somewhat determined by the materials available to children. For example, group and dramatic play may be inhibited by the availability of art activities. Such activities appear to encourage non-social and constructive behaviors. . . . The present study's findings appear significant for those who plan educational programs for young children. For example, it was discovered that group-dramatic play was inhibited by the presence of sand and water, puzzles and art activities. This form of play has recently been suggested, by some, to contribute significantly to the development of social competence and perspective taking skills. (Rubin & Seibel, 1979, pp. 7, 8)

Rubin and Bryant (Rubin, 1979) compared the play behavior of children attending a Montessori preschool and those attending a

traditional nursery. They found that the Montessori students engaged in significantly more solitary and parallel constructive play and significantly less cooperative functional and dramatic play than the traditional preschool children. In a study of carefully matched pairs of students, Dryer and Rigler (1969) attempted to explore the proposition that young children acquire the cognitive constructs which the materials in a Montessori school are intended to provide. The authors found the traditional nursery children to be significantly more creative on a non-verbal creativity test. These children approached the test situation in a markedly more social manner; they used significantly more functional terms to describe objects; and they included people in their drawings significantly more frequently. Montessori students were more task oriented in the test setting; they used significantly more physical attributes to describe objects and their drawing included many more geometric shapes. The authors feel that the study lends support to the ". . .notion that differing preschool educational environments yield different outcomes" (Dryer & Rigler, 1969).

Karlson and Stodolsiy (1973) delved more deeply into how children utilize the Montessori curriculum. In a series of five-minute observations children were found to exhibit significantly different patterns of involvement with activities. Children's activity preferences were analyzed in an attempt to predict their gain scores on subtests of the Wechsler Preschool and Primary Scale of Intelligence. Involvement in the following activities accounted for 76% of the variance in the gains made by the children: art,

13.5%; construction toys, 16.8%; blocks, 7.0%; sorting and matching, 16.6%; and, math, 22.6%. Children's cognitive gains were significantly associated with the materials they used.

Shure (1963) observed children during free playtime in five sub-settings in a nursery school. She recorded the population density, the mobility of children in and out of areas, the appropriateness of behavior to the location, complexity of social participation, positive neutral or negative affect, amount of constructive play with materials and sex differences. She found that blocks and art had the highest social densities but this finding is confounded by the relatively large size of the areas. Shure found that the most constructive use of materials occurred in the art and book areas with blocks eliciting the lowest rating. Games and blocks had the highest ratings for solitary child play while complex social interaction was found most frequently in the doll corner and at least half the time in the block area. Shure suggested that the high levels of functional manipulation and onlooker behavior in the block area was due to the high social density and levels of social interaction. She also speculates that the high level of social interaction in the doll corner may have been a function of the small size of the area.

Other studies have assumed an ecological approach to the investigation of young children's behavior in school settings. Shapiro (1975) observing the free play behavior of 274 four-year-old preschool children noted a striking disparity between children's and teacher's preference for activity areas. She speculated that the difference perhaps results in a loss of spontaneous teaching/learning interactions.

Children populated the block and doll corner areas 37% of the time but only 17% of teacher-child interactions occurred in those areas. However, the art areas where children spent 21% of the time averaged 35% of all teacher child contacts. The author suggested that teachers might set up more independent art activities so that they would be available for interaction and observation in the active block and housekeeping areas.

Rosenthal (1973) observed the involvement of children in various activity settings during 37 free play periods. The most popular settings included art, blocks, and special activities, while puzzles, books, kitchen, and sand were the least popular. Art and role play activities had the greatest holding power over children. Children averaged 20 activity shifts per hour with only three minutes of unoccupied time.

> Descriptive and statistical analyses consistently implicated setting variables as more significant predictors of the content and course of free play life than the demographic variables of sex, race and age. (p. 4004A)

Finally, Weinstein (1975, 1977) went about answering a major question posed by Shure (1963):

> Would a rearrangement or addition of equipment change some of the frequencies of the behavior found in this study? (p. 990)

Shure, as described earlier, had noted differences in children's task involvement, complexity of social play and the appropriateness of behavior to the location. Weinstein began her study in a manner similar to many ecological research efforts: she recorded children's

behavior within different areas of an open classroom. However, she then modified aspects of the physical design and recorded the behavior again. She avoided Shure's problem of confounding space and numbers of children by comparing the expected social density, determined by the size of the subsetting, with the obtained usage by children to arrive at a more accurate rating of the popularity of learning areas. Her intervention consisted of providing work-spaces, chairs, more display of materials, more accessible storage of materials, addition of low partitions and providion of a quiet private place for rest. Specific hypotheses concerning changes in children's behavior were formulated and tested for significance. Weinstein successfully modified the children's patterns of space usage, resulting in children occupying areas they had previously avoided. Secondly, she increased the range of behavior exhibited in certain subsettings, as desired. And finally, she altered the frequency of specific behavior categories as predicted. This study presents a strong case for the influence of the physical environment on the behavior of children in educational settings.

Thus, it seems that behavior settings need to be analyzed for dysfunctional factors in terms of resulting children's behaviors. Rather than concentrating on getting a child to adapt to various educational subsettings, the preceding studies suggest a search for clues in the structure of the setting. Children may be deviating from an expected pattern of behavior because the setting does not really support the expectations that teachers or adults hold for it.

All of the ecological studies tend to point in one direction, that early childhood subsettings have a strong influence on the children occupying the area. Children in housekeeping corners are frequently talking to each other and engaging in dramatic play. A well-equipped block corner seems to offer children opportunities for parallel or cooperative constructive play. In the art room children are often less social and busy carrying out an individual construction activity. The ecological studies reviewed support the proposition that activity centers can channel children's interaction with the environment and with each other in developmentally appropriate ways.

However, all the findings of the studies reviewed must remain relative in terms of the percentages reported. There are many confounding factors in the comparison of naturalistic research efforts. Among these include the lack of random assignment of children, the differences in the way housekeeping or block corner areas may be equipped and perhaps, most important of all, variance in the behavior of the adults. It is for this latter reason that the teacher behavior has been included in the present study. In addition, it also seemed crucial to describe the differences in the display, availability and type of materials provided within activity settings. It was hoped that one could gain a more informative picture of child environment interactions in early childhood settings by carrying out a more comprehensive measurement of both human and physical aspects of the environment.

Rationale for the Behaviors Chosen as the Dependent Variables

Five categories of behavior have been chosen as the dependent variables of the study. These categories are labelled (1) task involvement, (2) levels of social and cognitive play, (3) verbal interaction, (4) prosocial-antisocial behavior, and (5) autonomy. Each category is represented by several discrete behavioral items. These items appear in Table 3.1: Children's Behavior in Social Settings (CBSS). Appendix A presents the definition of the items and the rules for coding them. The selection of behaviors is based on the work of various atuhors, most particularly, Rubin (1977), Parten (1932, 1933), Smilansky (1968), Berk (1976), Day, Perkins, and Weinthaler (1978, 1979), Day and Sheehan (1974), Van Alstyne (1932), Wright (1943), and Green (1933) among others.

Day, Perkins and Weinthaler (1978, 1979) have argued that children's behavior can be taken as the criterion for the assessment of educational quality in early childhood classrooms. These authors proposed a Behavior Checklist based on categories of growth producing and growth inhibiting behavior identified by Day and Sheehan (1974). Following this line of inquiry, the present author constructed a shorter less complex instrument, Children's Behavior in Social Settings. The behaviors were first operationally defined by Perkins and Weinthaler (1978) drawing extensively from the authors cited above. The definitions were further defined and revised by Perkins during the instrument development phase of the study (see Appendix A).

Children's Behavior in Social Settings, Table 3.1, includes five major categories of behavior: task involvement, social and

Table 3.1

Children's Behavior: The Dependent Variables

Task Involvement

- unoccupied
- onlooker: listens, observes
  - reads
- focuses on activity, task

Social and Cognitive Levels of Play

- solitary functional
  - constructive, open or closed
  - dramatic
- parallel functional
  - constructive, open or closed
  - dramatic
- cooperative (group)
  - functional
  - constructive, open or closed
  - sociodramatic
  - games with rules
- rough and tumble

Verbal Interaction

- verbalizes to child or children
- verbalizes to adult
- verbalizes to self

Prosocial and Antisocial Behavior

- shares, takes turns
- helps, comforts, shows affection
- disturbs activity or other person, quarrels
- misuse or abuse of materials

Autonomy

- chooses activity
- readies, is responsible for maintenance
- waits

cognitive levels of play, verbal behavior, pro-social and anti-social incidents and autonomy. Each of the major headings is represented by three to eleven behavioral items. This section provides a rationale for the twenty-five behaviors that were selected for inclusion in the study.

The first category, involvement in tasks or planned activities has been used as a dependent variable by Risley (1973), Katz et al. (1968), Fagot (1973), Stallings (1975), Kounin (1977), Day, Perkins, and Weinthaler (1978), Van Alstyne (1932), and Berk (1976) among others. The behaviors chosen to represent levels of involvement include (1) unoccupied; (2) onlooker: listens, observes; (3) onlooker: reads; and (4) focuses on activity, task.

Parten (1932, 1933) developed a scale for coding the social participation of children in nursery schools. She utilized 6 categories: unoccupied, solitary, onlooker, parallel associative and cooperative. The first item on the current scale is unoccupied. The child apparently is not playing, not engaged in conversation or not involved in an activity which surrounds him or her. The child may be sitting with a group but not attending to the group's activity. S/He occupies him/herself with anything that happens to be of interest. The child may fumble with hands or clothing, stand around, wander, hang on equipment or stare off into space. The item occupied was combined with the behavior waits to form the analytic category of passive negative behavior. Berk (1976) in her study of five preschools found a medium range for the percentage of time children were wandering (2.0% to 15.1%), and a small range for the incidence

of "nonactive" behavior (0.1% to 5.0%). It is assumed that the item unoccupied includes both of the above categories.

Berk's category of watching/listening is analogous to the item onlooker: listens, observes. She found a wide range of such behavior from 7.9% to 33.2% in different schools. This behavior is coded when the child observes the activity of other children or adults without joining. This behavior includes times when the child listens and watches a teacher or child who is speaking or "showing" during story or group time. The child attends to verbal or visual input without interaction (e.g., in an alert but passive manner). In the analysis of behavior this category is combined with the next one, onlooker: reads, to form a category of passive positive behavior.

Onlooker: reads is coded when a child looks at books, pictures or a bulletin board by him/herself or with other children. Information is primarily taken in visually rather than aurally, as in onlooker: listens. It was expected that there would be a low frequency (>1%) of this behavior as preschool children are not usually adept at reading.

Focuses on task, activity is evidenced by eye contact, listening, alert facial expressions and active participation. The child may engage in a brief conversation or glance elsewhere briefly. The child may be alone or in a group, involved with materials or engaged in dramatic play, finger plays, songs or dances. The point of this behavior is to code active involvement in activities.

Risley (1973) created an entire evaluation system, PLACHECK, in which involvement in appropriate activities was the only behavior

coded. PLACHECK has been field tested for reliability by volunteer teachers and has also been used as a measurement device in several studies conducted by the Learning Environments group at the University of Kansas. Since interaction with the environment has been assumed to underly development, the number of children intent upon activities seemed to be a significant measure in a study of child environment interactions. The second major category of Children's Behavior in Social Settings involved 12 items characterizing the play of children in preschools. The social and cognitive levels of play were taken directly from Rubin (1977) and Blurton-Jones (1972). Rubin combined the work of Parten (1932, 1933) on social participation and the work of Smilansky on levels of cognitive play in order to look at these two aspects of behavior in conjunction with each other. Not only does Rubin contribute observational categories that are highly relevant to the investigation of child environment interactions but he was ". . .interested in the kinds of cognitive behavior (i.e., functional, constructive, dramatic, games) preschoolers and kindergarteners engaged in while they were playing in a solitary, parallel, associative or cooperative manner." (Rubin, 1977, p. 18). Associative play was combined with cooperative play because the distinctions between the two ideas were difficult to operationalize in a reliable manner (Rubin, 1977).

Rubin advocates the use of his combined social and cognitive levels of play for several reasons. His data revealed age differences only for particular aspects of solitary parallel and group play. The data suggested that solitary play becomes more cognitively mature as

children grow older. Rubin asserts that solitary play, long held to be the least mature form of play, should not be used as an index of social maturity. For four and a half year old children and five and a half year old children, he found that the combined scores of solitary-constructive plus solitary-dramatic were 67 and 86 percent respectively.

Rubin found significant positive correlations between the incidence of dramatic play and measures of spatial relations and classification skills. Low levels of dramatic play correlated negatively with these indices of cognitive development.

Earlier in this chapter, Rubin's findings concerning the relationship between the play categories and environmental variables were reviewed. He clearly found differences in levels of play that were associated with program format, materials used and adult role performance.

For the purpose of this study, the investigation of the relationships between children's behavior and aspects of the environment, the nested categories appeared to be sensitive to environmental variations, operational as dependent measures in natural settings, and indicative of developmental level.

The final social participation category, that of rough and tumble play was borrowed from the ethologists, N. Blurton Jones (1972) and Smith and Connolly (1972). The category represents physical play and "rough-housing," including laughing, running, wrestling, jumping and punching. This behavior emerged as one of three basic factors in a study of preschool children's behavior

(Jones, 1972). In that study, rough and tumble play was negatively correlated with work-related behaviors.

The third category of Children's Behavior in Social Settings, yields information on the amount of verbalization in each learning area and the person to whom it is directed. Bowman (1973), Boyer and Cunningham (1973) and Stallings (1975) have all looked at verbal interaction in considerably greater detail. Bowman and Stallings have found that child initiated talk was positively correlated with desirable patterns of adult communication (Bowman) and with achievement (Stallings). However, the author determined that recording to whom a child verbalizes would provide appropriate information for the environmental analysis of the learning areas.

The inclusion of "verbalization to self" reflects the position of Vygotsky (1963) regarding the central role of self-directed-talk in the development of inner speech or verbal thought in the young child. These three items constitute a mutually exclusive, exhaustive category of verbal interaction.

The fourth category was constructed as a measure of prosocial and antisocial behavior. The prosocial category is represented by two positive items: "Takes turns, shares" and "offers help, comfort, or affection," and two antisocial items: "disturbs activity or others," "misuses or abuses materials." Murphy (1936) observed children on a playground noting their social or sympathetic responses to events or other children. She used ten behavioral items including helps, comforts, removes cause of distress, protects, defends, etc. It was decided for the purposes of this study to include most of such

items together with affection under the one behavior of "offers help, comfort or affection." Murphy estimated that the incidence of sympathetic responses are equal to one-eighth the number of conflicts for the same group of children or approximately one sympathetic response per hour per child. White et al. (1973) omitted sympathetic responses from his social competency scale because they found the behavior occurred very infrequently in the school settings they observed. The author feels that sympathetic and affectionate behaviors are important developmental milestones reflecting the child's growing ability to take another's perspective.

Taking turns and sharing represent an important aspect in the social and emotional development of young children. They must be able to delay gratification and restrain impulsive behavior. Adults may often have to remind children or structure situations so that turns are taken. Nevertheless, if a child shares after being reminded by the adult it is coded in this category. If the adult should use threats or force, the child's subsequent actions would not be coded as sharing, Smith (1962) found that sharing increased when the total amount of equipment was reduced in an indoor situation but Johnson (1935) did not find an increase in sharing when she reduced the amount of equipment in an outdoor area.

The antisocial behavior of "disturbing an activity, quarreling" includes teasing, threatening, hitting, quarreling, taking an object, pushing or shoving. Green found positive relationships between the amounts of group play and quarreling (1933b) and the strength of friendship and number of conflicts (1933a). The more gregarious the

children were, the more conflicts arose. Sand and snow play scored the highest for the incidence of conflicts followed by construction activities, play with toys and inactivity. Dramatic play, quiet intellectual pursuits and helping were least fraught with conflict when two or more children were involved (Green, 1933b). Barker, Dembo and Lewin (1943) found that frustrating a group of children by separating them from a set of toys increased the amount of aggression in the group. Berk (1971) and Jackson and Wolfson (1968) both found that the desire of one child vs. the desire of another child made up almost one-third of all conflicts in two nursery schools. Berk (1973) found that desire vs. desire conflicts increased to almost 50% of all conflicts from autumn to spring echoing Green's (1933) finding that conflicts of this sort increase as children interact more. Muste and Sharpe (1947) in a study of two nursery environments concluded that the environment plays a large part in determining the amount of aggression. A city nursery that was highly regimented, had a very high teacher-child ratio, and provided unison activities only, with no provisions for spontaneous play, social interchange or large motor outdoor play. The authors hypothesized that this environment was much more frustrating than the university laboratory nursery and thus should be higher in aggressive behaviors. However, in the college nursery where long periods of free play allowed a great deal of social interaction, there was much more aggression. Sharing was correlated +.39 with aggression and the frequency of social interchange was positively correlated with aggression (+.24).

The second antisocial behavior defined was the "misuse or abuse of materials." This item included mild misuse such as laying books on the floor as stepping stones and the actual abuse of materials such as ripping pages out of a book or throwing blocks. A low frequency of occurrence was expected. Creative and unusual use of materials such as pretending long unit blocks were skis and ski poles was not coded as misuse unless the behavior was disruptive or inappropriate to the situation.

The category of autonomy was represented by three behaviors: the two positive aspects included chooses activity and readies, [takes] responsibility for center maintenance. The negative aspect of autonomy involved the child waiting, not in the sense of taking turns but mostly as a result of the situation (see Appendix A for further clarification). Bruner (1968) stated that development can best be enhances in children by maximizing the intrinsic motivation of learning and freeing the child from external reward systems that tend to make the child dependent upon environmental contingencies. It was held that free choice of activity by children would be dependent upon the provision of an interesting environment and a non-directive teacher role. A high frequency of "chooses activity" was expected to be negatively correlated with the category of direct leadership by the adults.

The developmental interaction approach appeared to support a heavy emphasis on this category. In a list of functional outcomes needed for healthy personality development Franklin and Biber (1977) list

> . . . a sense of trustfulness in others and trustworthiness in one's self; a sense of autonomy through making choices and exercising control; a sense of initiative expressed in a variety of making, doing, and playing activities in cooperation with others. . .

Thus, chooses activity, was seen as a positive aspect of autonomy.

The second category autonomy of "readies, prepares for" was seen as a potentially positive category that included putting away materials, caring for animals, passing out cups for snacks, and putting coats on to go outside. It was distinguished form "waits" in that the children are actively cleaning up or getting ready for an activity. Children were coded as waiting when they had finished getting ready but were not involved in the coming activity.

Berk (1976) found a broad range over five classrooms for "readies" (12.8% to 27.9%). Over one quarter of the children's time in one class was spent getting ready, which seems to be an extremely large amount of time. Berk found waiting to be a low frequency item (0.8% to 4.2%). This study expected that "waits" would occupy a low percentage of children's time. If children did not assume responsibility for maintenance, did not have free choice of activities or materials and were directed to and from activities, it was hypothesized that there would be high frequencies of waiting and unoccupied behaviors. Such a situation was not presumed to foster autonomy or initiative.

The behaviors were chosen as indicators of healthy child growth and development. Since development itself was assumed to occur as a result of organism-environment interaction, it was expected that observation of children's behaviors in conjunction with aspects of

the physical and human environment would result in the replication of some of the relationships found in the literature.

The Nature of the Study

As the major purpose of the study was to assess the applicability of Lewin's behavior-person-environment paradigm to an analysis of preschool children's behavior, it was necessary to develop an instrument. The instrument had to be constructed so that behavior and environment were measured in conjunction with each other. It needed to be simple enough to be appropriate for use in preschool classrooms in full view of children and teachers. In addition it was necessary to establish the reliability of the instrument and to ascertain some degree of its construct validity before it could be used to test Lewin's paradigm. The notion of construct validity involves the development of hypotheses drawn from previous research that are then tested out with the data collected by the instrument. If the constructs are validated by the data the instrument can then be said to have some degree of construct validity, e.g., that it measures what it purports to measure according to constructs derived from the literature.

Thus, several crucial questions were posed:

1. Would the instrument, Children's Behavior in Social Settings, prove to be reliable, practical, and acceptable to teachers when utilized in two early childhood programs?

2. Would hypotheses derived from the literature concerning differences in environmental factors and children's behavior be confirmed by a statistical analysis of the data gathered in two preschool sites?

3. Would the instrument be appropriate for a quasi-clinical (Fisher & Berliner, 1977) inquiry into the applicability of the behavior-person-environment paradigm (Lewin, 1931) in one preschool?

4. Would changes in the environment result in predicted changes in children's behavior in one preschool setting?

All four questions were formulated in an effort to explore the appropriateness of Lewin's equation (Behavior is a function of the interaction of the Person with the Environment) to early childhood settings. If the instrument proved to be reliable, capable of distinguishing between two preschools as predicted, and appropriate in a quasi-experimental time series experiment, then the author would be prepared to argue for the value of the instrument in measuring child-environment interactions in early childhood settings. The results of the environmental intervention study would determine the applicability of the behavior-person-environment principle to the practical on-site analysis of preschool programs.

Questions to be Answered by the Studies

In the comparison of the two preschool programs, the specific questions concerned the ability of the scale, Children's Behavior in Social Settings, to discriminate between two architecturally similar, philisophically "open" (Prescott, 1975) classrooms that differed in terms of adult behavior, type and display of materials, scheduling and arrangement of semi-fixed feature space. If the instrument did record differences in children's behavior then the results could be seen as lending validity to the scale itself as well as to the use

of the behavior-person-environment paradigm in early childhood education.

The major hypotheses that were tested are listed below:

> Did the adult behavior in the two centers differ significantly?
>
> Did the size of the groups that children played in differ?
>
> Did children's usage of activity areas differ?

These hypotheses were formulated to explore differences in the independent environmental variables of adult role, group size and daily schedule. There were no statistical tests carried out for the differences in the type and display of materials or the arrangement of semi-fixed feature space. Hypotheses then were constructed to test differences in the dependent variable of children's behavior. These included: differences in the frequencies of following behaviors: passive, negative, focuses on activity, amount of cognitive play, degree of autonomy, and amount of verbalization to adults and children.

In the environmental intervention study, the major question was stated as follows:

> Would children's behavior change as a result of changes in the arrangement of semi-fixed feature space, the display and type of materials, and the daily schedule?

Hypotheses were first constructed to test for changes in the independent variables of adult behavior and group size. Thus, the degree to which the intervention was actually implemented was assessed in this manner. Hypotheses were then constructed to test the effect of the environmental changes on children's usage of certain activity areas and overall patterns of behavior.

The major hypotheses concerned:

Increased usage of the manipulative, woodworking and library areas.
Increased frequencies of constructive play, all play behaviors, and focuses on activity or task.
Decreased frequencies of passive negative behavior, especially the subcategory waits.

If the instrument proved to be reliable and if both studies were to be affirmed by the rejection of the null hypotheses proposed in each analysis then the author would propose the acceptance of the B-P-E framework outlined earlier in the chapter. Children's behavior in preschool settings could se seen as a function of their interaction with the physical and human environment provided. Such a child-environment interaction analysis would offer early childhood educators a systematic and practical vehicle for exploring the ecology of the preschool.

In this chapter a conceptual framework for the application of the Behavior-Person-Environment paradigm (Lewin, 1936) has been presented. The purpose of the study has been stated in the form of three questions to be answered. In the following chapter the research design and methodology developed to answer these questions are described.

C H A P T E R I V

RESEARCH DESIGN AND METHODOLOGY

In order to test the applicability of Lewin's behavior-person-environment interaction principle to early childhood education it was necessary to establish the reliability and validity of the instrument developed to measure child environment interaction. In ascertaining the reliability of the environmental and behavioral indices several questions had to be answered. Could aspects of the environment be recorded with a high degree of consistency when used by different observers? In addition how reliably would the children's behaviors be when coded by those observers in two different schools.

In order to establish the validity of the instrument, a study was designed to compare two philosophically similar yet environmentally different preschools. Would observed differences in the adult role, and the scheduled use of locations be confirmed by the data collected? Secondly, would hypotheses, drawn from the literature, concerning the observed differences in materials, room arrangement, adult role and use of locations result in predicted differences in child environment interactions in the two schools? If so, it could be argued that the instrument has construct validity.

The third aspect of the study was designed to test Lewin's hypothesis that environmental forces or valences can best be investigated by measuring the impact of a change on the behavior of children. Would children behave differently within an altered environment according to hypotheses specified in advance? If so one could begin to accept the applicability of Lewin's (1931) behavior-environment interaction principle to naturalistic research in early childhood education programs.

Methodological concerns addressed in this chapter include the research designs, instrumentation, data collection procedures, analyses performed on the data, and site selection.

Research Design

The first part of the study involved data collection by four observers in two preschool settings. Various combinations of observers were utilized in order to obtain a good measure of the agreement of four early childhood practitioners using the instrument in differing settings. Reliability was assessed during the ten day training phase and several times during the two phases of data collection. The procedures used to assess reliability are reported in this chapter under the heading Instrumentation.

The second part of the study involved the comparison of two preschools in an effort to establish some degree of construct validity for the instrument. This research was designed as a simple two group comparison study. Two preschools were chosen because of their similarity of educational philosophy and overall physical

layout. In this manner gross differences in the physical plant or the educational goals could not be held accountable for differences in the children's behavior. However, with groups of young children involved in nursery school classes it is very difficult to find equivalent subjects and equivalent classes. Since the children could not be randomly assigned to sites the possibility that differences among the enrolled children might effect the outcome of the study exists. This threat to the external validity of the results of the comparison study is mitigated by the notion that research carried out in naturally occurring settings has a higher degree of practical application to real life situations.

The children in both schools A and B were observed on a regular schedule during the morning period between 9:00 a.m. and 12:30 p.m. A total of 48 observations at Site A were compared with 42 observations at Site B. Summary indices of the independent variables of the use of locations, the group size and the behavior of adults were compared as a test of the ability of the instrument to descriminate accurately among environmental factors. The chi-square statistic for qualitative variables (Light, 1974) was used to test the contrasts for significance. As a second step, hypotheses were constructed to test differences among the dependent variables of children's behavior according to predictions drawn from the literature. The confirmation of the hypotheses would be interpreted as an affirmation of the construct validity underlying the scale.

In the third phase of the research a quasi-experimental time series research design (Campbell & Stanley, 1963) was employed to study the effects of an environmental intervention. Would a shift in the environmental forces of the school result in appropriate changes in children's behavior, as proposed by Lewin (1931)?

This design was chosen for a number of reasons. First, it obviates the problem of finding an equivalent control group that does not receive the treatment. The behavior of the children before the treatment served as the basis for comparing their subsequent behavior. The design can be diagrammed as follows:

$$O_1\ O_2\ O_3 \cdots O_p\ \ X\ \ O_{p+1}\ O_{p+2} \cdots O_{p+q}$$

where O_1, O_2, ..., O_{p+q} indicates observations and X indicates the time of the intervention in the series. Essentially one observes the subjects repeatedly (O_1, O_2, ...) institutes some modification at point X and then continues to observe (O_{p+1}, O_{p+2}, ...). Analysis of the data involves the search for changes in the series of measurement. The analysis of all the time points in the series, rather than a comparison of pre- and post-intervention totals, allows the experimenter to distinguish effects due to maturation from those due to the experiment.

Although this is a powerful design it has various drawbacks. The design does not control for the effect of history on the behavior of the subjects. The fact that an outside event (known or unknown) may coincide with the treatment and influence behavior is a problem. To detect coincidental events that may have influenced children's

behavior the author asked the teachers to keep track of all events reported by parents during the data collection phase.

Another aspect of this research design was the attempt to work in close collaboration with the teachers in the preschool classroom. Fisher and Berliner (1977, pp. 14, 15) describe such research as follows:

> Quasi-clinical inquiry generates knowledge about the phenomenon while those engaging in the process work cooperatively on the solution of specific classroom problems. It is expected that the inquiry will bring about positively valued and substantial change, at least in the sites where the field work is conducted. . . . In this way, the knowledge produced by the activity will have a type of built-in validity. Whether or how this knowledge may be generalized to other sites will still be an issue, but the situation could hardly be any worse than we currently experience with conventional research.

These authors advocate that research efforts investigate the whole phenomenon of the classroom, the entire range of behaviors, not just cognitive ones. The ecology of the classroom must be the subject of study with the researcher spending large amounts of time observing and recording. Quasi-experimental time series research design and quasi-clinical inquiry seemed to be appropriate approaches to the study of child-environment interaction in early childhood settings.

Instrumentation

Children's Behavior in Social Settings (Tavle IV.1) was the major research instrument. The instrument measures the frequency of 25 behaviors reflecting aspects of cognitive, social and emotional

Table 4.1

Children's Behavior in Social Settings

Observer_____ Time_____(beg)

Date_____ _____(end)

Seq. #_____

(Phyfe-Perkins, 1978)

		TOTALS
	Learning Area	
	Group Size (1) 1 (3) 4-6 (2) 2-3 (4) 7+	
	Adult Role (1) Uninv. (3) Part. (2) Watch (4) Mediat. Help (5) Lead.	
TASK	Unoccupied	
	Onlooker: listens, observes	
	reads	
	focuses on activity, task	
SOCIAL & COGNITIVE PLAY	Solitary: functional	
	constructive O/X	
	dramatic	
	Parallel: functional	
	constructive O/X	
	dramatic	
	Coop/Group: functional	
	constructive O/X	
	sociodramatic	
	game w/rules	
	rough and tumble	
VERBAL	Verbalizes to: child(ren)	
	adult	
	self	
PRO-SOCIAL	Shares, takes turns	
	Help-comfort-affection	
	Disturbs activity, quarrels	
	Misuse, abuse materials	
AUTONOMY	Chooses activity	
	Readies, resp. maintenance	
	Waits	

development. The categories were combined to form the dependent variables that were analyzed for evidence of the effects of the intervention. Table IV.2 displays this hierarchical reorganization.

Point-time sampling of all the children in the early childhood program was chosen as the most appropriate data collection procedure. Point-time sampling procedures specify a set interval for observation and coding the behaviors noted. The recorder spent thirty seconds observing one child, followed by thirty seconds of coding. She then proceeded to the next child until all children were sampled. This sequence constituted one time point. Time points were scheduled throughout the core morning program at half-hour or hour intervals.

Point-time sampling was considered appropriate for several reasons, foremost of which was the fact that it permits the sampling of all children at all times relatively easily. Point-time sampling ensures that the behaviors measured are representative, and hence enhances the validity of the data collected. This procedure, of brief repetitive sampling of subjects, has been found to yield more accurate and representative data on the subjects' behavior than the procedure of time sampling over longer contiguous observation periods (Thomson, Holmberg, Baer, 1974). In addition, point-time sampling provides for the generation of many data points with a conservative expenditure of observer time.

There are two drawbacks with point-time sampling. Moderate frequency behaviors may be over-estimated when compared with high frequency behaviors of similar duration when the interval is long

Table 4.2

Table of Observed Behaviors and Analytic Categories

Observed Items	Analytic Categories
Onlooker: listens observes Onlooker: reads	Passive positive
Unoccupied Waits	Passive negative
Solitary: functional constructive O/X dramatic Parallel: functional constructive O/X dramatic	Solitary and parallel or "Non-social" play
Coop/Group: constructive O/X sociodramatic game w/rules functional Rough and tumble	Cooperative play
Solitary functional Parallel functional Cooperative functional	Functional play
Solitary Constructive (open & closed) Parallel Constructive (open & closed) Cooperative Constructive (open & closed)	Constructive play
Solitary dramatic Parallel dramatic Cooperative sociodramatic Games with rules	Dramatic play

Observed Items	Analytic Categories
Verbalizes to child	Total verbalizations
Verbalizes to self	
Verbalizes to adult	
Shares, takes turns	Prosocial behavior
Help, comfort, affection	
Disturbs activity, quarrels	Antisocial behavior
Misuse, abuse materials	
Choose activity	Autonomy
Readies, responsible for maintenance	

Items analyzed alone:

Focuses on activity
Verbalizes to child or children
Verbalizes to self
Verbalizes to adult
Waits
Readies, responsible for maintenance

(Sackett, 1978). Thirty seconds is fairly long when compared with six second intervals used in other studies (Weinstein, 1977). In a shorter interval, one loses the continuity and meaning that can be obtained in ten minute or longer time samples. Despite these drawbacks, point-time sampling of all children can be thought of as the most efficient, accurate and valid means of collecting behavioral data on children for this study.

Children's Behavior in Social Settings involved the coding of environmental variables. It called for the observer to indicate in which learning area or in which group activity each observation was made. An abbreviation indicating the area such as blocks, circle time, painting, etc. was recorded for each child sampled, so that one could later relate the observation to a particular activity setting in the environment.

Also coded was the size of the group in which the child was observed and the role of the adult nearest to the target child. Group size was coded as an integer (1) if the child was alone, (2) if there were 2-3 children in an activity area (not necessarily playing together), (3) if there were 4-6 children, and (4) if there were 7 or more children. Group size was taken as a measure of the social density in the classroom. The adult role was also coded as an integer:

(1) uninvolved, attention directed elsewhere

(2) watches, observes target child, helps, assists briefly

(3) participates with child

(4) mediates

(5) leads, directs behavior or activity.

These variables were coded repeatedly for each child sampled.

Reliability Estimation of the Use of Children's Behavior in Social Settings

Would the procedures outlined for data collection yield reliable information about selected children's behavior in two early childhood programs?

The importance and complexity of reliability estimation for observational measures has been discussed by Medley and Mitzel (1963), Johnson and Bolstad (1973), Rowley (1974), Herbert and Attridge (1975) and Hollenbeck (1978) among others. Reliability was defined as a characteristic of a procedure for quantifying characteristics of individuals, and hence, is situation dependent. As noted by Rowley (1974),

> A single instrument may produce scores which are reliable, and other scores which are unreliable. Even one measure may be reliable or unreliable depending on the manner in which the instrument is used, the subjects observed, the skill of the observer and the number and length of observation periods.

This statement appeared to be particularly relevant for observational data gathered in natural settings. One must establish the "reliability" of the data collection process before engaging in an analysis of effects.

Interrater reliability was computed using the formula

$$\frac{\text{number of agreements}}{\text{number of agreements and disagreements}}$$

Altogether four observers participated in the development of the instrument and the data collection. Two preschool sites were used. In the training phase reliability never fell below 65% and mainly stayed in the 70's and 80's. Eighty percent agreement was chosen as the criterion for beginning and continuing the study.

Procedure

Data Collection

Data collection began in site B in late October with observers B or C observing every hour at 9:00, 10:00, 11:00 and 12:00 followed the next observation day by a 9:30, 10:30 and 11:30 schedule. They observed Monday, Wednesday, and Friday mornings for four weeks. In Center A data collection began in mid-November with observers A (the author) and D. Data collection was carried out daily for two weeks, alternating the following schedules 9:00, 9:30, 10:00, 10:30, 11:00, 11:00, 12:00 and 9:10, 9:40, 10:10, 10:40, 11:10 11:40, 12:10. This schedule was decided upon for two reasons: (1) the time sampling took about 20 minutes to complete leaving a ten minute break before the beginning of the next half-hour, thus, it was feasible to carry out and (2) by alternating the starting time by ten minutes all parts of the core morning period would be observed. Ultimately eight days of observations were used from Center A's initial observation phase.

Center A's adjustment period lasted three weeks. Because the staff meetings were cancelled the author met with teachers individually. A negotiated environment change was implemented by the director,

education supervisor and the experimenter over one weekend. Teaching staff then rearranged equipment until they liked it. The children experienced a five day adjustment period with the final arrangement.

Center A resumed data collection on December 12th and continued observations only on days when there were no field trips or parties planned. The last day of data collection occurred on December 27th. Center B continued data collection on Mondays, Wednesdays and Fridays for two weeks ending on December 15th.

For the comparison study all the data from Center B, a total of 42 time points was contrasted with the Phase I data from Center A, a total of 48 time points. Table 4.3 displays the Behavioral Map that was constructed to summarize data collected using Children's Behavior in Social Settings. Appendix D contains the Behavioral Maps for Phase I in Center A and for all the observations in Center B.

Floor plans were drawn of Center A and of Center B. In addition a floor plan of the changes in physical space in Center A was constructed. Letters were sent home to the parents of the children explaining the purpose of the study. Appendix B contains copies of the letters.

Data Analysis: The Comparison Study

The hypotheses of differences stated in the previous chapter required comparisons of the frequency of specific variables. These were tested for significance using the chi-square statistic for dichotomous variables. First, the independent variables of adult role and group size were compared. Then specific hypotheses concerning differences in children's behavior in the two centers were tested for significance. An alpha level of .01 was chosen as the

Table 4.3

Behavioral Map for Children's Behavior in Social Settings

Phase_____ from_____ to _____

Center _____

Page___of___#of obs._____

(Phyfe Perkins, 1978)

# of girls		
# of boys		
Total # of children		
Group size	1	1
	2-3	2
	4-6	3
	7+	4
Adult role	uninv.	1
	watch/help	2
	partic.	3
	mediate	4
	leads	5
Unoccupied		
Onlooker listens/observes		
reads		
Focuses on activity task		
Solitary:	functional	
	construc. open	
	construc. closed	
	dramatic	
Parallel:	functional	
	construc. open	
	construc. closed	
	dramatic	
Coop. group:	functional	
	construc. open	
	construc. closed	
	sociodramatic	
	game w/rules	
Rough & tumble		
Verbalize	to child	
	to adult	
	to self	
Shares/takes turns		
Help/comfort/affection		
Disturbs		
Misuse/abuse		
Chooses activity		
Readies/resp. maint.		
Waits		

probability level for the rejection of the null hypotheses of no difference.

In order to make meaningful comparisons across centers it was decided to take into account the unequal distribution of males and females in the two centers. Center B enrolled approximately two males for every female, whereas Center A had an almost balanced ratio of one male to one female. Since previous studies have reported sex differences in preschool children's behavior a two-way chi-square test was performed with one factor being sex and the other being center. This additional test was carried out on specific variables that were expected to be influenced by one sex or the other.

In addition several post hoc exploratory comparisons were carried out. In examining the histogram of the two centers (Figure 5.11) several variables seemed to be quite different in Centers A and B. Although the results of the last group of chi-square tests were not considered as a formal part of the study, they suggested some interesting relationships between children's behavior and their environment.

Data Analysis, the Intervention Study: Phase I

Phase I data analysis consisted of the presentation of summary statistics to the staff at Center A. Behaviors were summed and recorded on the Behavior Map constructed for the study (Appendix D). Each location in Center A had a profile of the number of children using it, the adult behavior, the group size and the frequency of

the 25 behaviors observed. In addition the percentages of time children spent in various locations or engaged in certain behaviors were calculated. The purpose of this analysis was to make intuitive judgments about the desirability of the behavior patterns obtained and the relationship of such patterns to the location in which they occurred. To further such discussion a written report (Appendix C) was presented to the staff and the Parent Advisory Board. After discussion of the results the experimenter devised environmental shifts aimed at influencing children's behavior in the directions desired by the center staff. Since two staff meetings were cancelled, the education supervisor and the center director were the primary participants in the quasi-clinical aspects of the research: offering ideas as to program change, securing new materials and obtaining permission to utilize a fourth room for classroom purposes.

The fact that the two morning teachers were not enthusiastic about the environmental changes proposed, was attributed to their lack of participation in the intuitive analysis of the Phase I data. The cancellation of the staff meetings was a crucial factor in the implementation phase. Shifts in adult role were not able to be carried out due to the lack of involvement of the teaching staff. In addition one major physical change was not carried out due to their opposition to it. Nevertheless environmental changes were designed and changes in levels of behavior were predicted based on the Phase I analysis.

Phase II Analyses

In the second stage of the data analysis, the purpose was to study the effects of the environmental changes. This required studying trends in the data before the intervention and after it. For a particular behavior the mean frequency obtained for each of the eight days in Phase I and for the eight days in Phase II were plotted. The prechange pattern of behavior could then be compared with the post intervention levels. Thus, an increase in frequency that may simply be due to a growth trend discernible in the Phase I data could be distinguished from an increase due to the intervention.

Although it was anticipated that the data would be analyzed using either an Arima (an auto regressive integrated moving average) model (Glass, Willson & Gottman, 1974) or a model proposed by Swaminathan and Algina (1977), the data from Center A were not appropriate for such techniques. The large number of locations, twenty-seven, combined with the number of dependent variables, twenty-five, were factors that reduced the frequency of counts for each behavior at each location. In addition, scheduling of activities at Center A further reduced the number of observations in each location. Since many of the locations achieved a score during only one of the six observations scheduled for each day, these time points were collapsed to yield one score per behavior per location per day. Thus, the ninety-six scheduled time points which were needed for the time series analysis of the data were reduced to sixteen. Finally, only eleven children at Center A attended with enough regularity to be included in the proposed analysis.

White (1972, Hersen & Barlow, 1976) describe a method of median trend analysis that was selected for the analysis because of its simplicity of interpretation and its applicability to sets of data with extreme values. Median regression analysis has been advocated as a tool for describing the rate of behavior change for one individual or group. In addition, if one wants to examine the difference in behavior patterns across phases, a statistical test of significance has been offered by White (1972). First, the Phase I median regression or "celeration" line which would have a direction and a slope or rate of change is determined. This line is then projected into the second phase of data points. A null hypothesis of no change across phases is postulated. If the hypothesis is not to be rejected, the Phase I median regression line should approximate the regression line for Phase II. In other words, half the Phase II data points should lie on or above the extended Phase I line and half on or below the line. In order to determine statistical significance White (1972) has suggested the use of the binomial tables to determine the probability that the obtained number of data points would fall on one side of the line by chance alone. The formula for the probability of obtaining x data points above or below the Phase I celeration line is

$$f(x) = \binom{n}{x} p^x g^{n-x}$$

where

n = number of total data points in Phase II

x = number of data points above or below the projected slope

p and g = the probability of data points falling above or below the slope given the null hypotheses

(Hersen & Barlow, 1976, p. 308)

If half the Phase II data points fall on either side of the projected Phase I median regression line, one cannot reject the null hypothesis of no change in behavior in the intervention phase.

Thus, the regression line determined by the data from days 1 thru 8 (e.g., Phase I), is projected onto the data points for days 9 thru 16, Phase II. If most or all of the Phase II data points are on one side of the line, one determines the significance of the change according to the table of binomial distributions. If there are an even number of points on either side of the projected regression line then no effect is attributed to the intervention (c.f., Figure 4.1). However, if as in Figure 4.2 all of the points fall on one side of the projected line, one concludes that the hypothesis of no change may be rejected.

Since median trend analysis was designed primarily to detect and predict change over time, it was deemed particularly appropriate to the naturalistic study of children's behavior in preschool classrooms. If the behavior did not appear to be accelerating on decelerating at an acceptable rate one could then institute further environmental interventions. Although the study did not continue in this manner, the notion of progressive interventions and estimation of change utilizing median regression techniques would be especially relevant to quasi-clinical research. The close collaboration of both experimenter and teaching staff would facilitate continued intervention until a goal was reached. The purpose of such research would be primarily utilitarian, one of program improvement. Thus, the clarity and simplicity of median statistics are appropriate to repeated approximations and data analyses.

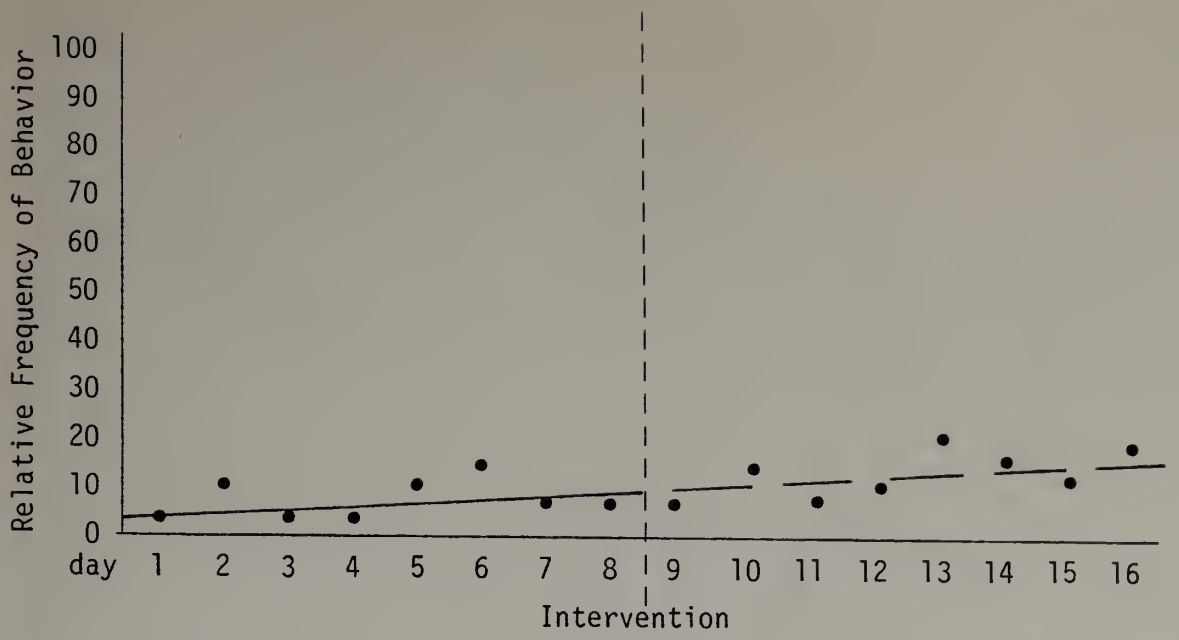


Figure 4.1. Example of no change in behavior between Phase I and Phase II

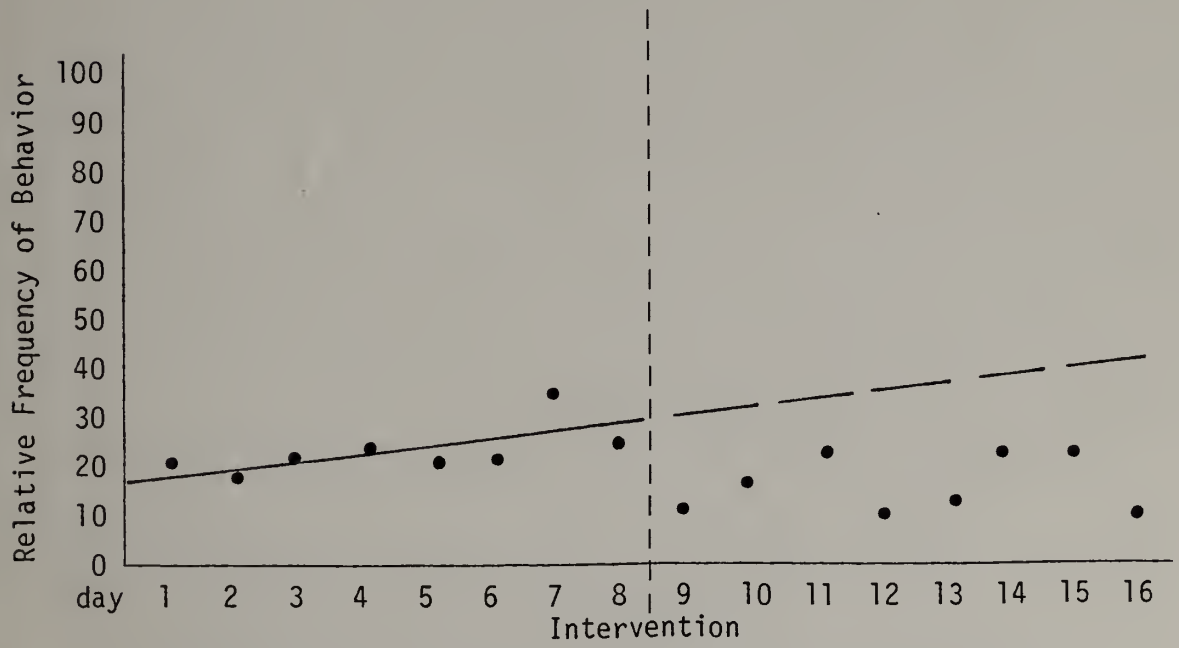


Figure 4.2. Example of a significant change in behavior between Phase I and Phase II

Another aspect of the Phase II analysis involved the preparation of a second behavioral map using proportional scores from both phases of the data collection so that learning area profiles from Phase II could be compared with the previous profiles by the program staff. Although a trend over time may be mistaken for a true change in level between phases, it was felt that this intuitive aspect of the analysis was important for two reasons: (1) it allowed local participants a chance to evaluate their "own" data, an important aspect of quasi-clinical research; and (2) it provided that investigator with the opportunity of validating visually significant results with a statistical test for significance.

Site Selection

Two sites were chosen for the study. One site (Center A) offered a full day care program for children from 2½ years to 6 years old. This program was run by a private non-profit association. Parents were charged $1.10 per hour and the United Way supported the program so that the cost per child per hour was maintained at $1.33 per hour. The staff consisted of a director, an educational supervisor/teacher, two head teachers, and four teaching assistants. The center was open from 6:30 a.m. until 5:30 p.m. Twenty-seven children were enrolled with only twenty children scheduled for each day. The other center chosen (Center B) offered half-day care from 8:30 a.m. to 12:30 p.m. This center was staffed by a director/teacher and a co-teacher with work study students, volunteers and student teachers scheduled variously throughout the week. The

program charged parents either $220 per semester (16 weeks) or $185 if the parent chose to work in the center. This center was subsidized by the University of Massachusetts. The effective cost per child per hour was calculated to be $1.45 per hour with parents paying $.64 per hour. The center enrolls twenty-four children ages 2 years 10 months to 5 years, for all five days per week. In the second site one child was referred to the Massachusetts Protective Services for suspected child abuse and another child who had disorderly behavior was changed to a shortened day until he could adjust to school better. Both centers felt they had several children with special social-emotional needs. The head teaching staff of both centers had specialized in early childhood education at 2 or 4 year colleges.

Both sets of staff agreed to participate in the study with the following restrictions: that no new materials be added, that room arrangement be held constant, and that two to four staff meetings be held with the author so that staff could be involved in the setting of goals for the learning areas, the analysis of the data and the design of changes in the physical and human environment for Center A. Due to the large number of staff, scheduling difficulties, bad weather and illnesses all but one of the staff meetings at Center A were cancelled. This seriously affected the quasi-clinical nature of the study in that staff were not intimately involved in designing the intervention. Thus, various aspects of changes in scheduling and adult role were not carried out in full.

Three research designs were employed: one to examine the reliability of the instrument, a second to establish some construct validity of the instrument's ability to detect differences in environments and behavior, and a third to explore the application of Lewin's behavior-person-environment interaction principle to the analysis of children's behavior in early childhood education settings. A comparison of environmental and behavioral variables in two preschool sites was carried out along with a quasi-experimental time series intervention study in one site. Children's Behavior in Social Settings was the major research instrument. Point time sampling was selected as the best method of data collection. Interrater reliability was estimated for raters at both sites, A and B. Finally, chi-square tests for differences between centers and median regression for the detection of changes in children's behavior after the intervention were employed in the data analysis phases. In the following chapters the results of both studies are described.

CHAPTER V

RESULTS

There were three major questions addressed by this study. The first concerned the reliability and practicality of the instrument, Children's Behavior in Social Settings, for naturalistic research in early childhood settings. The second question asked whether or not a comparison of children's behavior-environment interactions in two preschools would result in the confirmation of predicted differences. The third issue involved an environmental intervention in one preschool. Would alterations in the environment result in significant changes in children's levels of play, use of locations, and other behaviors?

This chapter summarizes the results obtained concerning the reliability of the instrument, the differences between the two schools and the behavioral changes attributed to the environmental intervention.

The Reliability and Practicality of Children's Behavior in Social Settings

A major goal of this study included the development of an instrument to record the child-environment interactions of naturally occurring groups of preschool children. Two criteria were set as indicators of success. The instrument needed to be simple and

intuitively valid so that early childhood practitioners would be able to learn to use it with ten or less hours of training. Secondly, observers must attain 80% interrater reliability to begin and continue with data collection.

Interrater reliability was calculated by the following formula:

$$\frac{\text{number of agreements}}{\text{number of agreements plus disagreements}}$$

The percentage of agreement ranged from the sixtieth to the ninetieth percentile. Table 5.1 and 5.2 give the percentages that the four raters achieved for the various assessments carried out during training and both phases of data collection at the two preschool sites.

Due to the logistics of running two studies simultaneously no interrater agreement data was collected for Observer A with B or A with C during the second two weeks at Center B. In addition, Observer A did not train Observer C and thus no reliability data is presented for A with C during the training phase. As can be seen agreement tends to remain in the mid-eightieth percentile. The Rules for Coding which were developed in order to clarify some of the ambiguities inherent in assigning behavior codes to children in natural settings are presented in Appendix A.

Table 5.3 presents the reliabilities of the individual categories. These were computed using paired observations of 131 children. As can be seen, the agreement on the coding of the environmental variables was consistently high ranging from 100%

Table 5.1

Percentages of Interrater Agreement for Children's Behavior in Social Settings in Center B

Observers	Training: Assessments	1st Data Collection Period: Assessments	2nd Data Collection Period: Assessments
A with B	67.4	86.5	None
A with B	73.8		
A with B	73.0		
A with B	91.1		
A with B	88.2		
B with C	77.8	83.5	93.0
B with C	85.2	87.0	84.3
B with C	89.3	87.1	87.2
B with C	92.0	92.4	90.1
B with C		90.7	
A with C	None	87.6	None
A with C		89.3	

Table 5.2

Percentage of Interrater Agreement for Children's Behavior in Social Settings for Center A

Observers	Training: Assessments	1st Data Collection Period: Assessments	2nd Data Collection Period: Assessments
A with D	68.2	78.3	85.0
A with D	73.3	78.4	89.4
A with D	79.0	86.9	84.6
A with D	86.4	87.8	93.9
A with D	84.1		

Table 5.3

Reliabilities for Categories of Behavior
(n=131)

Variables	Agreements	Disagreements	% Reliability
Environmental			
Location	131	0	100.0
Group Size	128	3	97.7
Adult Role	129	2	98.4
Behavioral			
Unoccupied	12	4	98.4
Passive neg. (unocc. & waits)	27	8	75.0
Waits	15	4	78.9
Passive pos. (onlooker: observes	24	9	72.7
listens	46	7	86.8
reads			
Focuses on activity			
All functional play	15	2	88.2
All constructive play	21	2	91.3
All dramatic	1	1	
Verbalizes to child	29	6	83.8
Verbalizes to adult	36	1	97.3
Verbalizes to self	13	3	81.2
Prosocial behavior (shares/takes turns + help, comfort, affection)	10	3	76.9
Antisocial behavior (disturbs activity + misuse, abuse materials)	7	1	87.5
Autonomy (chooses activity + readies resp. maintenance)	15	3	83.3

for designating the location to 97.7% for the group size. However, the complexities of coding children's behavior in preschool settings is apparent. The constructive play category achieved the highest agreement, 91.3%, while prosocial behavior maintained only 76.9% agreement.

However, many disagreements occurred within one category. For instance, both observers saw the child engage in functional play but one marked parallel and the other solitary. This disagreement is counted as two points of disagreement with no credit being given for the agreement on the cognitive level of play. Another frequent inconsistency occurred when both observers marked the child as verbalizing but one thought it was to a nearby child and the other thought the child talked to him or herself. The third common area of disagreement occurred when one person coded "focuses on task" and the other did not or one person marked onlooker during group circle time and the other marked unoccupied or no code at all. And finally, there were disagreements within each category of antisocial or prosocial behavior. The lowest, prosocial, contains ambiguities about the occurrence of sharing and taking turns. If the children are using a large set of interlocking manipulatives to build separate individual constructions one observer may code sharing, taking turns and another may not.

Some of these problems seem inherent when two adults try to observe one child simultaneously from different positions. Shortening the observation period to 15 seconds might improve agreement, as there would be less behavior to record and remember. Since the

purpose of the instrument was to give a general picture of how a group of children spent their time in a day care environment some error is permissable. However, interrater agreement in the 90th percentile would be desirable.

Comparison of Center A with Center B

The behavior of children and adults in Center A during the first eight days of data collection is contrasted to the behavior of children and adults in Center B during twelve days of data collection. Twenty-eight children were observed for eight days at Center A and twenty-four children were observed for 12 days at Center B. Centers A and B had very similar architectural layouts. Figures 5.1, 5.2, 5.3, and 5.4 reveal that each center consisted of a row of interconnecting small rooms. Both, therefore, possessed potential traffic problems. They both had similarly labelled activity areas, e.g., waterplay, role play, blocks, art, library, and a manipulative area. Both centers maintained an adult staff ratio of 1 to 5 or better in the morning periods observed. The manipulative area of Center A was located near the opening of a door through which children arrived and departed. Although a small rug and table were provided nearby, the rug was in the flow of traffic and the table was used for snack during the free play period. Materials were stored on a low shelf in unmarked odd-sized containers. The library corner was small, protected and contained a rug and mattress. The housekeeping area was located in the same room with the blocks and contained no soft mattress or chair. The

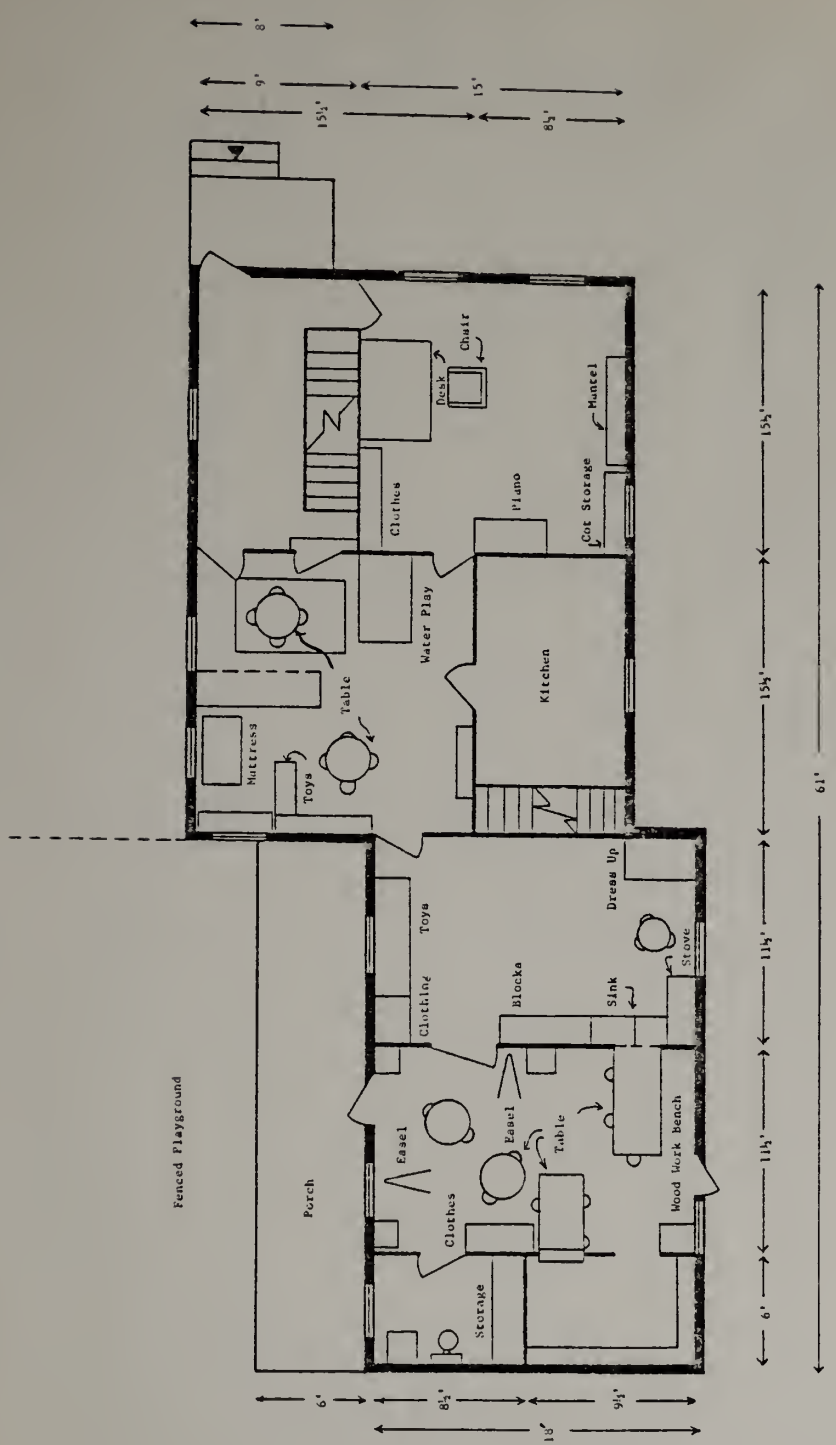


Figure 5.1. Center A

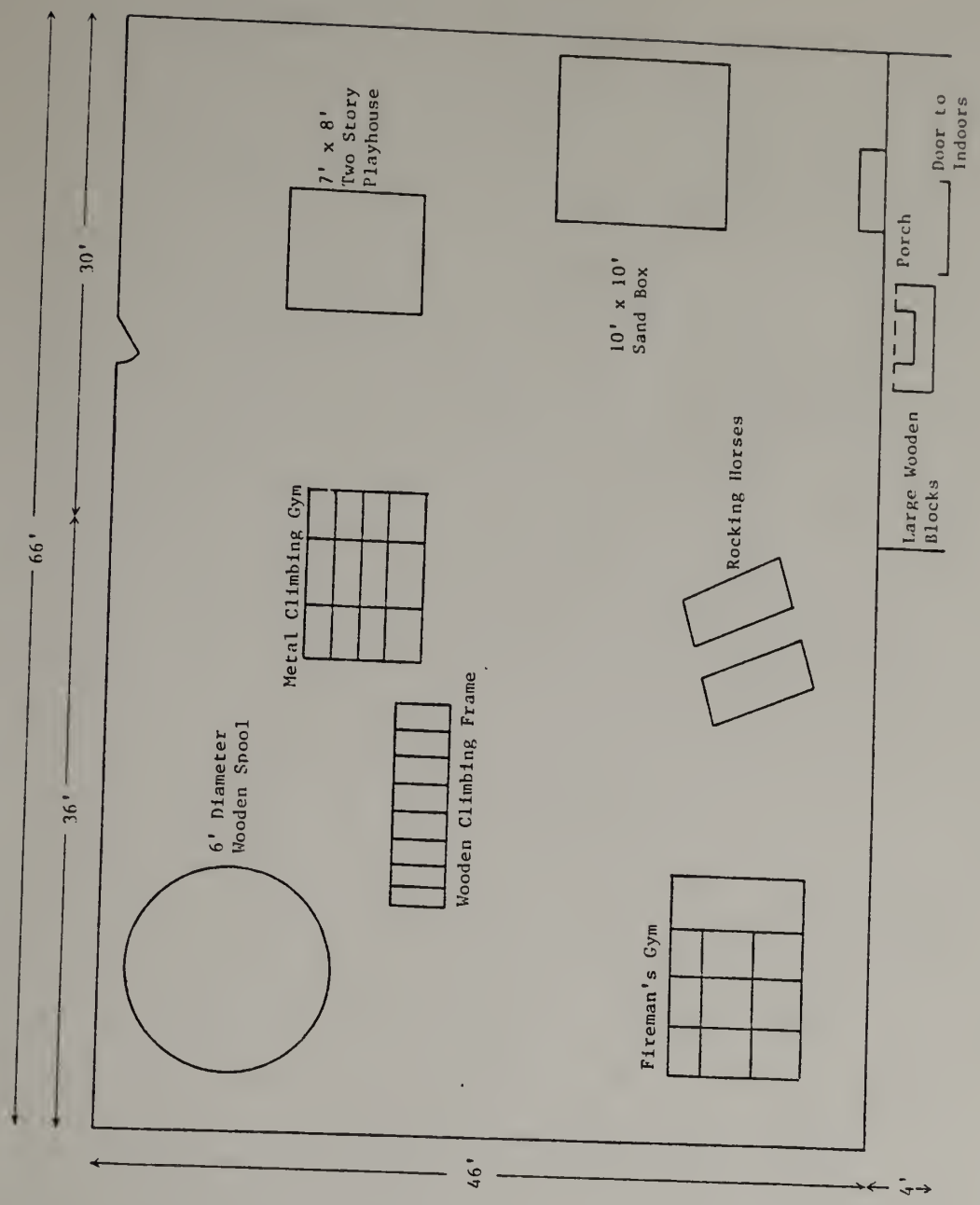


Figure 5.2. Center A outdoors.

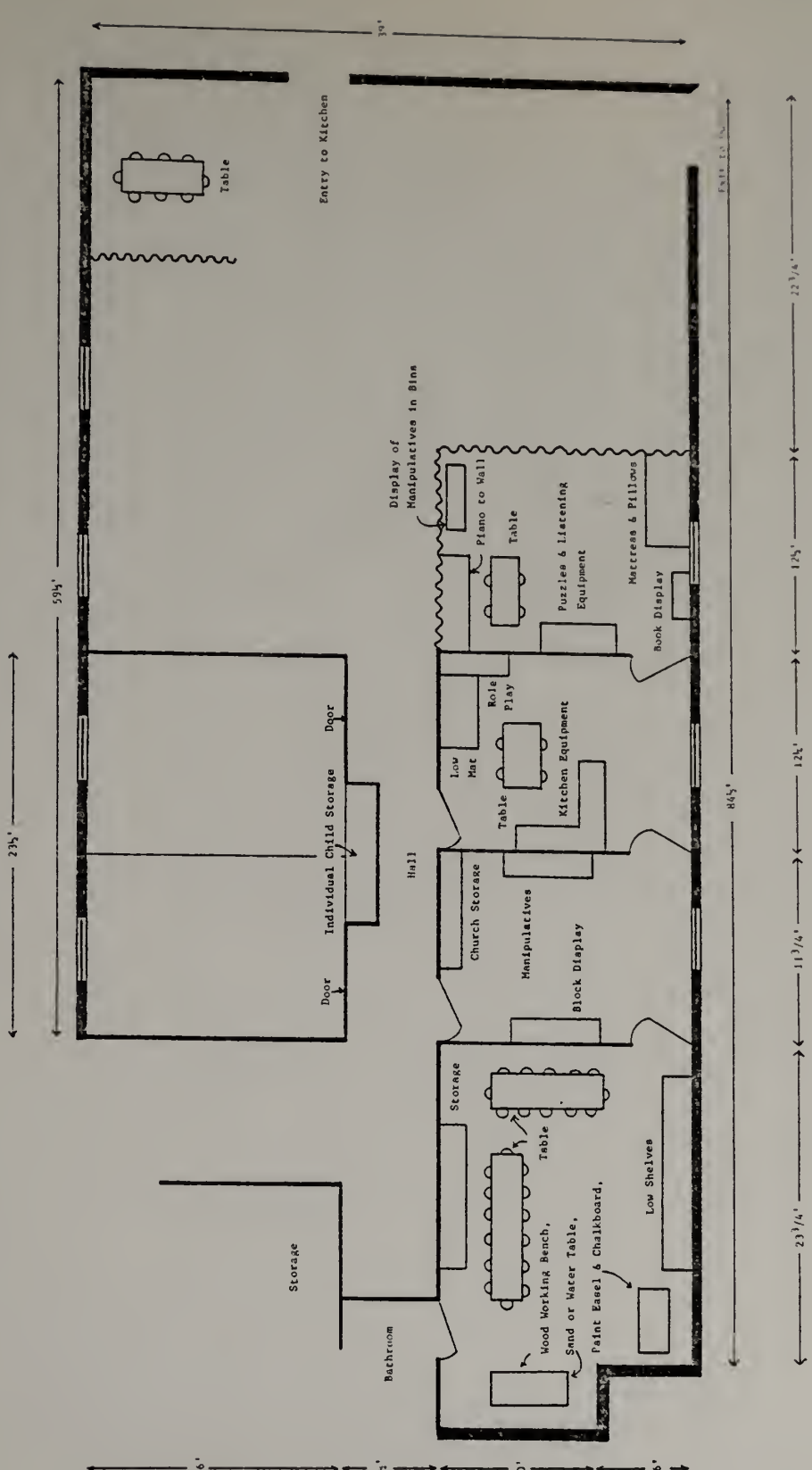


Figure 5.3. Center B.

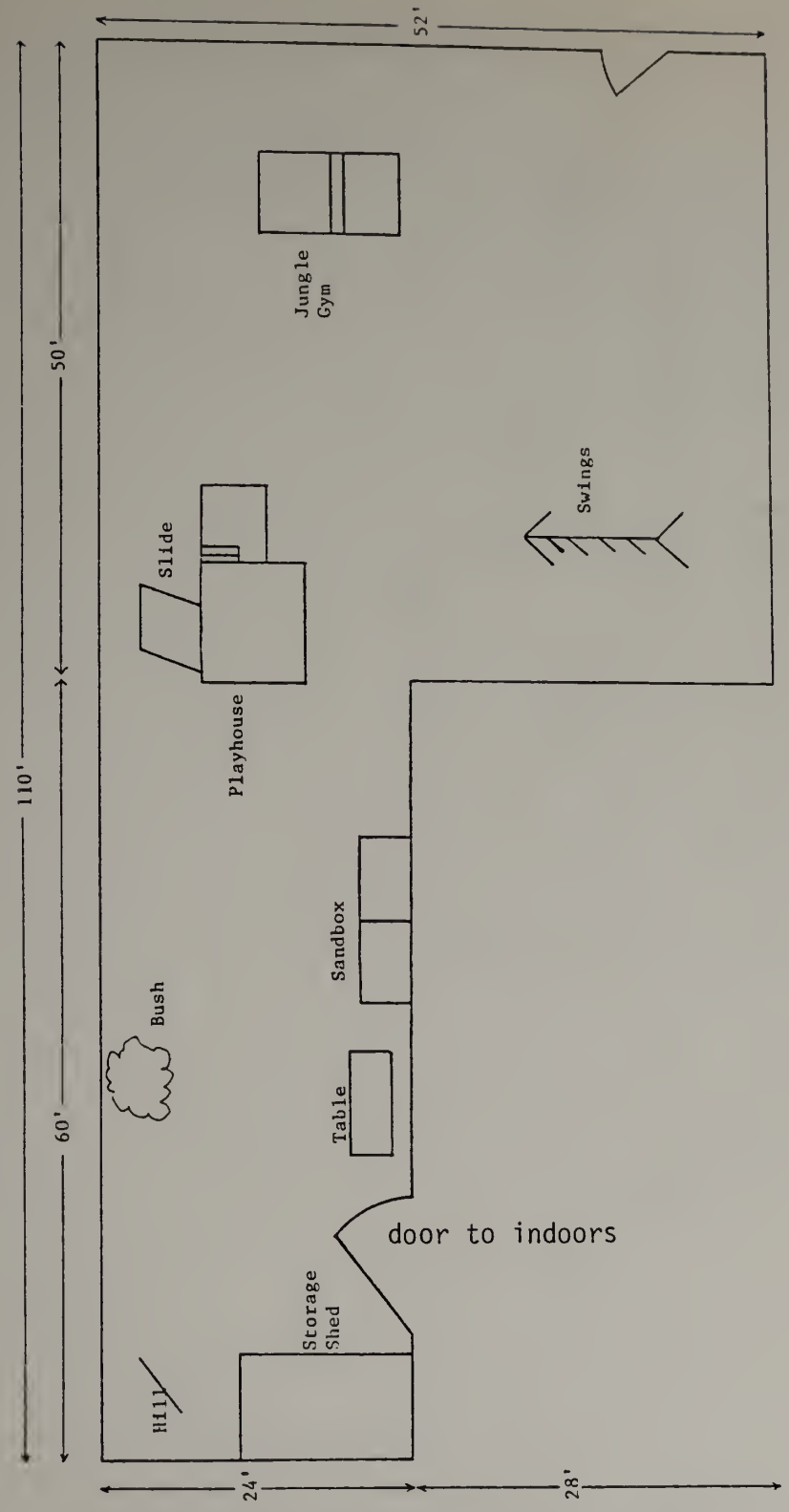


Figure 5.4. Center B outdoors.

truck storage for the block area was located across a traffic-way between two adjacent rooms. The art area contained three sets of tables and chairs with a small carpeted play-room off of it. Each room contained a set of wooden clothes storage lockers. Adults were often seen talking to each other or carrying out planned activities.

Center B organized its learning areas so that one room was given over to blocks and various appropriate props, one room contained role-play equipment, a third housed the manipulative, library and listening areas. The boundaries between areas were clear and there were clear paths around activity areas. The fourth room contained awkward long tables for art projects and snack time. A woodworking bench, a water play table, and easel painting were rotated periodically. Pathways did not intersect specific activity areas. Adults were stationed in separate rooms and seldom interacted with each other. Few adult-directed activities were planned.

The author hypothesized that there would be differences in children's behavior in the centers because of the variation in the organization of materials and space and the roles taken by adults. Construct validity was established by the specification of hypotheses drawn from the literature. The major scope of these are discussed below.

Since Center A's schedule allowed for such a short period of freeplay it was supposed that this would frustrate children and, according to Barker et al. (1943), there would be greater frustration leading to a lower amount of focused constructive play.

"Constructive" in Barker's study, pertains to appropriate positive play behaviors as opposed to the constructive level of play used in this study.

Since the first morning circle was preceded by outdoor play in Center A, it was hypothesized that children in Center A would be more unoccupied and would wait more because the transition into circle time would be long as it was preceded by outdoor play (Krantz & Risley, 1972). In addition, Kounin and Gump (1974) asserted that teacher-led recitation and group time (which occurred more frequently in Center A) often have the highest off task scores (e.g., unoccupied or waiting).

The block and roleplay areas have been designated as areas of high social interaction by Shure (1968) and Kounin (1979) and as areas characterized by high levels of social and cognitive play by Rubin (1977). Since Center B children were coded in these areas more than twice as often, one would expect higher percentages of the levels of social and cognitive play in that center.

Tizzard et al. (1976) suggested that the following characteristics promoted short attention spans and simplistic levels of play: a great range of alternatives, and lack of pressure to persist by staff. Since these items appeared to describe Center A more than B, one would expect less focused behavior exhibited by Center A children. Other physical elements that would support the above hypothesis were the type and amount of materials available in the manipulative area at Center B. A low shelving unit located next to a soft rug was equipped with 12 dishpans which were

labelled with colored pictures of the contents. The materials included lincoln logs, legos, and 10 kinds of small construction toys. As Moyer and Gilmer (1955) have argued, children's attention spans are longest with toys especially designed for their age group. The manipulative equipment in Center B appeared to fit that description.

Prescott et al. (1967) have argued that the organization of semi-fixed feature space is associated with the level of children's involvement in activities. The provision of clear paths that circumvent learning areas is crucial as is the complexity, variety and amount of materials. Center A was designed so that two paths disrupted children's activities—one went through the block area and the other through the manipulative area. Center B not only had more complex and varied materials in the manipulative area but also the block area was equipped with small cars, people, animals, and other props on a rotating basis. Thus, both the materials of Center B and the problems associated with the paths in Center A combined to support the hypothesis that there would be more focused behavior and more incidence of play in Center B.

Another aspect of the construct validity study included the prediction of differences in children's behavior based on hypothetical relationships between adult and child behavior drawn from the literature.

Thompson (1944) has argued convincingly that the greater involvement of teachers in play and in friendships with preschool children resulted in increased social participation, constructiveness,

leadership and ascendance on the part of the children. Thus, if adults were found to be more participatory, helpful and available to mediate in Center B, one would hypothesize that the children would be observed in more play and more verbalizations among each other. In addition, Thompson found that the classroom with adults who were aloof and restrictive of children had low scores on constructiveness and social participation. Thus, one would expect that children would be low on levels of cognitive and social play if adults obtained high frequencies of uninvolved or leads, directs.

According to Tizzard et al. (1972) adults who engage in significantly more social activity with children, make more informative remarks, and use fewer negative commands (among other things) have children who are more active in adult-child interactions and answer more remarks made by staff. Thus, if staff in Center B are more participatory with children one would expect the child behavior category, verbalizes to adults, to have a significantly larger frequency.

The work of Huston-Stein (1977) supports the notion that children in a less structured classroom would engage in more dramatic play, would be more attentive at circle time, and would engage in more prosocial, antisocial, and clean up behaviors. Thus, children in the school that had fewer teacher-led formal segments should show more of these behaviors. Similarly, Fagot (1973) has suggested that children engaged in higher levels of task involvement when teachers directed their behavior less often and praised their activities more often. In the same vein Doke and Risley's (1975)

work suggested that activities characterized by informal free choice of materials and individual adult attention resulted in more task involvement. Thus, if Center B had less adult direction and more adult participation one might expect higher levels of task involvement.

Smilanski (1971) and Rosen (1974) support the hypothesis that more participation of adults in the role play area would be associated with higher levels of dramatic play. It was hypothesized that the lack of involvement of adults in Center A together with the lower levels of mediates, participates and watches/helps would result in higher levels of aggression. As Siegel and Kohn (1959) have suggested children engaged in more aggressive acts in the presence of a permissive adult than when no adult was present, it was hypothesized that an adult whose attention was directed elsewhere would be interpreted as a permissive adult.

The rest of this section presents the specific null hypotheses tested and brief discussions of their relationship to underlying constructs. As the chi-square statistic assesses differences in the size of proportions, comments concerning the direction of the relationships are derived from an inspection of the histograms presented or the chi-square tables themselves. The validity of the instrument rests on whether one center will obtain significantly higher or lower frequencies than the other according to various hypotheses drawn from the literature.

Hypothesis I. There will be no relationship between adult behavior and the center within which the adults are coded.

Figure 5.5 displays a histogram of the percentage of time adults were coded in the various roles. Center A adults were uninvolved with children 38.9% of the time and were directing children's behavior 35.7% of the time, while they participated with children only 4.5% of the time. Center B staff participated 21.1% of the time and watched or helped 28.6% of the time. They were uninvolved and directed children about equally, both 19% of the time.

In order to test the hypothesis of the relationship between the pattern of adult behavior and the center, a chi-square test was carried out. The results are indicated in Table 5.4. The chi-square value obtained was 229.36 with 4 degrees of freedom and a tabled significance level of $p<.0001$ thus indicating that adults behaved differently in the two centers.

Table 5.4

Adult Role by Center

	Uninvolved	Watches/Helps	Participates	Mediates	Directs
Center A	294	158	33	2	275
Center B	135	237	155	15	127

chi-square 229.36, 4 df, $p<.0001$.

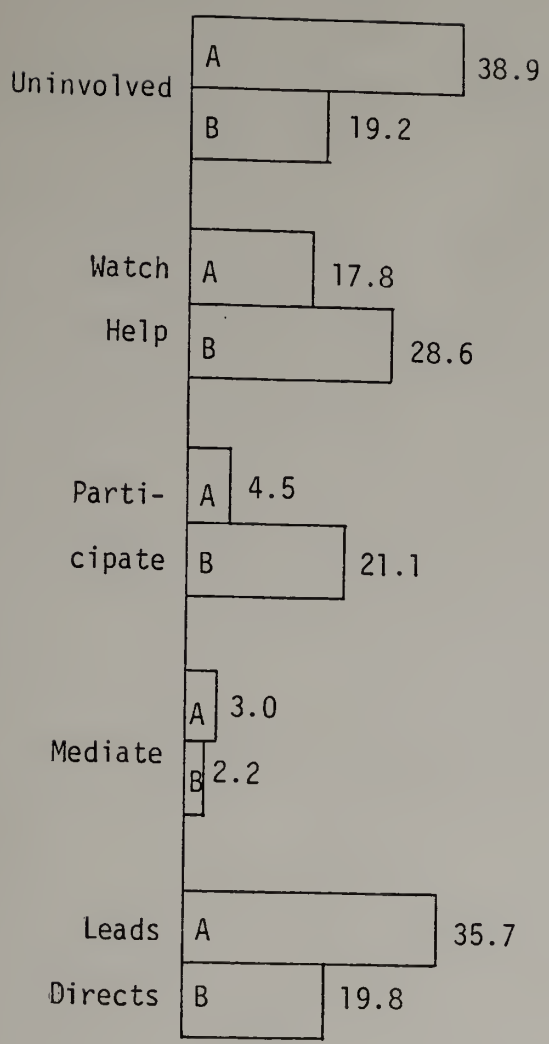


Figure 5.5. Percentage of adult roles by center.

Hypothesis II. There will be no significant relationship between group size and center.

Figure 5.5 displays the relative frequencies of group sizes that were coded in both centers. In Center A children were coded in groups of 2 or 3 and in large groups of seven or more an equal amount of the time both about 34%. Children were alone 13.5% of the time. Whereas in Center B, the modal group size in a learning area was 4-6 children with children being in large groups only 24.5% of the time.

A chi-square value of 66.79 with 3 degrees of freedom indicates the significance of the relationship. Table 5.5 displays the contingency table for this variable.

Table 5.5

Group Size by Center

	1	2-3	4-6	7+
Center A	89	257	151	286
Center B	63	208	271	177

Chi-square 66.79, 3 df, $p<.001$.

Another difference between the centers was the daily schedule. In Center A the following prevailed:

8:00 - 9:20 outdoor time

9:30 - 10:00 circle time

10:00 - 10:45-50 small meeting followed by free play

10:50 -	cleanup
11:00 - 11:15	circle time
11:15 - 11:30	story time or outdoor time
11:30 - 12:00	outdoor time
12:10	transition and lunch

Center B:

8:30 - 10:30	free play
10:20 - 10:30	cleanup
10:40 - 11:00	snack
11:00 - 11:15	circle time
11:20 - 12:30	outdoor time

Since the schedules clearly did not allow children in the two centers the same access to learning areas, a chi-square analysis was performed to test:

Hypothesis III. There will be no relationship between children's usage of activity locations and the center which they attend.

The relationship between use of location and center obtained significance at the .00001 level, thus indicating that the children's activity patterns differed. Table 5.6 displays the results of the chi-square test while Figure 5.6 gives the percentages of time children spent in each location in each center. An inspection of this table reveals some interesting differences. Center A children sepnt more than twice as much time in circle or small meeting than did Center B children (20.4% vs. 9.8%). In contrast Center B

Table 5.6

Usage of Activity Locations by Children in Centers A and B

	Housekeeping	Block	Circle and Small Meeting	Transition	Library
Center A	38	32	157	52	13
Center B	85	74	64	39	0

	Snack Time	Art	Wood Working	Little Playroom	Water Play	Cooking	Cleanup
Center A	10	21	0	14	8	11	65
Center B	23	60	8	0	19	5	23

	Story	Sand Box	Manipu-latives	Swings	Porch & Play House	Out Doors	Large Muscle Indoor	Other
Center A	3	10	8	0	70	213	0	0
Center B	27	0	51	21	0	156	11	1

Chi square = 316.924 with 20 degrees of freedom significance. $p<0.$

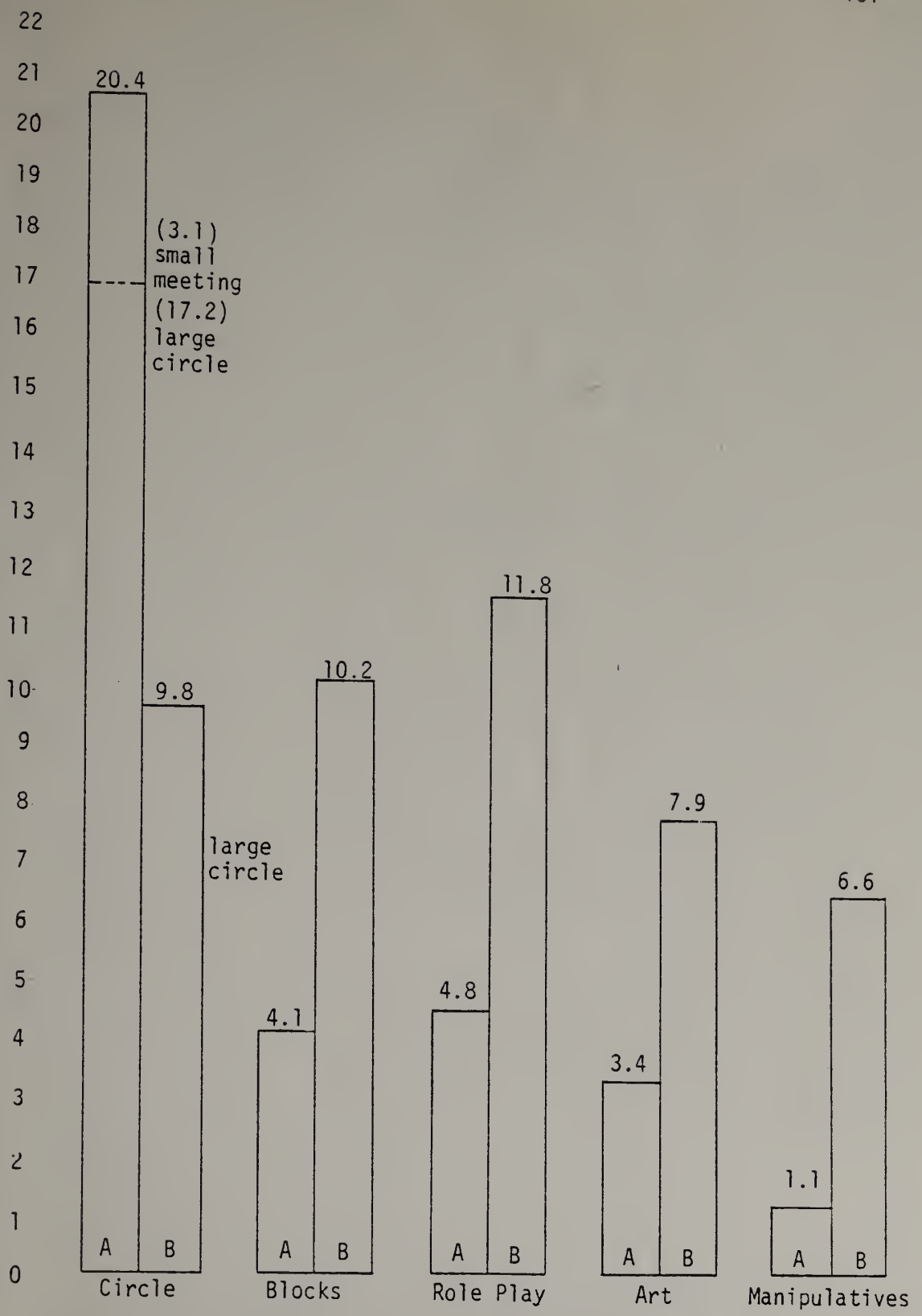


Figure 5.6. Percentage of time children were coded in indoor activity locations for Centers A and B.

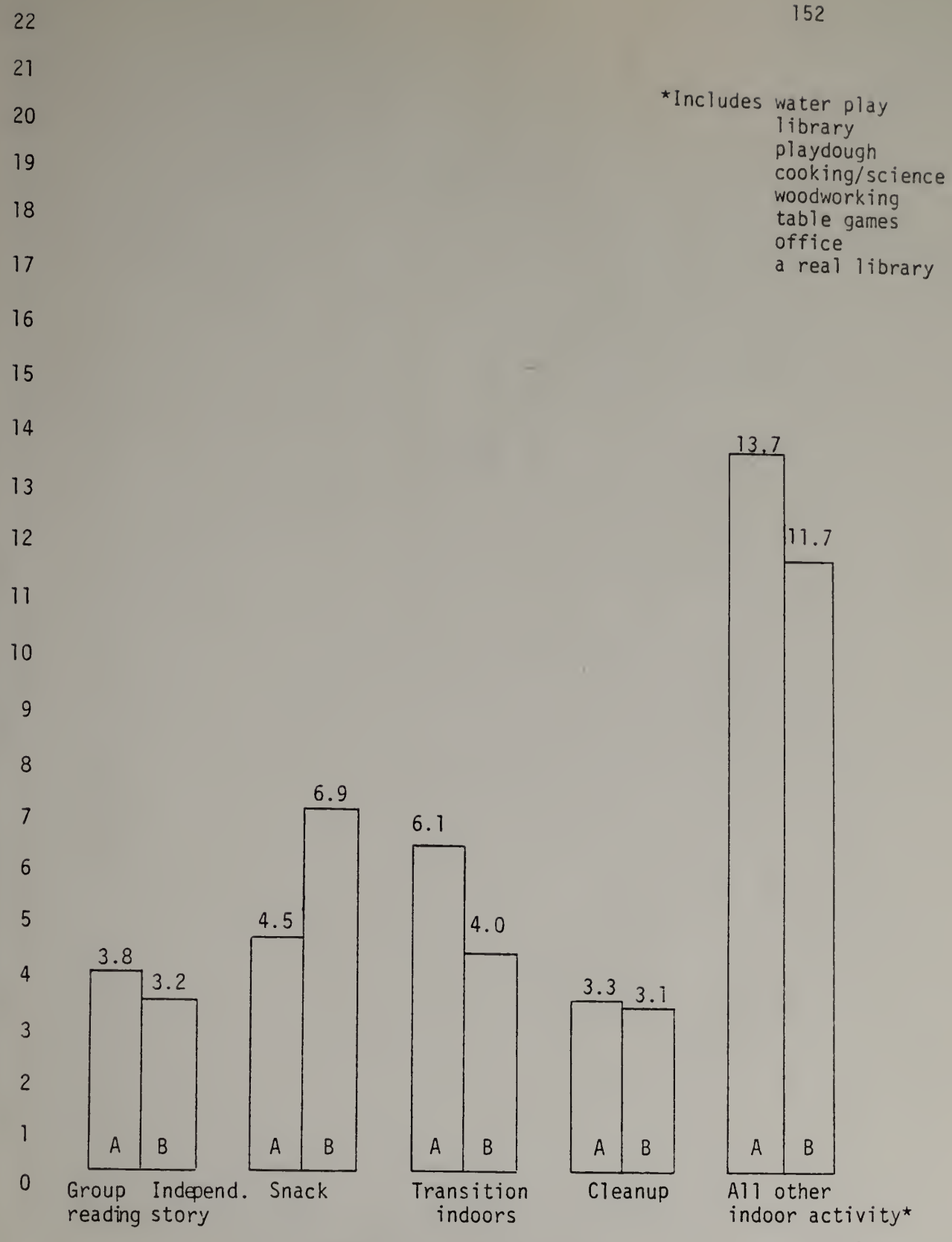


Figure 5.6 (continued)

children spent more than twice as much time as A children in the following activities: blocks, role play, art, and manipulatives. All of these activity areas contain materials that stimulate cognitive and social levels of play. Whereas circle time mainly involves listening or recitation. Thus, one might predict differences in the amount of play behavior engaged in by the two groups of children.

The role of adults, the group size, and the scheduling were considered with the organization of materials and the layout of the physical space as the independent variables that may be associated with differences in children's behavior in the two centers. Differences in the frequency of children's behavior in the two schools were predicted. The null hypotheses are listed, rationales provided and the results of the chi-square tests are given.

Because of the large amount of time children were scheduled to spend in adult directed meeting times and because of the fact that adults were uninvolved (38.9%) or directing children's behavior (35.7%) in Center A, the author hypothesized there would be more passive negative behavior in Center A. Kounin and Gump's (1974) signal system theory says that adult directed group recitation must proceed with few and brief inputs from children. Since circle time sometimes lasted 30 minutes or more and was preceded by outdoor or free play activity (Krantz & Risley, 1972), it was predicted that children would be unoccupied or waiting while adults disciplined or tried to manage lengthy or frequent inputs from children in Center A.

As can be seen in Figure 5.7, Center A children were engaged in the composite category of passive negative behavior 27.5% of the time as opposed to 16.1% for Center B. By looking closely at the behavior profiles of circle time (Figure 5.8) one can easily see two contrasting patterns of behavior. It must be noted that the category of passive negative behavior is a composite one and thus the behavior waits and unoccupied may be observed at the same time giving the category a value of two. Therefore the percentages in Figure 5.8 add up to more than 100%.

During circle time, Center A children established a ratio of passive negative behavior to passive positive plus focuses of about 6:4 while Center B's pattern was the reverse 4:6. In addition it seemed that the adults' lack of involvement with children may result in a lack of incidental teaching (Risley, 1977) or a lack of suggesting alternatives during free play when a child has explored the materials to the extent he is capable. Thus, children may appear more unoccupied in Center A.

Hypothesis IV. There will be no relation between the frequency of passive negative behavior and the preschool center.

Throughout the morning in all activity areas, Center A children were coded 27.5% of the time as waiting, unoccupied, or both. Whereas in Center B this occurred only 16.1% of the time. The chi-square contingency table is presented in Table 5.7. The chi-square value was 30.80 with 2 degrees of freedom ($p<.0001$), thus, lending support to the hypothesis that Center A children would obtain higher levels

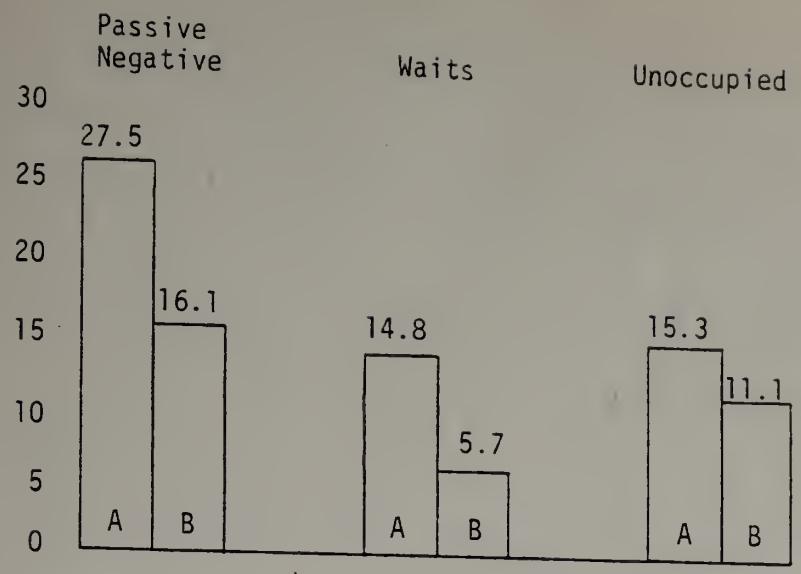


Figure 5.7. Percentage of time children are coded as passive, negative, waiting and unoccupied in Centers A and B.

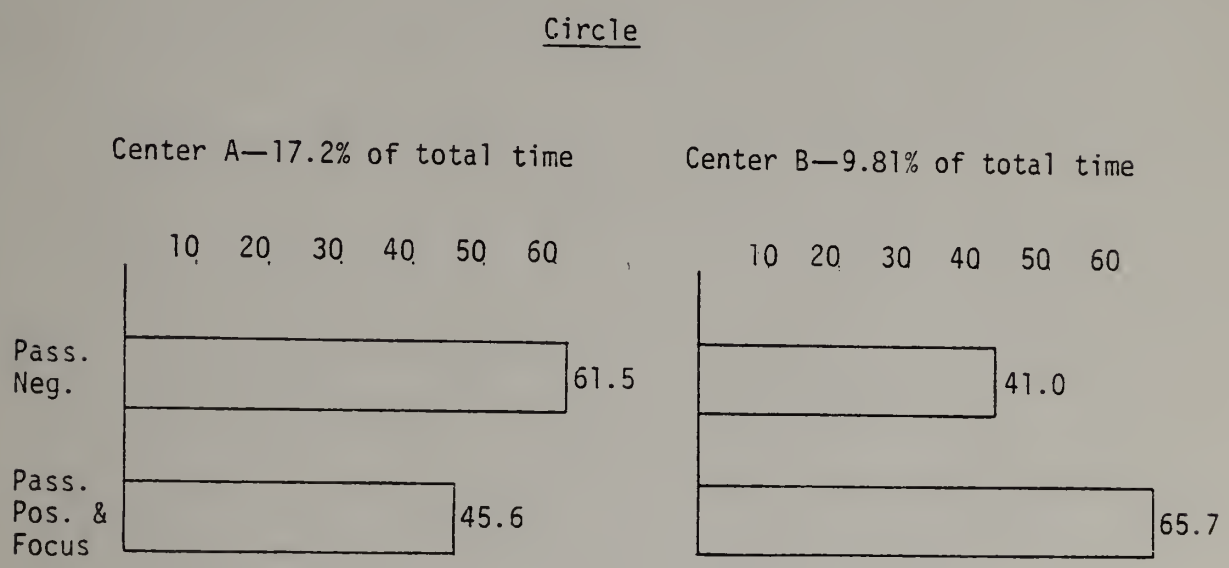


Figure 5.8. Profiles of group circle time in Centers A and B.

of passive negative behaviors. Table 5.8 gives the separate chi-square tables for waits and unoccupied. The category of waits contributed heavily to the difference between the centers. Children were coded as waiting 14.8% of the time in Center A and only 5.7% of the time in Center B.

Table 5.7

Passive Negative Behavior by Center

	0	1	2
Center A	568	194	21
Center B	603	111	5

Chi-square = 30.80, 2 df, p<.0001

Table 5.8

Unoccupied and Waiting Behaviors by Center

Unoccupied

	0	1
Center A	663	120
Center B	639	80

Chi-square = 5.37, 1 df, p<.0205

Waits

	0	1
Center A	667	116
Center B	678	41

Chi-square = 32.28, 1 df, p<.0001

Given that materials were displayed in easily accessible, labelled containers in Center B and that learning areas were well defined with protected workspaces nearby, it would be reasonable to assume that children would find it easier to focus on activities in Center B. In addition since adults participated and watched/helped more in Center B, one could expect that more children would be prompted by adults to extend their play (Risley, 1977) and thus would be more focused on activities in Center B.

Hypothesis V. There will be no difference in the amount of time children are focused on activities and tasks between the two centers.

Center A children were coded as focused on activities only 23.9% of the time while B children appeared to be focused over a third of the time (36.7%). This relationship between task involvement and center was confirmed at the .0001 level (Table 5.9).

Table 5.9

Comparison of the Behavior Focuses on Activity Between Center A and B

	0	1
Center A	596	187
Center B	455	264

Chi-square = 28.78, 1 df, p<.0001

A related hypothesis concerned the expectation that the levels of cognitive play would be higher in Center B than in Center A. Both the higher percentage of participaing and watching/helping adult roles as well as the nature of the schedule in Center B were hypothesized as fostering a higher frequency of play behaviors. Figure 5.9 reveals the differing amounts of time the children in each center were observed in free play activity segments. Play behaviors are much more likely to be coded in these areas than in teacher-led group activities. Center B children spent 48.5% of their time in free play segments whereas Center A children occupied such segments only 22.4% of the time. Thus, one would expect more play behaviors from the Center B children.

Hypothesis VI. There will be no relationship between the frequency of play categories and the two centers.

The chi-square value obtained was 18.7, with two degrees of freedom and a tabled significance level of .0001, thus indicating that children engaged in differing amounts of play according to the center they were in. (See Table 5.10 below.)

Table 5.10

The Comparison of the Frequency of All Play Categories in Centers A and B

	0	1	2
Center A	497	284	3
Center B	379	335	5

Chi-square = 18.69, 2 df, $p<.0001$

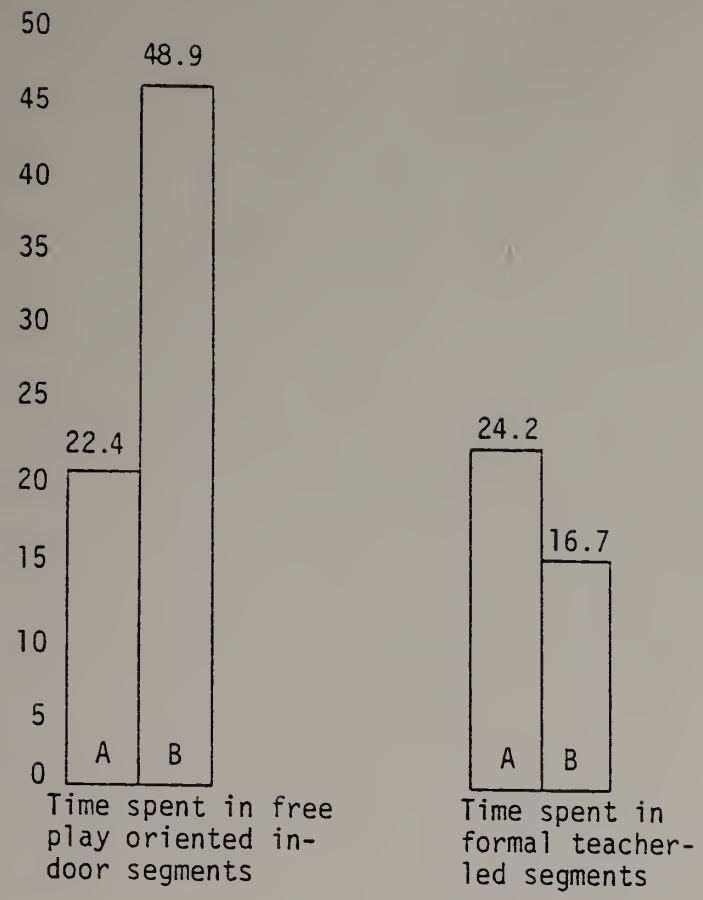


Figure 5.9. Percent of time spent in play-oriented indoor activity segments.

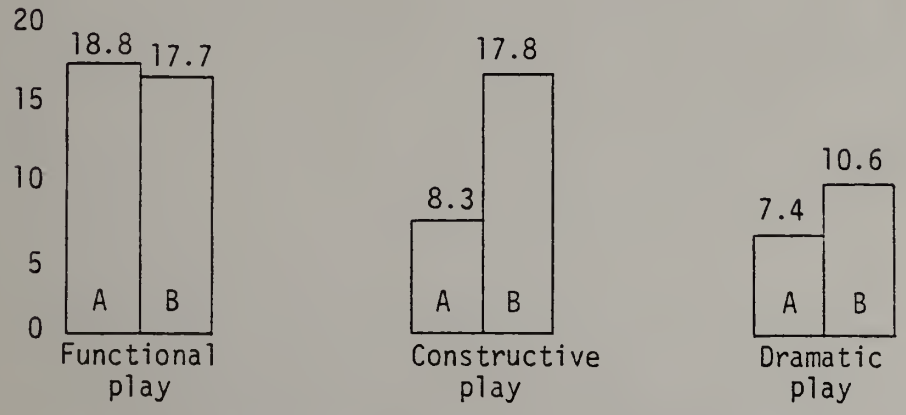


Figure 5.10. Percentage of levels of play for Centers A and B.

Thus, in Center B children were coded in one of the following categories of play 46.6% of the time: functional, constructive, dramatic, sociodramatic or games with rules. Whereas in Center A children were coded in such play categories only 36.5% of the time. In an attempt to see which play category may have contributed to the difference chi-square tests were carried out on the subcategories. The chi-square value obtained for the incidence of dramatic play was 4.23 ($p<.0396$) for constructive play 29.37 ($p<.0001$), and for functional play .597 (p=.N.S). Figure 5.10 displays the percentage of each play category by center. Center B had higher levels of constructive and dramatic play categories whereas children tended to engage in functional play about equally in both centers.

It was expected that the level of autonomy would be higher in Center B because there was less adult direction of behavior and the time scheduled for free play was more than double that of Center A. The category of autonomy is composed of two behaviors: (1) readies, responsible for maintenance and (2) chooses activity. Thus, it was expected that choosing activities would contribute most to the difference in autonomy between the two centers rather than the incidence of maintenance behaviors.

Hypothesis VII. There will be no relationship between the frequency of autonomous behavior and the preschool centers.

This hypothesis could not be rejected. In addition, both subcategories of readies and chooses activity were not significant at the .01 level. A possible explanation of this result lies in the

high frequency of non-involvement of adults with children in Center A, 37.5% of the time. Thus, children were left alone to choose their own activities when they were not in circle or small meeting. Both centers stressed clean up time which may account for the lack of difference in readies, responsible for maintenance.

Further chi-square tests were carriedout on an exploratory basis. The results are summarized in Table 5.11. In Center B, children verbalized to adults 34.4% of the time as opposed to 22.0% of the time in Center A. This result is to be expected because adults in Center B were more involved with children than were adults in Center A. The fact that children tend to talk more to children in Center B ($p<.04$) is surprising since they are busy verbalizing more to adults also. Perhaps the higher incidence of all categories of play ($p<.0001$) may be interpreted as a stimulus for conversation among peers. It is clear, however, that there is more total language production ($p<.0001$) in Center B (65.8%) than in Center A (55%).

The higher incidence of antisocial behavior in Center A ($p<.0016$) was hypothesized to be a function of the teacher's lack of involvement with children. The subcategory of disturbing the activity of others or quarreling contributed heavily to this difference. This occurred 6.1% of the time in Center A and only 2.0% in Center B. One might hypothesize that Center B adults were more likely to prevent such quarrels because they were more involved and attentive. In addition the greater amounts of time Center B children spent in play-oriented segments and engaged in play

Table 5.11

Post Hoc Comparisons Between Centers A and B:
Verbalizes to Adult, Verbalizes to Child
Antisocial Behavior, Total Verbalizations

Verbalizes to Adult

Center A	611	172
Center B	472	247

Chi-square = 27.98, 1 df,
p<.0001

Verbalizes to Child

Center A	537	246
Center B	456	263

Chi-square = 4.23, 1 df,
p<.0397

Antisocial Behavior
(disturbs activity, quarrels, and
misuse, abuse materials)

	0	1	2
Center A	724	56	3
Center B	695	22	2

Chi-square = 12.91, 2 df,
p<.0016

Total Verbalizations

	0	1	2	3
Center A	352	355	73	3
Center B	246	363	105	5

Chi-square = 22.45, 3 degrees of
freedom, p<.0001

behaviors may have contributed to the lesser amount of quarreling among children. It is important to note the different distribution of males and females in the two centers. Center B had 66% boys and 33% girls and Center A had 51% boys and 49% girls. One might normally expect Center B to have more antisocial behavior as boys are often considered to be more boistrous or aggressive. However, Center A was higher in antisocial behavior ($p<.0016$).

In a further analysis of antisocial behavior controlling for sex there was no significant difference for female antisocial behavior by center but the males in Center A engaged in significantly more antisocial acts ($p<.0025$).

In comparing the levels of cognitive play in Centers A and B while controlling for the sex of the children, some interesting findings occurred. There was a significant relationship between the center and the amount of constructive play for both males ($p<.0000$) and females ($p<.0028$), with higher levels for both sexes occurring in Center B. There was no difference in the amount of dramatic play in both centers for females. However, males in Center B engaged in dramatic play ($p<.0021$) significantly more than males did in Center A (9.4% for Center B and 3.9% for Center A).

Table 5.12 gives the chi-square tables for constructive play by center controlling for sex and dramatic play by center controlling for sex. Figure 5.11 summarizes the differences in percentage of time the children in Centers A and B were coded in all the various categories of behavior.

Table 5.12

Constructive Play by Center Controlling for Sex
and Dramatic Play by Center Controlling for Sex

Constructive Play—Males

	0	1
Center A	373	400
Center B	35	91

Chi-square = 17.508 with 1 degree of freedom, p<.0001

Constructive Play—Females

	0	1
Center A	345	191
Center B	30	37

Chi-square = 8.904 with 1 degree of freedom, p<.0028

Dramatic Play—Males

	0	1
Center A	392	445
Center B	16	46

Chi-square = 9.466 with 1 degree of freedom, p<.0021

Dramatic Play—Females

	0	1
Center A	333	198
Center B	42	30

Chi-square = .3475 with 1 degree of freedom, p<.5555

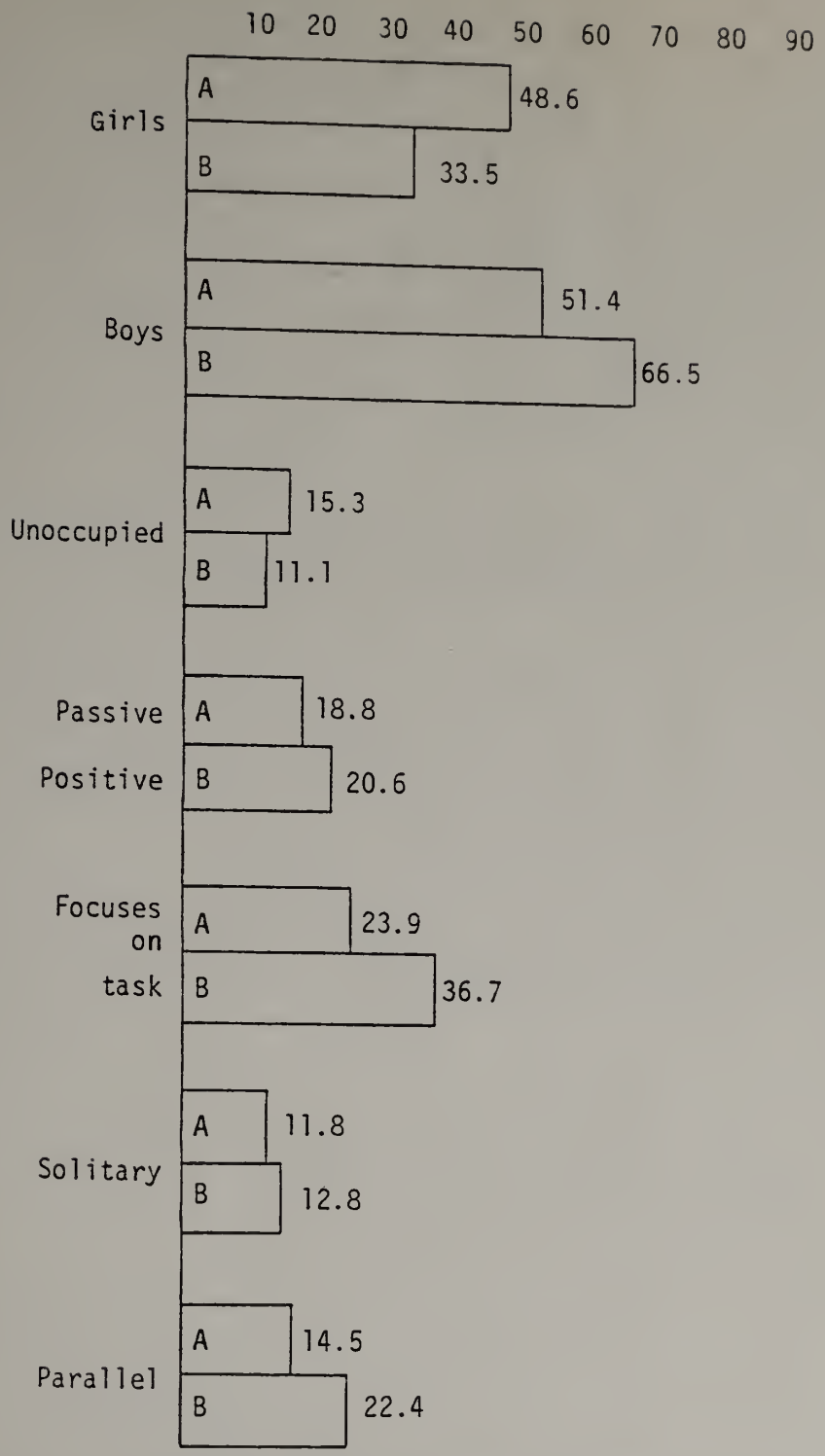


Figure 5.11. Comparison of percentage of frequencies of children's behavior at Center A and B.

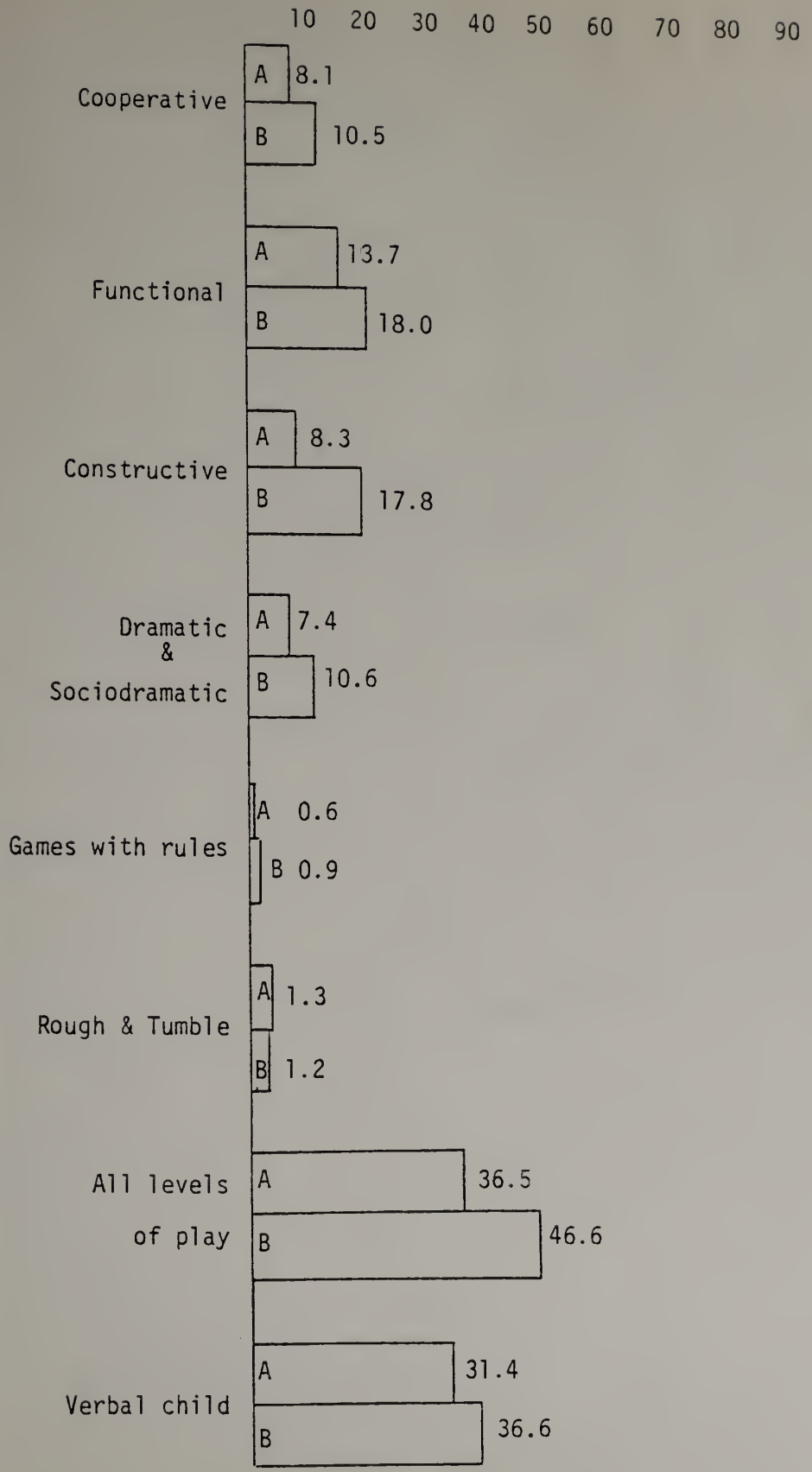


Figure 5.11 (continued)

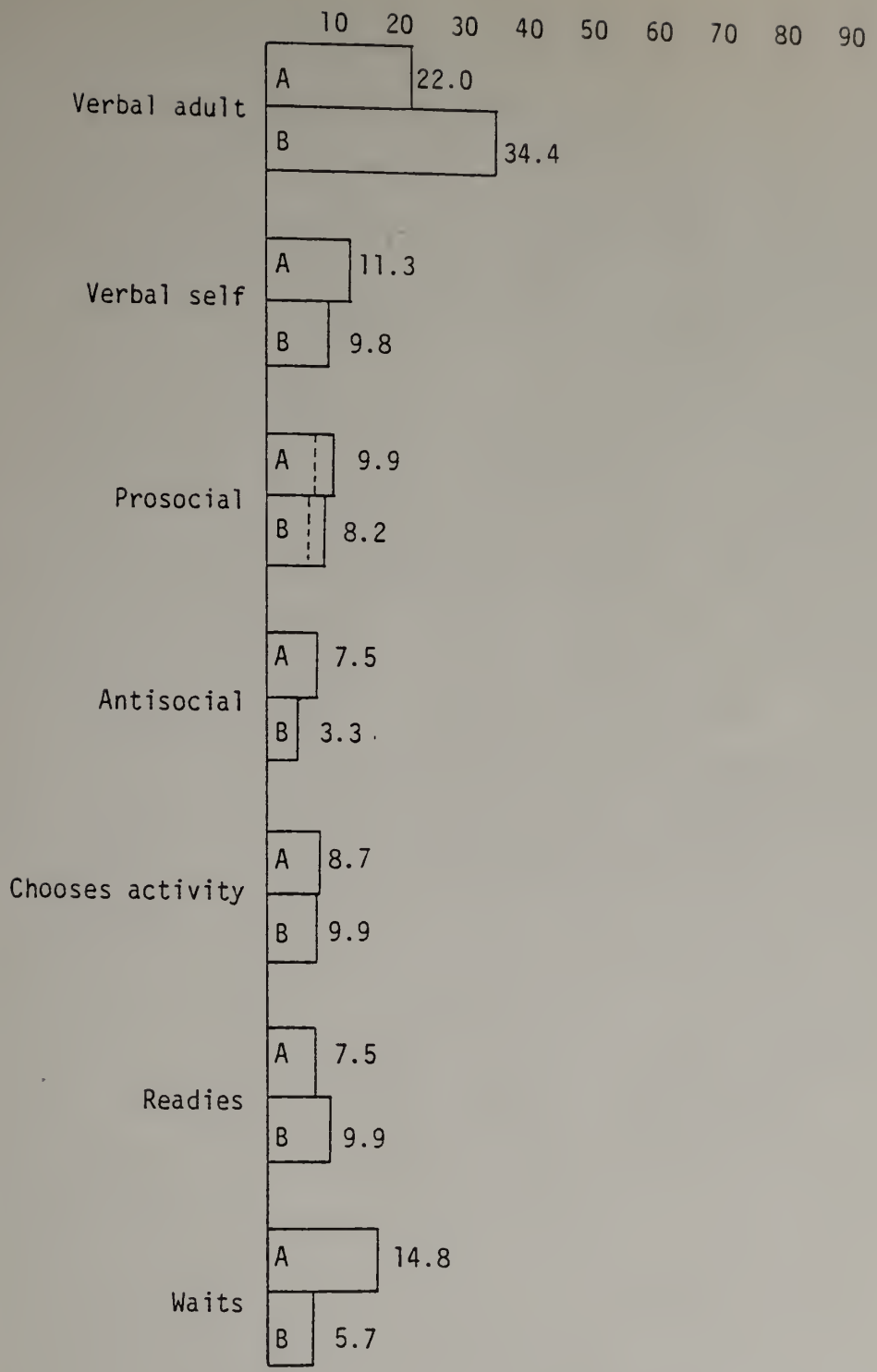


Figure 5.11 (continued)

The construction of various ratios to indicate the relationship of one set of behaviors to another set served as a way of summarizing the differences in child-environment interactions in the two preschools.

These indices were derived in part from relationships suggested in the literature, such as Anderson's (1944) conceptualization of dominative and integrative behaviors, and in part from the ability of such ratios to represent significant differences between the two schools. The index of autonomy differentiates Center A and B in a manner that the chi-square test did not because the negative aspect of autonomy, e.g., waits, is incorporated in the denominator of the index. A ratio reflecting the amount of task involvement in contrast to the amount of unoccupied behavior is presented as an intuitively appealing index for the early childhood practitioner. The same can be argued for the prosoical index which relates prosocial to antisocial behaviors. Perhaps the least informative ratio is the one which compares passive positive to passive negative behavior. However, since all of the proposed ratios do differentiate the centers on some of the more significant variables they are presented as easily computed descriptive statistics for early childhood educators in the field. They may be useful as a means of comparison not as absolute indicators of quality.

The autonomy index was formulated as follows:

$$\frac{\text{number of chooses activity and number of readies, responsible for maintenance}}{\text{number of waits}}$$

As can be seen in Table 5.13, the index for Center A was 1.15 while Center B achieved a more positive value, almost three times as large, 3.13. In looking at the denominators of the ratios, it can be seen that Center B children spent less than half as much time waiting as Center A children. However, they spent about the same amount of time choosing activities and readying or helping with maintenance. This finding is attributed to the fact that both centers adopted a free play format and stressed individual autonomy. Thus the denominator, the incidence of waiting, contributed heavily to the differing ratios. The added time spent waiting in Center A is attributed to the higher degree of adult directed group activities. The transitions into such segments as well as the activities themselves often constrain children to wait while adults pass out materials or interact with one child.

The index for task involvement, was constructed by dividing the total of the behavior, focuses on activity or task, by the total of unoccupied behavior in each center. The resulting ratios reveal that Center B has a more positive index, 3.1, which is almost twice as large as Center A's index of 1.6. The higher level of focusing behavior at Center B can be explained by the greater amount of time staff spent watching, participating, helping, or mediating with children 52.9% as opposed to 25.3% in Center A. It would appear that when children were bored with an activity an involved adult would be more aware and ready to suggest a new activity. In addition, the physical environments differed in a way that would support task involvement in Center B. The materials in the manipulative area of

Table 5.13

Quality Indices for Centers A and B

Index	Center A	Center B
Autonomy: chooses activity & readies, responsible maintenance / waits	$\frac{134}{116} = 1.2$	$\frac{138}{44} = 3.1$
Task Involvement: focuses on activity, task / unoccupied	$\frac{193}{122} = 1.6$	$\frac{268}{86} = 3.1$
Passivity: passive positive (reads & observes intently) / passive negative (waits & unoccupied)	$\frac{152}{243} = .6$	$\frac{156}{127} = 1.2$
Prosocial Index: prosocial behaviors / antisocial behaviors	$\frac{79}{62} = 1.3$	$\frac{65}{30} = 2.2$
Adult Domination/Integration Index Adult: leads, directs / watches helps & participates & mediates	$\frac{285}{198} = 1.4$	$\frac{144}{439} = .33$

Center B were more specifically designed to hold the children's attention (Moyer & Gilmer, 1955), clearly labelled and available (Dodge, 1978) and a protected work area was provided nearby (Kritchevsky & Prescott, 1969). Center A had serious traffic flow problems (Kritchevsky & Prescott, 1969) with two major paths cutting through the manipulative and the block areas potentially disrupting children.

A passivity index was calculated as follows:

$$\frac{\text{passive positive behaviors (observes intently, reads)}}{\text{passive negative behaviors (waits \& unoccupied)}}$$

Center B's index was double the value of Center A (1.2 to .6). The denominator, descriminated between the two centers. Center A had almost twice as much passive negative behavior as did Center B. These results seem to be related to the role of the adults and the differences in the amount of time children spend in formal vs. informal activities. Doke and Risley (1972) and Kounin and Gump (1974) both have found that children in formal adult-led segments often have to wait while adults interrupt their presentation to attend to one child, distribute materials, or control many or lengthy inputs from children. Their research supports the interpretation that the larger amount of adult led formal activities in Center A may have contributed to the larger proportion of unoccupied and waiting behavior on the part of Center A children.

The adult domination/integration index can be related to the passivity index. This notion of adult domination vs. integration is based on Anderson's (1943) research in which teachers with

integrative teaching styles (e.g., participatory and facilitative) had children who were integrative in the sense that they tended to solve problems and work constructively with other children. Dominative adults (those who directed behavior and resorted to rules frequently) had children who were dominative also. The adult domination/integration index in this study was constructed in the following manner:

$$\frac{\text{adult leads, directs}}{\text{adult watches/helps \& participates \& mediates}}$$

Center A's ratio results in a figure of 1.4 which is four times larger than Center B's index of .3. When a center is high in dominative adult behavior the research cited earlier (Doke & Risley, 1973; Kounin & Gump, 1974) would suggest that the passivity index would be low. Such was the case with Center A. The adult domination/integration ratio was high, 1.4, with a low passive positive figure of .6, while Center B had corresponding figures of .3 (low in domination) and 1.2 (higher in the passive positive ratio). Thus, indicating a larger percentage of passive negative than passive positive behavior in Center A. Further, research would be needed to explore the nature of such relationships among the indices.

The prosocial index was calculated by the following formula:

$$\frac{\text{prosocial behaviors}}{\text{antisocial behaviors}}$$

A value less than one indices that more antisocial behavior is occurring than prosocial incidents. Thus, a low value is negative

in a manner similar to the passivity index. Centers A and B both obtained values greater than one but Center B's value of 2.2 was more positive than Center A's index of 1.3

Thus, the indices consistently favor Center B on the aspects of children's autonomy, task involvement, passive positive and prosocial behaviors. The adult domination/integration index reveals in one figure a major aspect of adult behavior in preschool classrooms. The indices are limited in that there is no normative set of values from which to make judgments of quality. However, they are easily calculated statistics which may be useful in a comparison of two or more preschool classrooms.

Environmental Change Study in Center A

The data used in the comparison of Center A with Center B was the phase I data for Center A. An examination of Center A's Phase I Behavioral Map yields some interesting information about how the children spend their time at the Center. (See Appendix D.)

Outdoor play accounted for 35% of the morning program which was observed from 9:00 to 12:30. Free play activities were engaged in only 20.3% of the time while cleanup, circle, small meeting and transitions together occupied the children 37% of the time. The percentage of time children spent in various activities are displayed in Figure 5.1.

Within circle time which occupied 17.3% of the morning program children were coded as unoccupied 28% of the time and waiting 33% of the time. They were observing intently or focusing on the activity 46% of the time. The major format of circle time involved the adult

leading and directing the total group of twenty children seated on the floor in a circle. Cleanup time took up 9% of the time with children being coded as unoccupied 23% of the time and involved in maintenance only 30% of the time. They were involved in all levels of play 51% of the time. Children were coded in transition 8% of the morning.

In general, it seemed that the behavior in the block corner, the housekeeping corner and the art area were appropriate but those areas only occupied children a total of 12.5% of the morning. All free play activities were allowed only one fifth of the morning program. Appendix D contains the Behavior Map for the Phase I data.

Once the Phase I data had been summarized the experimenter was ready to begin the intervention phase of the research design. In quasi-clinical research (Fisher & Berliner, 1977) this period would call for the close collaboration of the teaching staff with the researcher. It was expected that the staff would examine the Phase I Behavior Map, discuss the summary statistics and join in making judgments about the child-environment interactions recorded.

However, two critical staff meetings were cancelled due to inclement weather and staff illnesses. Finally, the experimenter met with the program director and the educational supervisor to review the Phase I Behavior Map and the summary of descriptive statistics (Figure 5.12). Together we made various judgments which are summarized below.

1. The children spent too little time in play-oriented activity segments.

Circle & small meeting	20.5%
Cleanup	9.0%
Transitions	8.0%
Blocks	4.0%
Housekeeping	5.0%
Library	1.6%
Art	3.4%
Cooking	1.4%
Waterplay	1.0%
Manipulative	1.1%
Playdough	1.6%
Large Muscle	1.2%
Little Playroom	2.0%

Figure 5.12. Percentage of time children were occupied in various activity segments during Phase I data collection in Center A.

2. Too large an amount of time was given to group meetings, transitions and cleanup.

3. Outdoor time, occupying more than a third of the morning program, needed to be curtailed.

4. Adults were predominantly uninvolved or directing activities rather than participating or watching/helping.

5. The children's behaviors were predominantly positive but play behavior ought to be encouraged and passive negative behavior reduced.

In order to increase play behaviors and reduce passive negative behavior the following schedule changes were planned. Table 5.14 displays the Phase I and the Phase II schedules:

Table 5.14

Phase I and Phase II Schedules

Phase I Schedule		Phase II Schedule	
8:00- 9:30	Outdoor play	8:00- 8:50	Outdoor time
9:30- 9:40	Clean up	8:50- 9:00	Clean up
9:45-10:10	Circle	9:00- 9:20	Circle
10:10-10:30	Small meeting	9:20- 9:40	Small meeting
10:30-11:00	Freeplay	9:40-10:50	Freeplay
11:00-11:10	Cleanup	10:50-11:00	Cleanup
11:10-11:20	Circle	11:00-11:10	Circle
11:20-12:00	Story & outdoor time	11:10-12:00	Story & outdoor time
12:00	Lunch	12:00	Lunch

The major changes involved lengthening freeplay time from one-half hour to one hour and ten minutes and shortening circle time from forty-five minutes to thirty minutes. The new schedule, however, was not jointly worked out with the morning teachers due to the cancellation of staff meetings.

The education supervisor and the director participated in the quasi-clinical aspects of the planning process but they were not the ones responsible for carrying out the teaching aspects of the environmental intervention. During Phase II the experimenter noted that circle time was often extended into free play time and outdoor time ran on past nine o'clock. Thus, the intervention was not completely implemented.

Various aspects of the arrangements of semi-fixed feature space appeared to hinder the children's involvement in their play. Figure 5.13 displays the Phase I physical layout. The following design problems were noted:

-Clear boundaries were not provided between the block and the housekeeping areas.

-Major traffic paths intersected two free play areas—the block corner and the manipulative area.

-There was a lack of softness andprivacy in the housekeeping area while the self-contained and private library area contained a mattress upon which mother-daughter role play was frequently enacted.

-The woodworking bench was used for the storage of children's lunch boxes.

The following environmental intervention was designed, negotiated and implemented with staff over a two week period. Figure 5.14 displays the revised floor plan.

-A quiet room was added which contained a physically bounded area for manipulatives with rug space for playing with the materials.

-An enlarged library area, also physically bounded was moved to the quiet room.

-A separate table area with nearby shelving for quiet table activities such as lotto, measuring or table games was located in the quiet room.

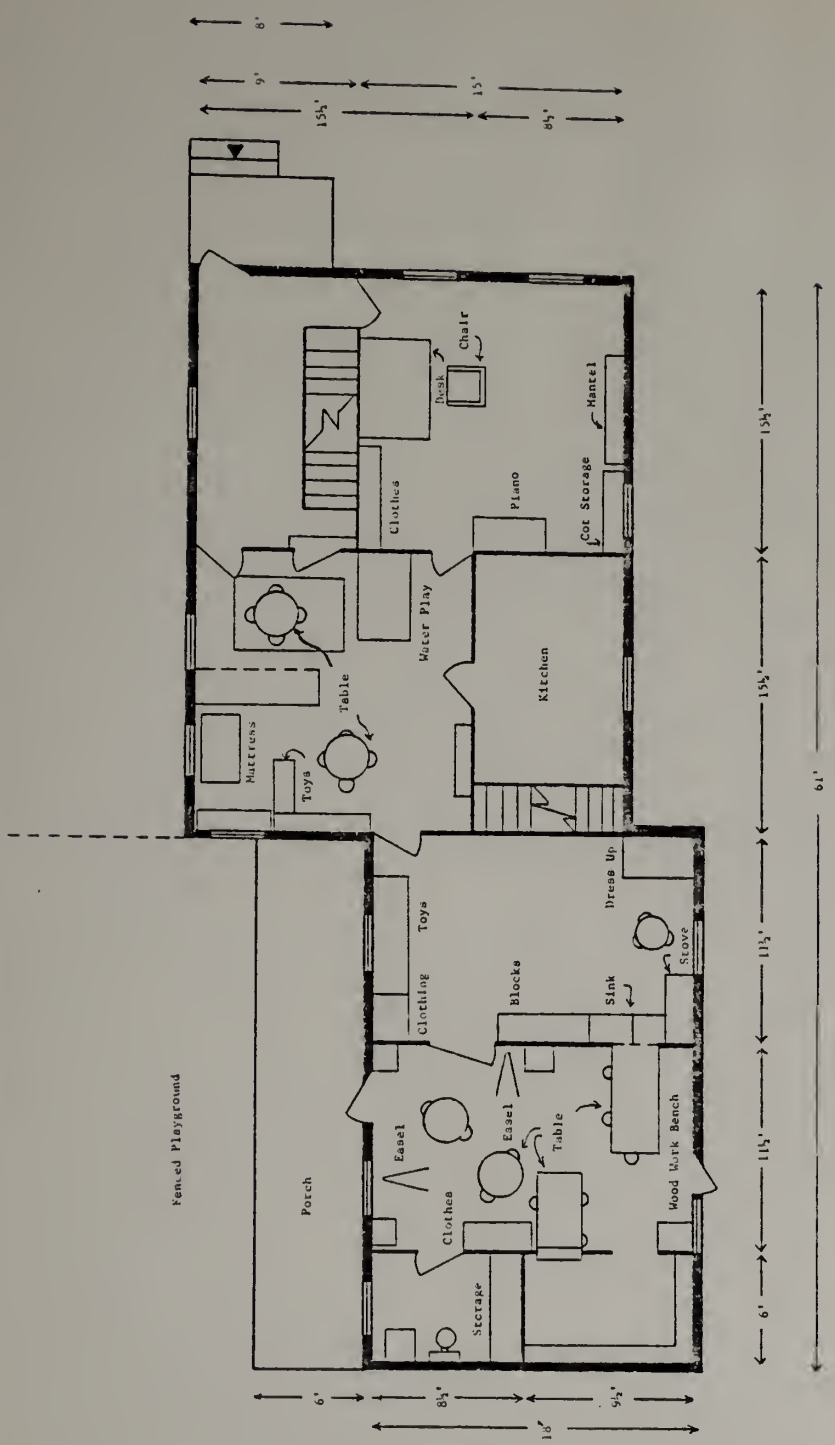


Figure 5.13. Center A—Phase I.

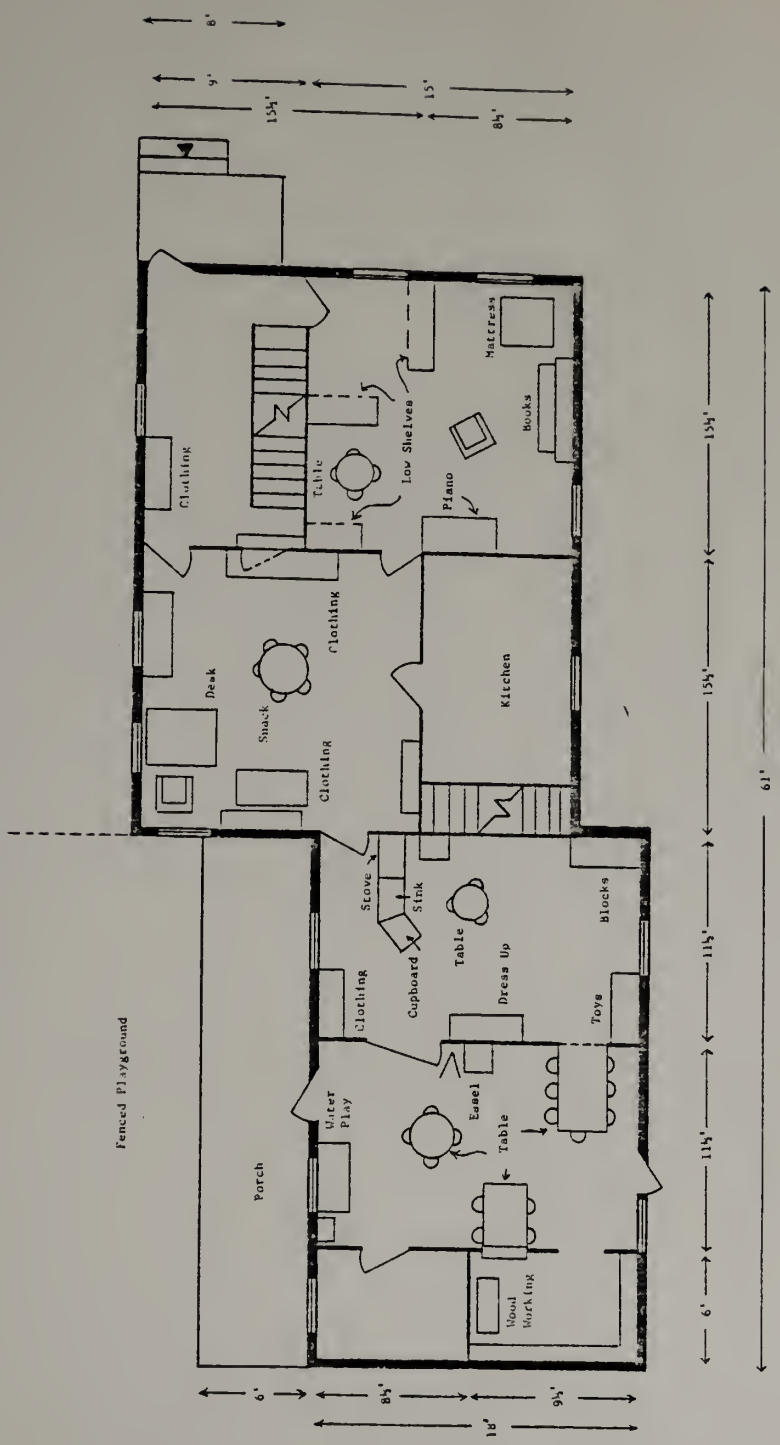


Figure 5.14. Center A—Phase II.

-The block corner was removed from the traffic path and the housekeeping area furniture was rearranged to delineate the space allocated to it.

-Higher wattage light bulbs were installed.

-One central room was organized to centralize the arrival and departure of children. All the clothing racks, the directors desk and a snack table were located there.

-A woodworking area was set up with nails, wood, hammers, and rug squares to absorb sound.

The last environmental factor to be analyzed was the display and type of materials. In the manipulative area the materials were sparse and arranged in odd-size containers. There was a lack of constructive materials. The materials were transferred to brightly colored dish pans which were sturdy and slid easily off the shelves. Bristle blocks and large preschool lego construction toys were added.

The two environmental variables of adult role and group size were analyzed in terms of the children's behavior. During adult-directed large group activities there was a lot of waiting (33%) and unoccupied behavior (28%). Whereas in child-directed activities such as the block corner or the housekeeping area children were involved in all levels of play 66% and 63% respectively and waiting or unoccupied 21% and 13% respectively. The group size in child-directed areas was predominantly two to six children. Adults were uninvolved with children over half the time.

Since the teaching staff did not participate in the extensive discussion or analysis of the Phase I data, the author doubted how much the role of the adult could be manipulated. Therefore, the intervention in adult role consisted of the schedule (see Table 5.14) which reduced the amount of time children spent in adult-directed

activities. In addition, the large percentages of the time adults were either uninvolved (38.9%) or directing children (35.7%) were discussed. The morning teaching staff welcomed the changes in the manipulative and library areas, were unenthusiastic about the revival of the woodworking area, and opposed any separation of the block and housekeeping areas. The environmental changes were thus confined to the library, manipulative, snack and woodworking areas with some minimal rearrangement of the block and housekeeping areas.

The first set of hypotheses concern changes in the pattern of adult behavior in the classroom. A brief discussion with the teaching staff of the preponderance of category 1, uninvolved, and category 5, leads directs, together with the changes in the schedule that limited adult directed activites may have led to changes in adult behavior. These hypotheses concerning adult role serve as a test for degree of implementation of the human aspects of the intervention.

Hypothesis VIII. There will be no decrease in the frequency of adult behavior category 1—uninvolved, attention elsewhere.

Figure 5.15 displays a graph of the relationship between the behavior and time over 16 days. The median regression line has been constructed for the first eight data points and extended into the Phase II data. Six points lie above the line and two below yielding a table significance level of $p<.109$. Thus, one cannot reject the null hypothesis of no difference in the lack of attention of adults. Further, since six of the points lie above the line, the trend, is not in the desired direction. The intervention called for fewer uninvolved adults not more.

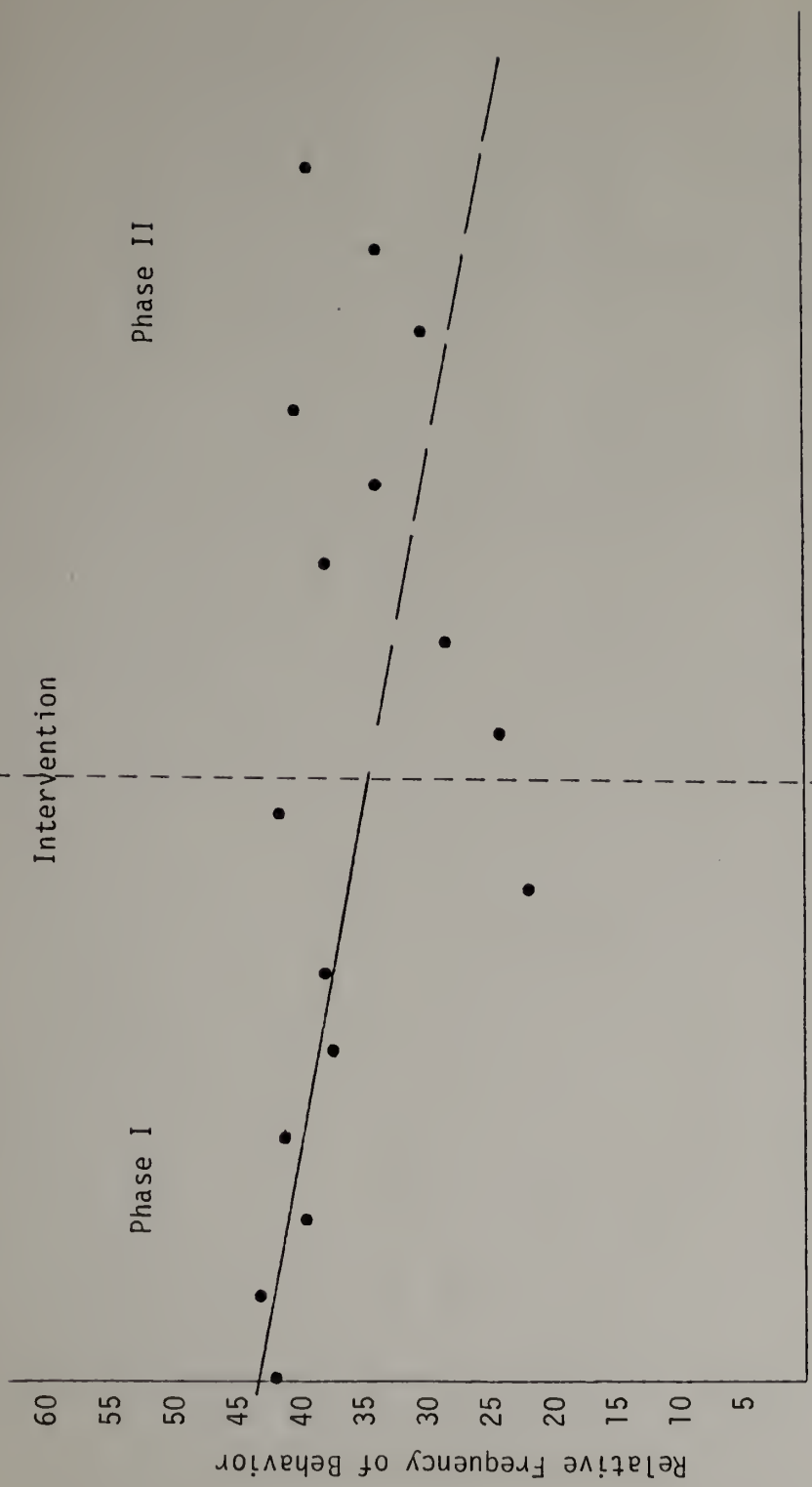


Figure 5.15. Graph showing the relationship between the adult behavior, uninvolved attention elsewhere and time over 16 days

Hypothesis IX. There will be no increase in the amount of time adults are engaged in helping/watching, participating and mediating with children.

It was anticipated that more involved participatory adults would lead to higher levels of children's play behavior, and task involvement. Figure 5.16 displays the Phase I regression line passing through the Phase II data points. Six of the points fall below the line giving a nonsignificant probability level of .109 and indicating that the trend is not in the desired direction.

Hypothesis X. There will be no decrease in the amount of time adults spend in leading and directing children in Phase II.

A reduction in adult direction of children was expected to contribute to a reduction in the dependent variables of waiting and passive negative behavior for children. Figure 5.17 shows the projected Phase I median regression line passing through the Phase II data with one point on the line and one below. One can reject the null hypothesis of no change in adult directing behavior at the .034 aplha level.

However, the trend lies in the opposite direction from that which was desired. One might even conclude that adult directing behavior had increased, since six points lie above the projected regression line. Thus, changes in the pattern of adult roles, that were designed to influence children's behavior were not confirmed by the data analysis. This failure to implement the human aspect of the intervention may influence hypotheses concerning the relevant dependent variables.

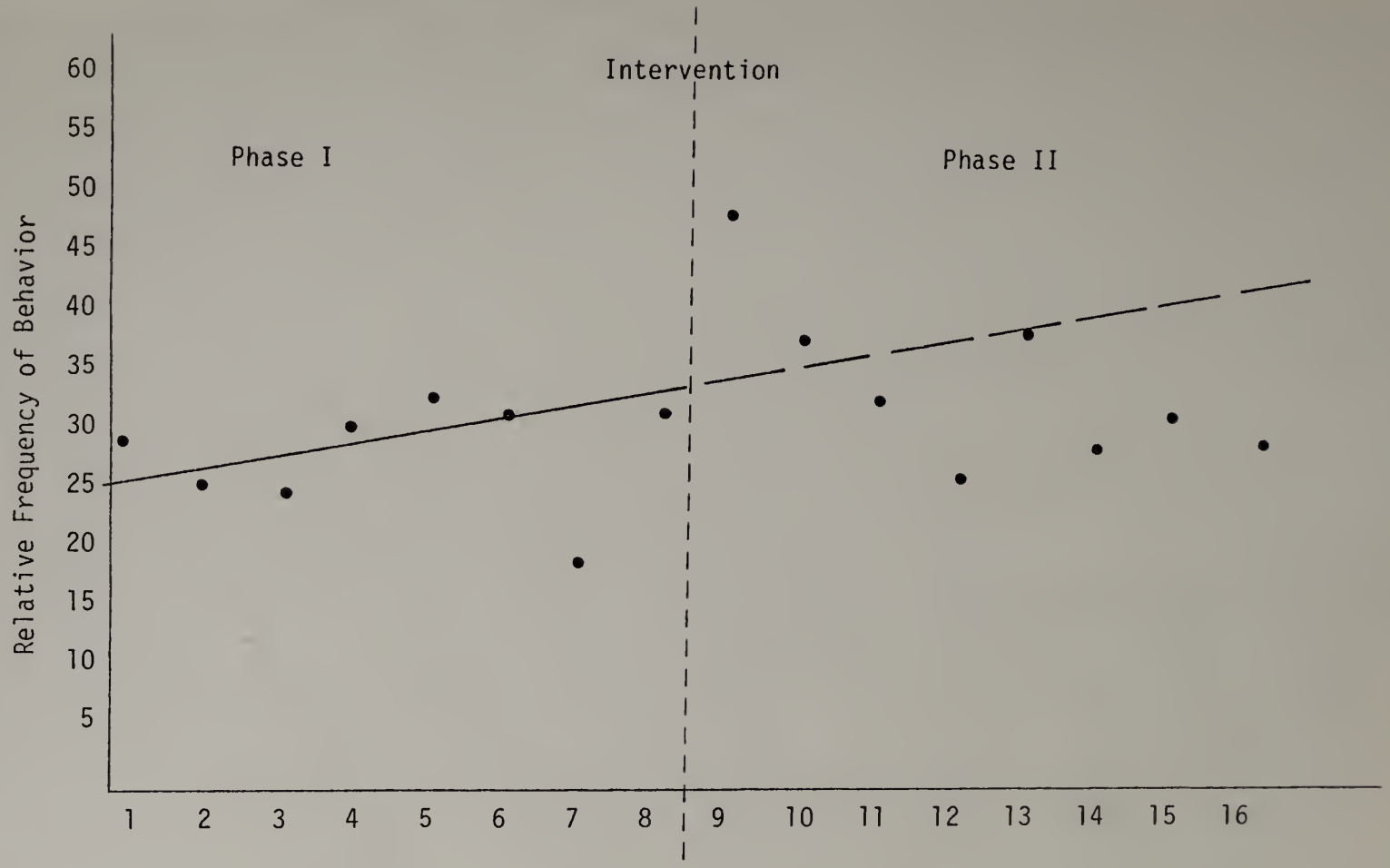


Figure 5.16. Graph showing the relationship between the combined categories of adult behaviors: watches/helps, participates, mediates, and time over 16 days

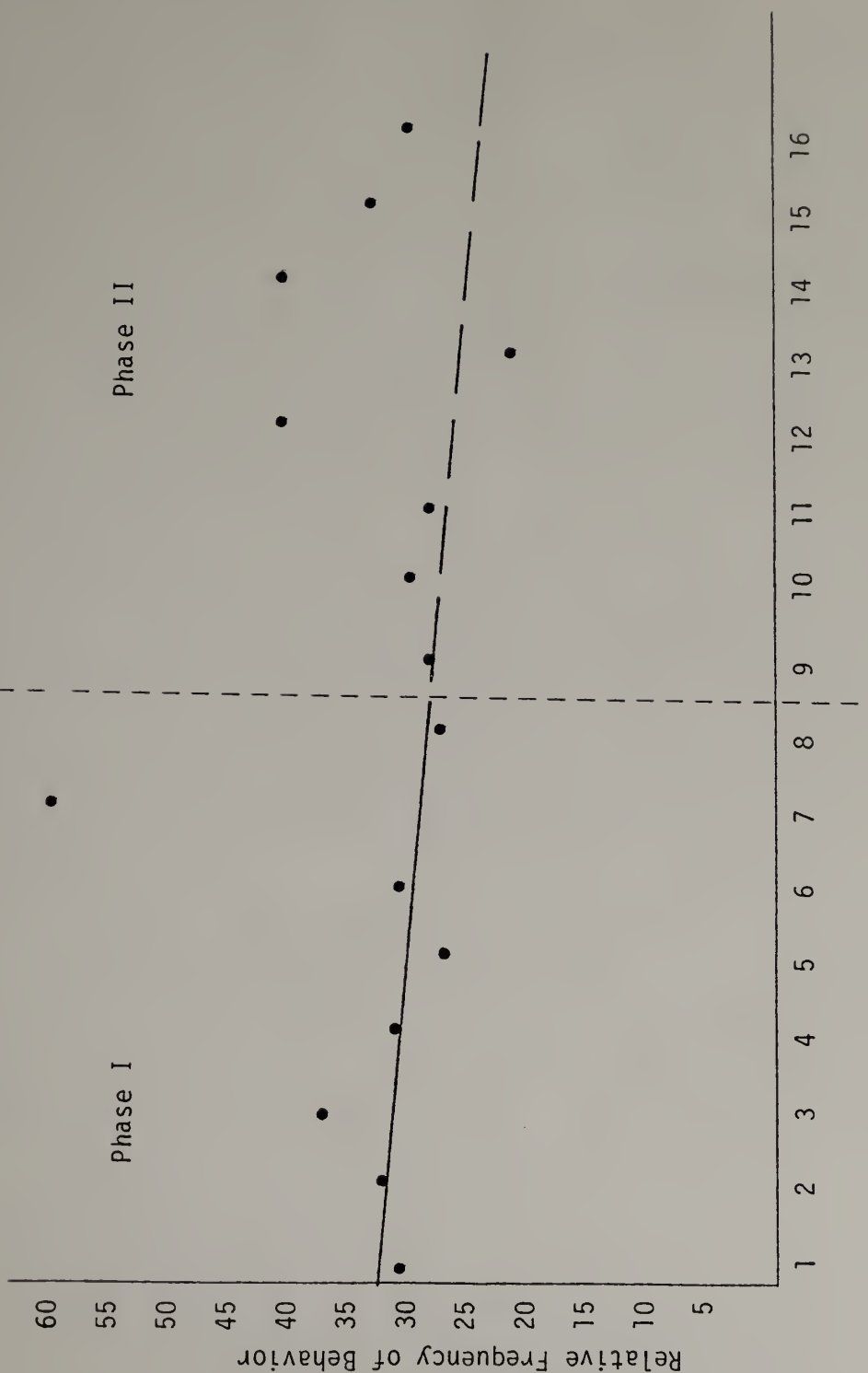


Figure 5.17. Graph showing the relationship between the adult behavior, leads directs, and time over 16 days

As a check on the implimentation of the reduction of time children would spend in adult-directed large groups, figure 5.18 was constructed to display the relationship of time spent in groups of seven or more children and time over 16 days. Since an earlier hypothesis concerning the reduction in the adult role of leading or directing children's behavior could not be confirmed, it seemed appropriate to check on group size.

Hypothesis XI. There will be no reduction in the amount of time children spend in large groups of seven or more.

Of the eight Phase II data points, six fell below the projected median regression line and two above it. Thus, one fails to reject the null hypothesis at the .109 significance level. The trend is in the desired direction indicating that children were spending somewhat less time in large groups during the Phase II data collection period.

All of the previous tests indicate that the environmental changes which could be measured by Children's Behavior in Social Settings were not successfully implemented. These findings were not unexpected due to the lack of involvement of the teaching staff in the planning and implementation of the research. Changing the usual way that one interacts with children is simply not as easy as altering the arrangement of furniture or materials. The following hypotheses concern differences in children's choice of locations during free play and in the levels of various behaviors.

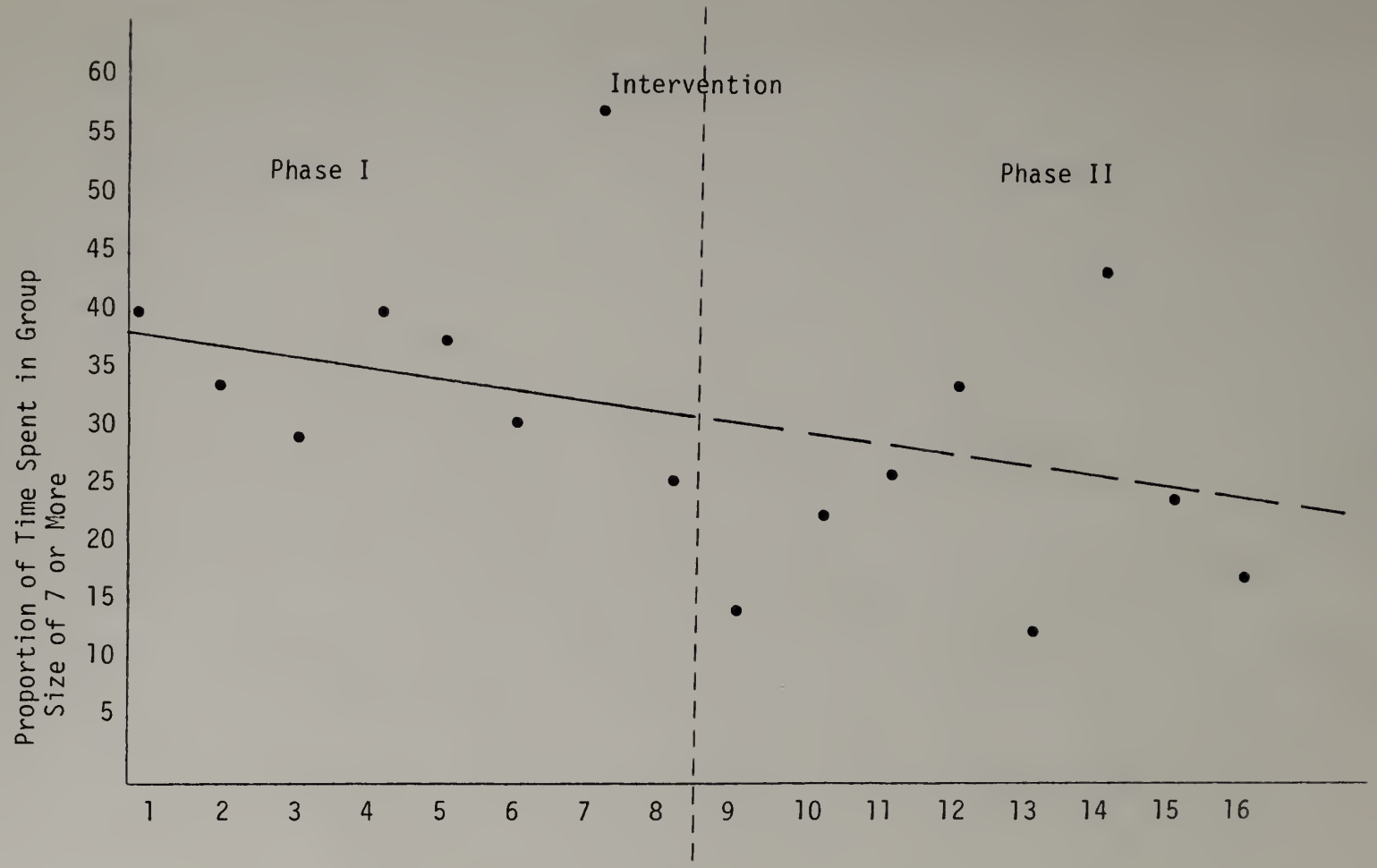


Figure 5.18. Graph showing the relationship between the proportion of time children spent in the group size of seven or more and time over 16 days

The third set of hypotheses focus on the children's usage of the three learning areas that received major alterations during the intervention. As mentioned earlier, the library was enlarged, moved to a quiet room and given a rocking chair. It was anticipated that the quietness of the area and the rocking chair for an adult reader would encourage greater usage.

Hypothesis XII. There will be no increase in the use of the library area.

Figure 5.19 reveals the relationship between the mean usage of the library area before and after the intervention. The median regression line was constructed using the first eight data points and extended into the second phase. All eight points were above the extended line. Using the Binomial Table, Hypothesis XI can be rejected at the .004 significance level. Thus, one can conclude that children were attracted to the newly positioned and equipped area.

The manipulative area was moved out of a traffic path to a quiet room, enclosed by shelves, and equipped with additional construction toys. In addition the display of materials was reorganized by the use of open bins on low shelves.

Hypothesis XIII. There will be no increase in the use of the manipulative area.

Figure 5.20 shows the relationship between mean usage of the area over all sixteen days. All eight post-intervention points fall above the Phase I regression line. The null hypothesis of no increase can be rejected at the .004 significance level. Thus, one may assume that the manipulative area absorbed more children.

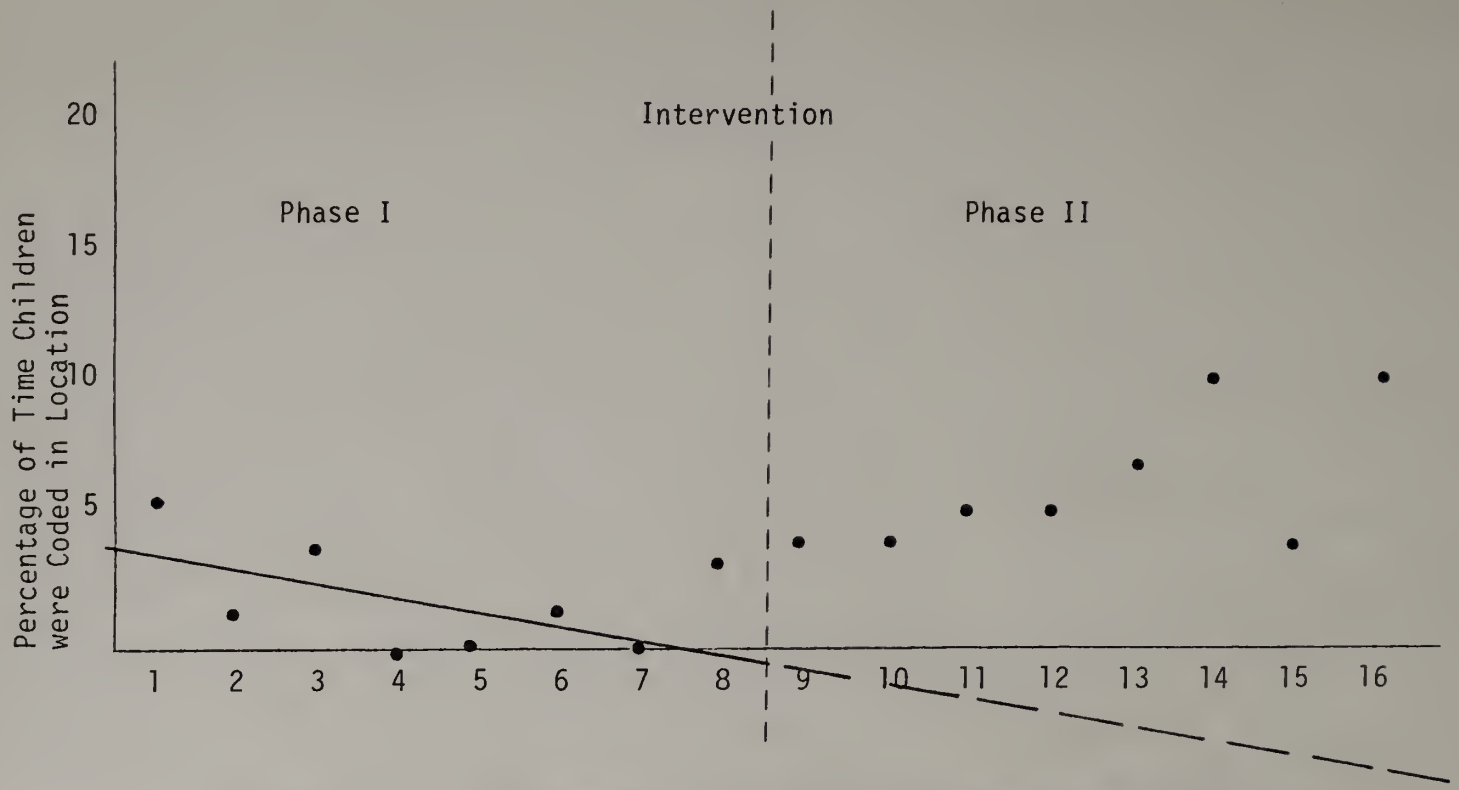


Figure 5.19. Graph showing the relationship between the use of the library area and time over 16 days.

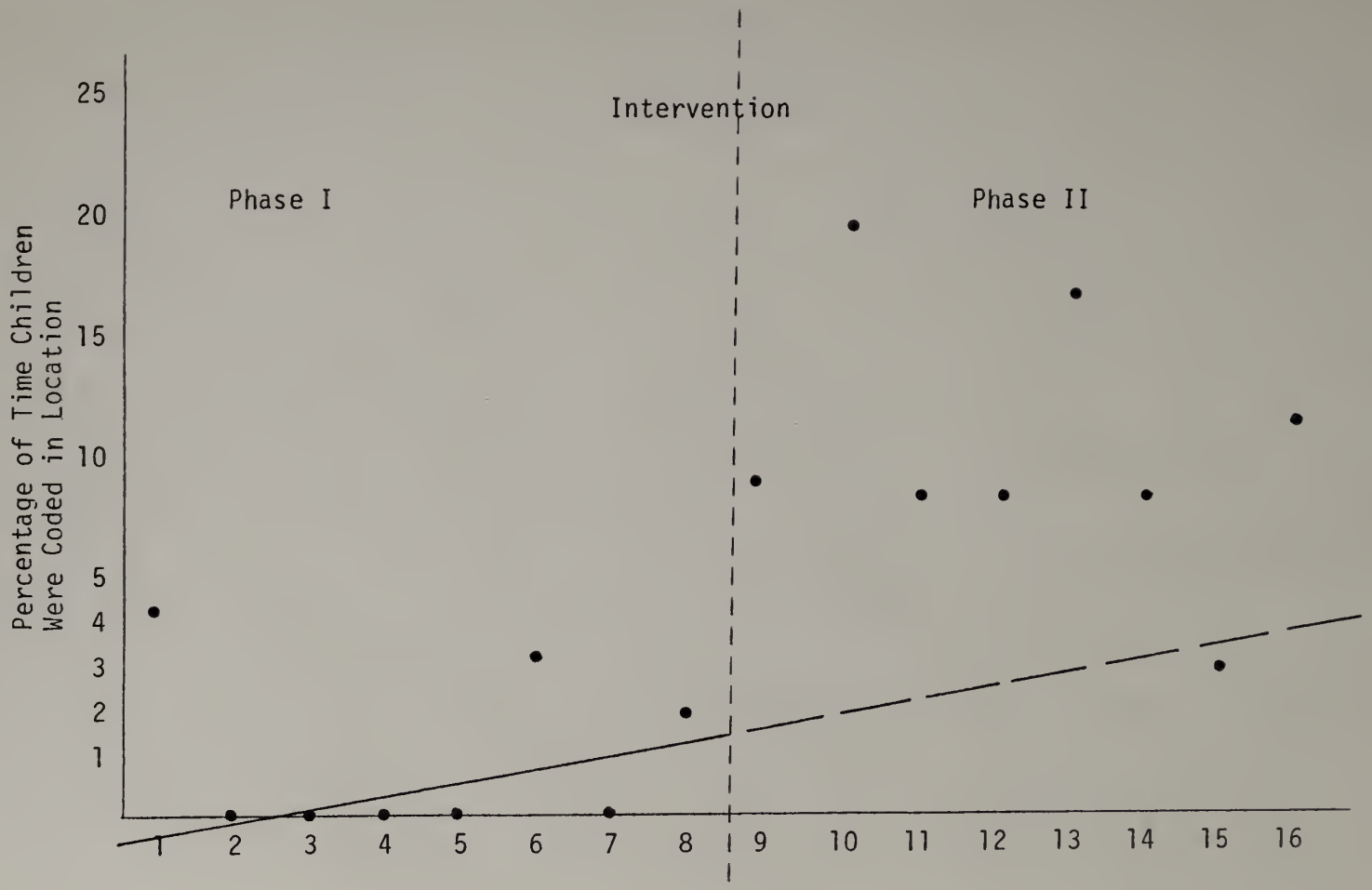


Figure 5.20. Graph showing the relationship between the usage of the manipulative area and time over 16 days.

The woodworking bench was moved to an enclosed area and equipped with nails, tools, and wood scraps.

Hypothesis XIV. There will be no increase in the usage of the woodworking area.

Figure 5.21 shows that the area was not used at all during Phase I but that children used it five out of eight times during Phase II. Thus, one can fail to accept the null hypothesis at the .012 level.

Several interventions were designed to increase the overall frequency of children's play behaviors and their focusing on activities. The schedule had been altered to allow more free play time. Various changes had been made in the boundaries of the housekeeping and block areas that reduced disruption by traffic. Constructive materials were added to the woodworking and manipulative areas. The author hypothesized that there would be an overall increase in all play behaviors throughout the center.

Hypothesis XV. There will be no increase in play behaviors.

Figure 5.22 displays the mean levels of play over the 16 days. Five of the latter eight data points fall above the pretreatment regression line. One falls on the line and two below. According to the Binomial Table, one fails to reject the null hypothesis of no increase in play behavior at the .112 probability level. However, the trend was definitely in the expected direction. Perhaps the failure to increase adult integrative and participatory behaviors which were expected to lead to higher levels of play and

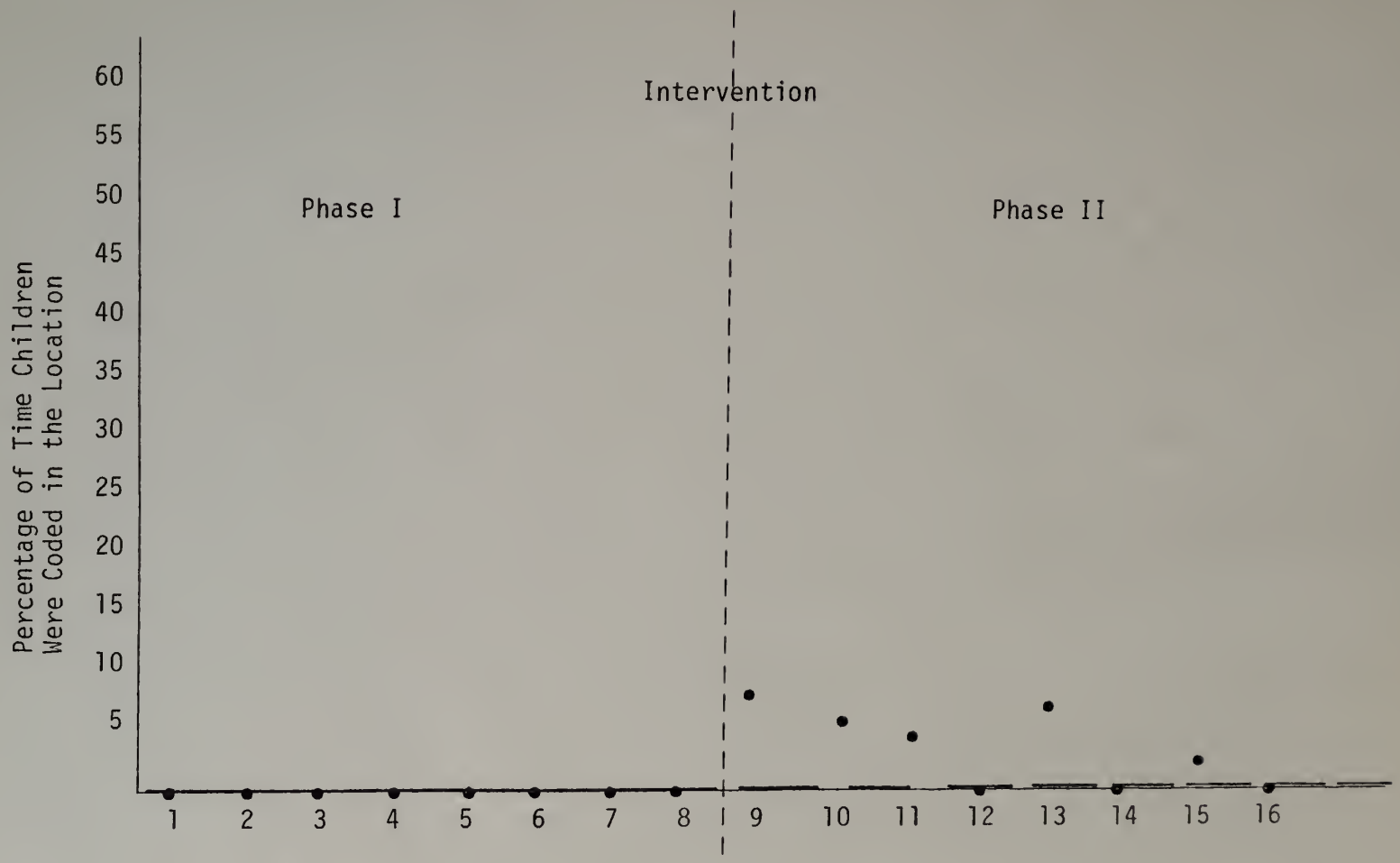


Figure 5.21. Graph showing the relation between the use of the woodworking area and time over 16 days

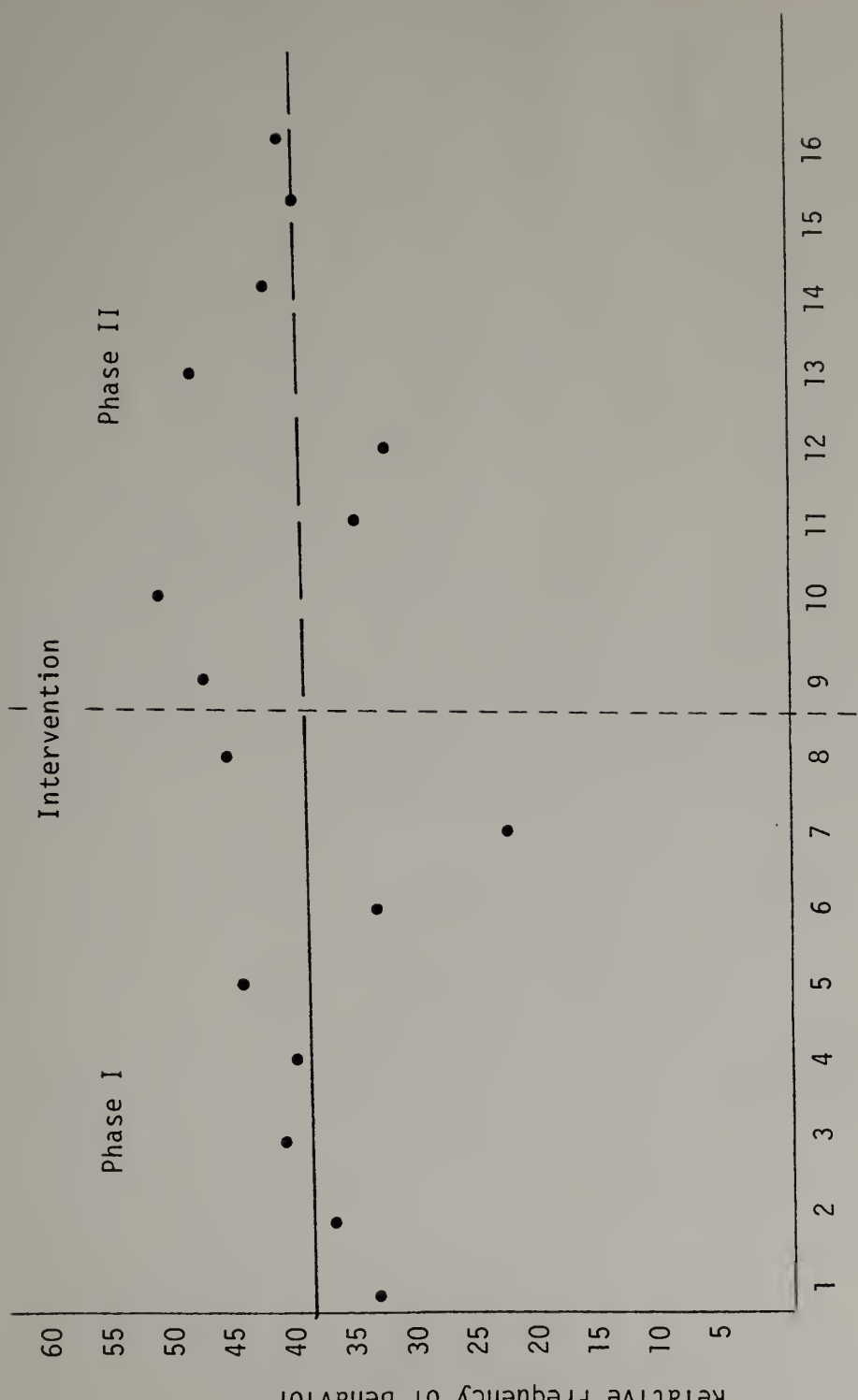


Figure 5.22. Graph showing the relationship between the mean percentage of all categories of play and time over 16 days

task involvement on the part of children contributed to the lack of a significant increase in play.

Because of the addition of construction toys in the manipulative area, the removal of disruptive traffic from the block area and lengthening of free play time, the author hypothesized an increase in the level of constructive play alone.

Hypothesis XVI. There will be no increase in the level of constructive play.

This hypothesis was rejected at the .004 alpha level as Figure 5.23 reveals that all the post-treatment means fall above the pretreatment regression line. Thus, perhaps the addition of the woodworking area and the provision of constructive materials and the removal of traffic from the manipulative area and the removal of traffic from the block area were enough to raise the level of constructive play but not to inflate all levels of play without adult intervention.

Another anticipated outcome of the intervention was an increase in the level of focuses on activity or task. The reduction of distractions, the increased free play period and changes in the availability and type of materials in the woodworking and manipulative areas all could draw the children into more focused activity. Even if the levels of play do not increase one might expect the children's level of concentration to increase.

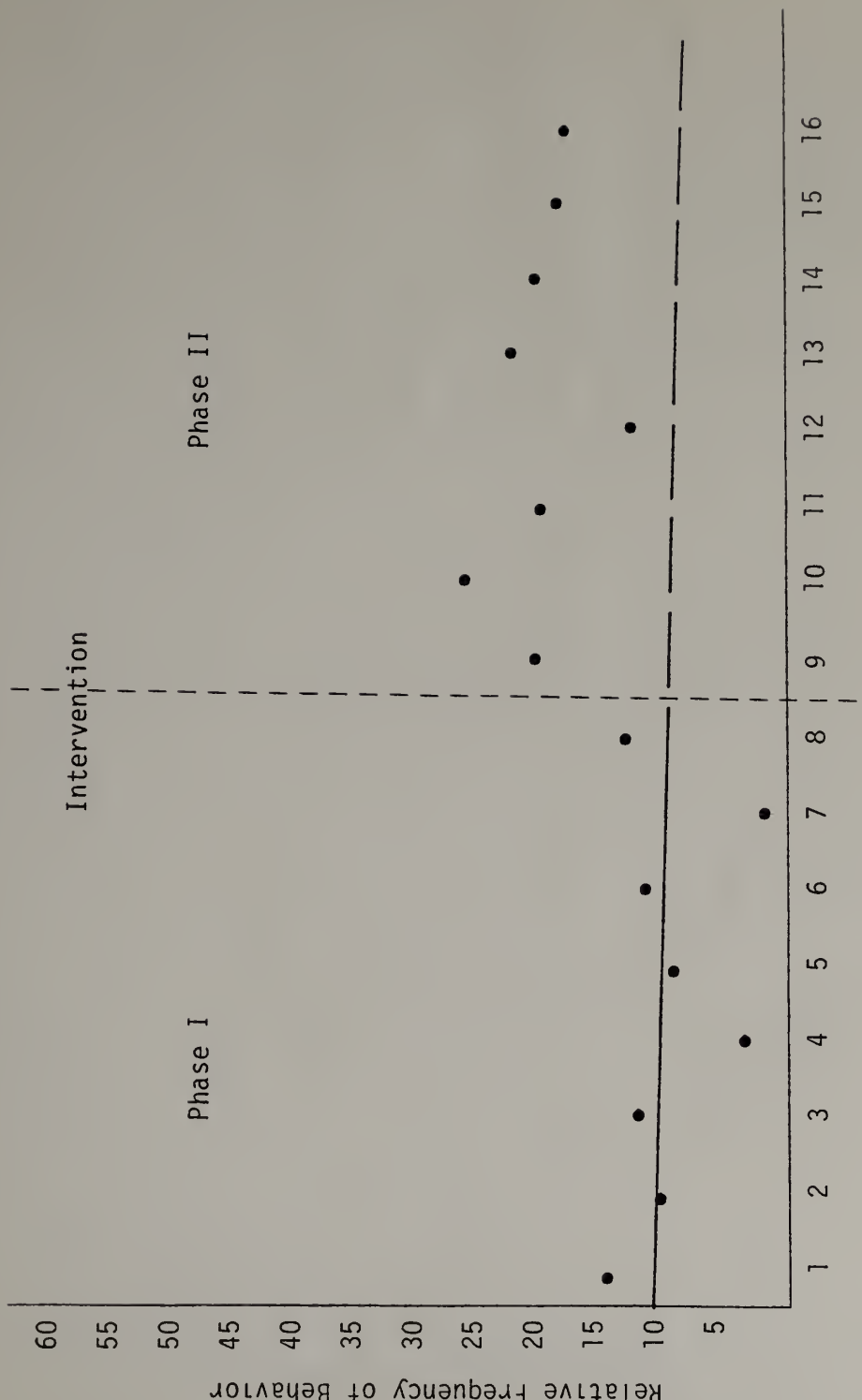


Figure 5.23. Graph showing the relationship between the mean percentage of constructive play and time over 16 days

Hypothesis XVII. There will be no increase in the mean level of children's focusing on activities or tasks.

As the eight post-treatment points fall above the pretreatment regression line (Figure 5.24) one may fail to reject the null hypothesis at the .004 alpha level. Perhaps all the environmental interventions combined have some relationship to the Phase II pattern of increased task involvement.

It was hoped that the change in schedule reducing the amount of time children spent in large teacher directed circle times would reduce the amount of waiting and unoccupied behaviors observed overall. These two behaviors, combined, formed the category of passive negative behavior.

Hypothesis XVIII. There will be no decrease in the mean occurrence of passive negative behavior.

This hypothesis was not rejected. Three of the post-treatment data points fell above the Phase I regression line (Figure 5.25), while three were above and one on the line. The null hypothesis of no decrease cannot be rejected. In an attempt to clarify the contribution of waiting behavior to this result, the author predicted that waiting may have been reduced by itself due to the schedule changes that increase free play time and reduced teacher-led group times.

Hypothesis XIX. The mean levels of waiting behavior will decrease.

This hypothesis was rejected (c.f., Figure 5.26) at the .004 level thus contributing to the idea that shorter teacher-led segments

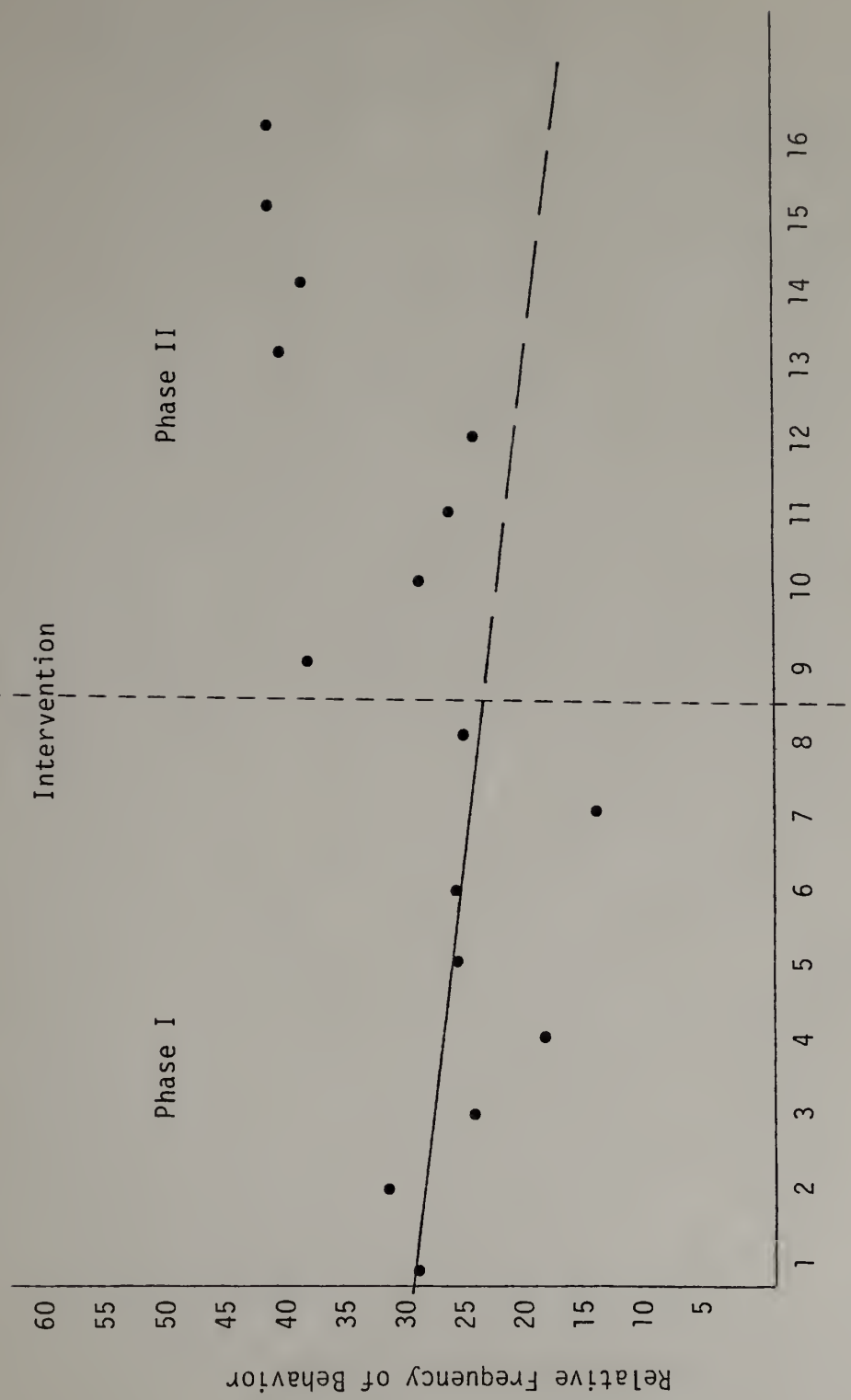


Figure 5.24. Graph showing the relationship between the mean percentage of the behavior focuses on activity or task and time over 16 days

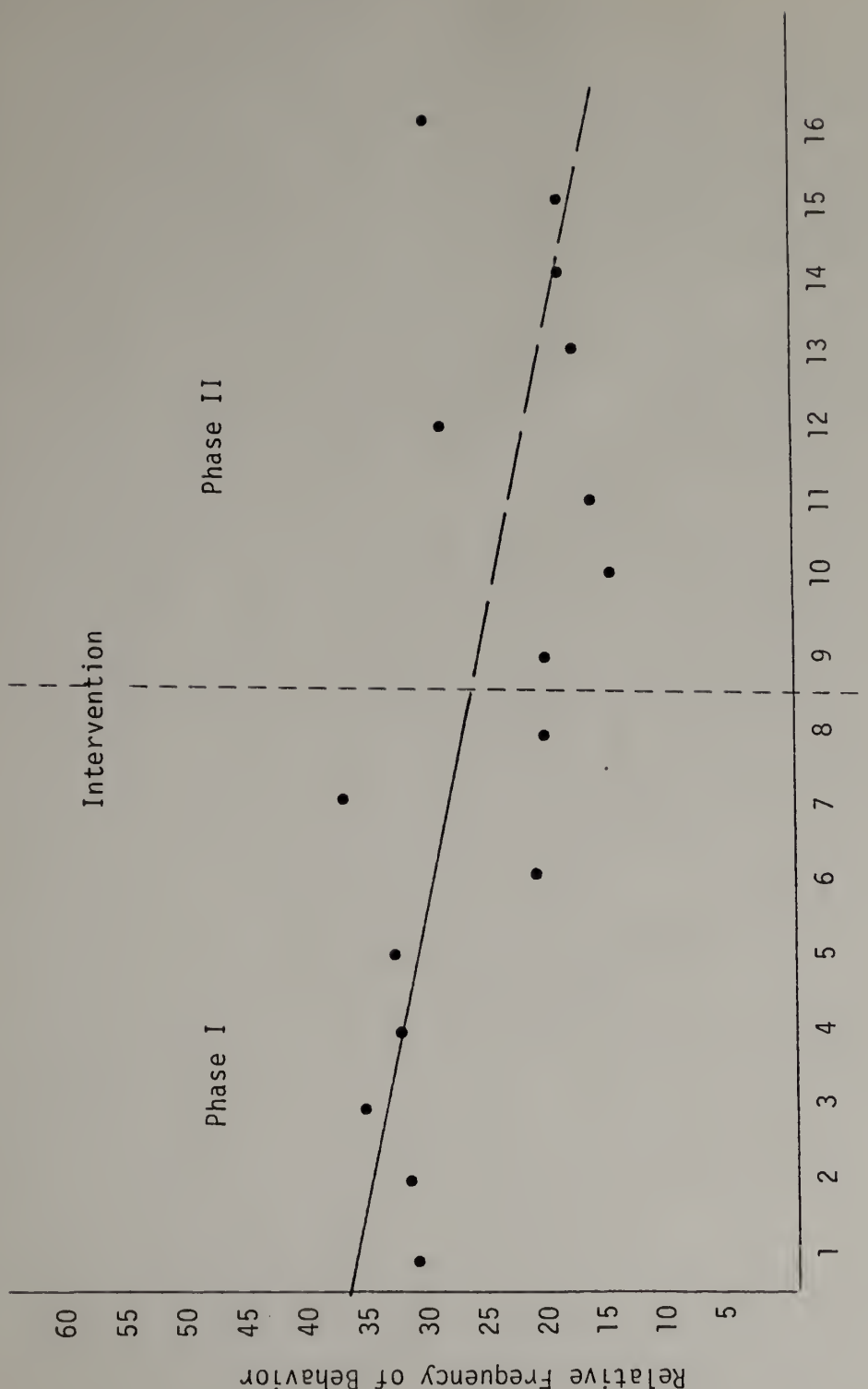


Figure 5.25. Graph showing the relationship between the mean percentage of passive negative behavior and time over 16 days

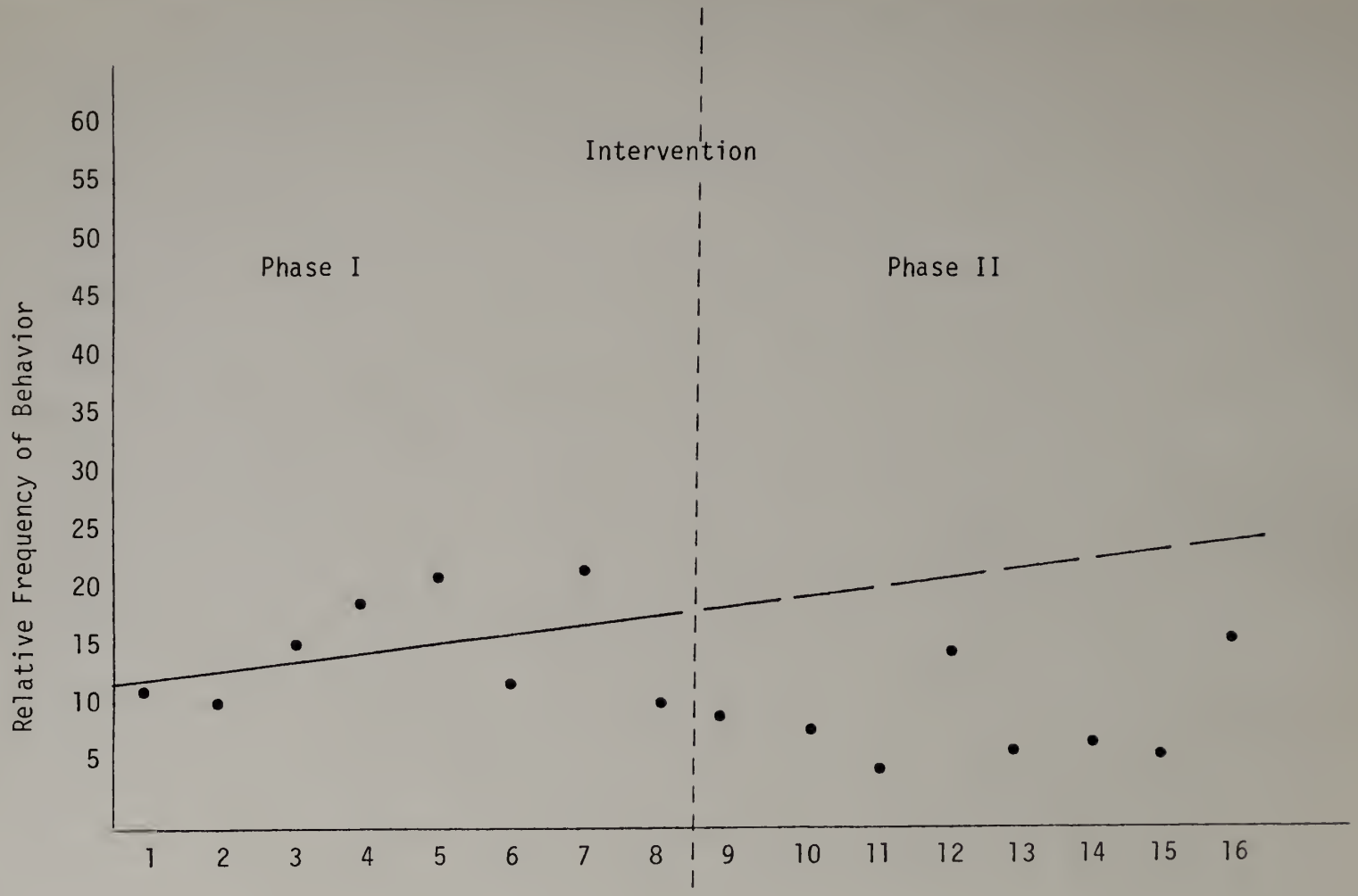


Figure 5.26. Graph showing the relationship between the mean percentage of the behavior waits and time over 16 days

may diminish the amount of time children spend waiting in the preschool.

The results of the intervention study may be interpreted as a confirmation of the influence of changes in the environment on children's behavior-environment interactions. Since the study surveyed the entire range of the preschool curriculum including outdoor play, lunch, circle time, and scheduled transitions, it may not have gathered sufficient data concerning the foci of the interventions. The environmental changes carried out were mainly applicable to free play, the period where activities were set out and children were free to make choices among the alternatives. The rest of the time children were constrained to participate in activity segments that were not characterized by the play behaviors. Although the children used the newly equipped areas more, the combined levels of play did not increase significantly. When one looked exclusively at constructive play it did increase significantly perhaps due to the specific nature of the interventions mentioned earlier. Children did increase their task involvement but did not decrease the amount of passive negative behavior they engaged in. This finding may be partially attributed to the failure of adults to become more participatory and thus stimulate and extend children's play.

The results of the third aspect of the Behavior-Environment-Interaction study indicate that relatively simple changes in the physical environment and the daily schedule can influence children's behavior in the appropriate directions. Changes in the adult role

could not be tested for effect due to the fact that they were not implemented. In order to secure adult participation in such a study one must adhere closely to the requirements of quasi-clinical inquiry in educational settings (Fisher & Berliner, 1977) to involve the participant teachers in all phases of the research.

The following chapter outlines the conclusions that may be drawn from the results presented and an analysis of the significance of the study for early childhood education.

CHAPTER VI

CONCLUSIONS, LIMITATIONS AND SIGNIFICANCE

The purposes of the study were three fold. The first component involved the instrumentation of Children's Behavior in Social Settings. Could an instrument be constructed to record behavioral and environmental variables in a reliable manner within naturally occurring preschool sites? If so could some degree of construct validity be established by comparing child environment interactions in two philosophically similar but environmentally different preschools? Hypotheses concerning predicted contrasts in children's behavior were constructed on the basis of child-environment relationships specified in the literature.

Once some degree of reliability and validity were established for the instrument, it could be used to test the applicability of Lewin's (1936) behavior-person-environment paradigm to the analysis and modification of children's behavior in one preschool. This was accomplished by carrying out an interrupted time series research design in which the behavior of a group of children before and after an environmental intervention was examined for evidence of differing child environment interactions. This chapter will discuss the significance limitations and conclusions to be considered in evaluating each aspect of the research.

Children's Behavior in Social Settings can be analyzed according to the criteria proposed by Herbert and Attridge (1975).

> Research findings can be no stronger than the weakest link in the methodological chain. Yet different links in this chain have received unequal attention. Quantitative procedures for analyzing data have developed greatly beyond procedures for analyzing the means by which the data were obtained. Techniques for testing the significance of findings have outstripped in sophistication techniques for testing the validity of the means of data collection. (p. 2)

The authors propose that observation systems can be evaluated according to three sets of criteria; those pertaining to identification, validity and practicality. Aspects of identifying criteria include the appropriateness of the title, clear designation of the purpose and use and the provision of an underlying theoretical framework.

Children's Behavior in Social Settings has a concise and relevant title. It identifies the focus, which is child behavior, and the context in which it is to be used, social settings. Although development of the instrument was carried out in preschools, it could be used in hospital settings, day camps or any program in which young children are brought together in groups. Since the methodology of the behavior map was based on work done in mental hospitals by Proshansky, Ittelson and Rivlin (1970), it would be appropriate for that setting also.

The purpose is to record young children's behavior simultaneously with their location in the environment, the size of the group and the behavior of the nearest adult. The instrument focuses -

on task involvement, cognitive and social levels of play, verbalizations, prosocial behavior and indices of autonomy. The instrument was based on the work of Parten (1933), Rubin (1977), Berk (1976), and Day, Perkins, and Weinthaler (1978, 1979) among others reviewed in Chapter III. It was developed because no adequate observation system could be found that reliably recorded significant child-environment interactions in a form that could be summarized with a minimum of secondary analysis. The instrument is particularly appropriate to the naturalistic evaluation of preschool programs by early childhood education practitioners (Day, Perkins & Weinthaler, 1979). It is not intended as a tool for evaluating individual children although data may be summarized for a particular child as a preliminary diagnostic device.

The instrument thus meets Herbert and Attridge's (1975) identifying criteria of: a representative title, clear statements of purpose, applications, contraindications and a theoretical framework.

The validity characteristics proposed by the same authors include three areas: the observability of the behaviors, the objectivity of the instrument and problems of inference and representativeness. The definitions and rules for coding behavior in Appendix A were developed over time and observers in order to clearly and unambiguously define the twenty-five items chosen to represent the major categories. Every effort was made to be sure the categories were exhaustive and that items were mutually exclusive within certain categories. However, two behaviors in one category may be coded within the same 30 second interval if appropriate.

For example, a child may verbalize to another child and to an adult within the same observation. On the other hand, one can only code one aspect of adult behavior. Ground rules are clearly delineated in the Rules for Coding Behavior.

The degree of observer inference required was carefully considered during the instrument development phase. Very little inference was required to ascertain whether a child talked to another child or an adult. However, the prosocial categories needed more attention to the problem of observer interpretation as did the levels of play. Since the observation period lasted 30 seconds, it was long enough for two items to be observed consecutively and short enough so that some aspects of cooperative or dramatic play may need to be inferred. Thus rules were constructed that specified the coding of these play categories.

Children's Behavior in Social Settings for the most part avoided affective variables, e.g., those that often require higher degrees of observer interpretation. Items in the affective category of prosocial behavior were carefully constructed to reflect observable actions. However, the prosocial category of offering help comfort or affection requires the highest degree of inference on the part of the observer. Thus, early childhood education practitioners were designated as primary observers because they would be knowledgeable of the developmental level of the observed children and such knowledge would form the best basis for inferring the occurrence of such prosocial acts.

The nature of the inferences that can be drawn from the data generated by the use of the instrument are context specific because the purpose of Children's Behavior in Social Settings is to record child-environment interactions as a means of individual program analysis and evaluation. Data is gathered for the purpose of focusing attention on the existing behavior patterns of a particular group of children within the parameters of a unique program. At this time the results of such analysis are not intended for inference to a larger universe of children and programs. Practitioners are expected to draw inferences specific to the particular children and the environment in which they are observed. Normative reference points are not provided for any aspects of the scale. Comparisons among programs are appropriate but again these should not be seen as absolute as there are no representative ranges provided for child-environment interactions.

Median statistics are recommended for the analysis of intervention efforts because of the simplicity of computation and interpretation and its applicability to sets of data with extreme values. However, for research purposes a time series analysis such as the one by Swaminathan and Algina (1977) is recommended if the research design includes 70 or more data points. In addition, data summary procedures are provided for practitioners which are amenable to intuitive analysis by the user.

Interrater reliability was chosen as the index of reliability because the basic purpose of the instrument was for use in quasi-clinical research (Fisher & Berliner, 1977) or for use by an interactive

evaluator (Bryk & Weisberg, 1977). Evaluation of this sort demands close communication and agreement among program and research staffs concerning all aspects of the research. It is crucial that there be agreement about the observation of behavioral items. Thus using a simple interrater percentage of agreement formula was deemed practical and appropriate.

The validity of the instrument rests on the work of previous authors and the results of the comparison study. Rubin's (1977) report on the high correlation between the levels of cognitive play and measures of spatial and conceptual relations contribute to the criterion related validity of the play items. Parten's (1933) work on observed levels of social play has been accepted and refined by other authors (Rubin, 1976; Rubin & Seibel, 1977). The notion of construct validity was explored in the comparison study of the two preschools. Hypotheses of difference in children's behavior derived from the literature were explored as tests of the validity of the constructs underlying the scale. Finally, both sets of teachers and observers accepted the face validity of the instrument in that it was accepted as being a measure of the five categories it was designed to measure.

The last set of criteria proposed by Herbert and Attridge (1975) are those of practicality. Although a complete user manual has not been assembled, most of the relevant aspects are described in this paper. Codes are simple and the categories are easily learned by early childhood practitioners. In comparing Weinstein's (1975) classroom behavior-environment observation system with

Children's Behavior in Social Settings, the latter was judged to be much less complex and easier to learn. In addition, it included data summary procedures for practitioners not given by Weinstein. The instrument was perhaps strongest in this aspect of user practicality. It was designed for practitioners as well as researchers. However, since the primary purpose of the instrument was to provide data on situation-specific behavior-environment interactions it was tailored to meet the needs of early childhood educators.

The instrument, Children's Behavior in Social Settings, has been evaluated according to criteria for observation systems and manuals presented by Herbert and Attridge (1975). Although aspects of validity, instructions for use and data analysis are not complete at this time, the instrument meets many of the standards for identifying the scope and purpose of observation systems, assuring a low level of observer inference by means of clear definitions and rules, presenting an appropriate index of reliability and attending to practical issues concerning the simplicity of the data analysis and summary procedures. An observation system for the recording of child environment interactions has been developed that may be of use to early childhood practitioners and others responsible for programs involving young children in social settings.

The author does suggest several changes in the scale. The first modification reduces the number of categories without losing any information. Instead of nesting the cognitive levels of play within the levels of social interaction each would be listed separately. One could still ascertain indices of solitary functional

play but each aspect of the category would be coded separately. This would obviate a common interrater agreement problem occurred often. For example, one observer would code solitary functional and another parallel functional. No credit accrued to the rater's agreement on the cognitive aspect of play. As displayed in Table 6.1, separating these aspects of play reduces the number of categories from 14 to 8 or 9 thus simplifying the instrument and, it is anticipated, improving the interrater reliability coefficients obtained.

The second change involves expanding the adult roles coded. During the observation and coding periods carried out by the author, various aspects of adult behavior appeared to be related to children's behavior. In addition the work of Prescott (1975), which was not located by the author earlier, clearly suggests a relationship between three of the added items of adult behavior and the behavior of children. For example, the current instrument requires one to code restricts child behavior and leads or directs behavior as the same item. Table 6.2 displays the categories of adult role used in the study and the proposed items. The addition of five categories may decrease the reliability of the adult behavior category obtained in this study (98.4%) but the ten categories may yield more informative profiles of adult behavior.

The proposed new instrument would include the assignment of a code number to the various adults in the program rather than the current practice of not distinguishing among adults. In this manner one could prepare profiles of different staff members in addition to

Table 6.1

Proposed Changes in Social and Cognitive Levels of Play Category for Children's Behavior in Social Settings

Items Used in This Study		Proposed Items
Solitary	functional constructive O/X dramatic	Solitary Parallel Cooperative or group
Parallel	functional constructive O/X dramatic	Functional Constructive* Dramatic Game with rules
Cooperative or group	functional constructive O/X sociodramatic game with rules rough & tumble	Rough and tumble

*The use of open or closed constructive play would be open to the choice of the use. If she or he felt the inclusion of that distinction warranted the addition of this distinction, then it could be included.

Table 6.2

Proposed Changes in Categories of the Adult Role for Children's Behavior in Social Settings

Items Used in This Study	Proposed Items
1. uninvolved, attention elsewhere	1. uninvolved in learning area, attention directed elsewhere
2. watches/helps	2. talks to another adult
3. particpates	3. watches/helps (briefly)
4. mediates	4. praises/shows appreciation
5. leads/directs	5. participates, converses with children
	6. opens up activity, suggests further exploration by child
	7. shows affection, comforts
	8. mediates, redirects child behavior
	9. restricts child behavior (without direction)
	10. leads group, directs activity

the composite adult profiles presented in this study. In the case of a proposed computer analysis, the new instrument would include the assignment of numbers to learning areas and children, in advance, so that the conversion of abbreviations and names to numbers after the data were collected would not be so tedious. The name of the instrument would be changed to avoid confusion and to perhaps more clearly identify the instrument's intended use. Children's Behavior in Preschool Settings would be designated primarily for use in early childhood classrooms. In addition users would be advised to collect data mainly during indoor planned activity and free choice periods to maximize the amount of data collected in each location observed. A maximum of 15 or 16 activity locations is advised. Table 6.3 gives a suggested list for early childhood settings.

It is important to note that no work has been carried out using the proposed scale. And thus reliability data presented here is irrelevant.

This portion of Chapter VI has examined the scale created, Children's Behavior in Social Settings, according to criteria for observation systems set forth by Herbert and Attridge (1975). For the most part the instrument appears to meet their standards for identifying purpose, rationale, and intended use. Criteria for for specifying reliability and degree of inference are included as their guidelines for practicality. Although more work is needed to ascertain content, construct and criterion-related validities, some evidence of these notions was presented. The coming discussion

Table 6.3

Proposed List of Activity Locations for Children's Behavior in Preschool Settings

1. blocks
2. role play/housekeeping
3. art
4. water or sand table
5. manipulatives
6. library
7. woodworking
8. table games
9. playdough/clay
10. circle time
11. program transition
12. individual child transition
13. clothing
14. outside
15. other

of the comparison study of the two preschools lends support stresses the validity of the instrument's main purpose, the recording of behavior-environment interactions. Finally, some suggestions and rationales for revising the instrument were presented. The rest of this chapter focuses on the two studies which were carried out using Children's Behavior in Social Settings.

Distinguishing Behavior Environment Interactions in Two Preschools: Establishing Construct Validity

In reviewing the research summarized in Chapter III, it became clear that systematic observation of children at play in the educational setting was crucial to an analysis of the environment. Examining where the most social interaction including aggression, took place could be done at the same time as recording what level of cognitive activity occurred during the scheduled activity periods. How much of the time did children wait during circle time or for adults to pass out materials in a formal teacher led segment? If an observation system were developed teachers and administrators might learn to look for restrictions on child behavior that are imposed by the arrangement of the space, materials, the structure of activities and the daily schedule.

As a first step the author attempted to compare two preschools that varied in terms of schedule, adult behavior, materials and aspects of physical space. If the author could predict behavioral differences based on an analysis of the environmental variables in each center then perhaps, teachers and administrators would be

encouraged to examine the relationships between environment and behavior in the preschool. In terms of the purpose of this study such research would establish some validity for the constructs underlying the instrument, Children's Behavior in Social Settings.

As the results of the comparison study confirmed seven out of eight hypotheses one may conclude that the observation instrument was capable of distinguishing between two architecturally and philosophically similar preschool programs that varied in terms of adult behavior, scheduling, materials and arrangement of equipment.

But is it important to distinguish among such programs in a systematic manner? If the daily quality of life of children in schools (Gump, 1978) is of concern to educators then it is important to be able to measure that in some way. Many early childhood educators tend to espouse an open education philosophy; that is, one in which children are allowed to choose among activity centers rather than having to follow a programmed series of teacher-directed curriculum modules. Both schools advocated an emphasis on an individual growth, attention to social emotional adjustment, and encouragement of intellectual development. As educators tend to discuss programming in terms of philosophical points of view, one of the contributions of this study is that the implementation of similar educational goals may vary. And even more important—the behavior of the children enrolled in those programs may differ significantly. Thus, two groups of parents purchasing similar open education programs for their children might be surprised at the differences in children's behavior in the two centers.

In terms of the role of early childhood educators to promote quality child care, this distinction between stated philosophy and the day-to-day behavior of the children is crucial. One may then work with teachers around specific behaviors observed in all areas. The delineation of the independent variables of group size, teacher role and aspects of the physical environment serves as a definition of environment in an analysis of child-environment interactions. If behavior is seen as a function of the child's interaction with the environment (Lewin, 1931, 1951) then teachers can be encouraged to focus on child behavior as a criterion variable in the preschool not a "given." Teacher statements concerning educational programs can be contrasted with the children's observed use of the activity settings provided.

Another contribution of the comparison study was the confirmation of several hypothetical differences in behavior that were derived from the literature. Thus, the provision of workspace, the display and availability of quality construction toys and the involvement of adults were predicted to be related to children's focusing behavior. Although a distinct cause and effect relationship is not to be inferred, a difference in focusing behavior was confirmed by the analysis. A theoretical relationship between adult-led group times and children's passive negative behavior formed the basis for the predicted relationship between center and passive negative behavior. This was confirmed lending some weight to the work of Kounin and Gump (1974) on signal system theory, and Doke and Risley (1972) on formal vs. informal activities.

As stated in the conceptual framework specific relationships could not be tested as naturalistic research does not involve the isolation of variables, rather it seeks to explore relationships as they exist in natural settings. More detailed analysis of differences in individual learning areas would offer more vivid insight concerning the interrelationships of environmental variables and subsequent children's behavior. Such an analysis was not carried out in this study due to one of the major limitations in the design of this study. The sampling procedure involved an observation schedule which spanned three and a half hours of the morning program. Thus, there were a large number of locations sampled but not enough data was gathered for the most important free play areas to allow for a valid analysis of behavior by location by center. Thus, it is recommended that a future study of this sort be limited to the core morning program of a preschool and to fifteen or so locations. In this manner one would observe for a shorter portion of the day for more days, gathering more data on behavior patterns within the primary curriculum locations.

Other significant aspects of the comparison study include the summary statistics displayed by the bar graphs. The differences confirmed by the chi-square tests for significance are readily apparent in the percentages calculated and drawn to scale. Thus, the statistical significance obtained shares the face validity of a graphic display of differences.

The indices of quality that were calculated summarize concisely some of the major differences apparent in the data. The task

involvement ratio of the number of focuses on activity divided by the incidence of unoccupied behavior gives widely descrepant values of 1.6 and 3.1. Similarly, the adult domination/integration index descriminates between the two centers with values of 1.4 versus .33. The major limitation to such intuitively appealing statistics is the lack of any reference point from which to judge both values. Even though one value may be three times the other we do not know if these are on a scale of 0 to 5 or 0 to 20. In the latter case the difference between the two centers is greatly reduced.

A similar limitation runs thorughout the comparison study. For instance the two centers appear to differ in the overall amount of play engaged in by the children but one cannot ascertain if both centers are at the high or low end of a normative range. Perhaps one is at the high end of a distribution of play behaviors found in preschools and the other is at a low end. If this could be determined then the statistically significant difference obtained in this study would take on additional meaning. As it is, one may only speculate on the relative position of both centers. Thus, the absence of a scale or normative reference point inhibits the broader interpretation of the results of the comparison study. One can only make judgements concerning the relative merits of each school without knowing the scale upon which the measurements depend.

However, the significance of the comparison study lies in the methodolody presented for contrasting the quality of life of

children in two preschool environments. In addition the variables are measured in such a way that one can analyze child-environment interactions from the summary Behavior Maps. An observation sytem has been presented which early childhood practitioners can utilize to study the usage of the educational program by the children. Goals of intellectual development or cooperation can be assessed by observing the average level of such behaviors in various activity settings. Since the instrument has been shown to be capable of discriminating between two architecturally and philosophically similar schools, one may have some confidence in the validity of using it to record child-environment interactions.

The Environmental Intervention Study

The application of Lewin's (1931) paradigm to the analysis of early childhood education programs involved the Phase I measurement of children's behavior, the implementation of an environmental intervention and the Phase II measurement of behavior. In this way the study replicated Lewin's prescription for the study of field forces (Lewin, 1931). Since environmental forces could be defined by their effect on behavior Lewin advocated studying children's behavior before and after an environmental manipulation.

Could these ideas be applied to early childhood educational settings? Using the model of an interactive evaluator (Bryk & Weisberg, 1977) the author sought to carry out such a study in one preschool. The freeplay format, when children can choose their own activities is the most amenable to the study of environmental field

forces. A limitation of the current study involved data-collection covvering the full three-and-a-half hour morning program which contained many locations and activities in which children were not free to choose among the indoor areas to be manipulated. Thus, behavior profiles for the target locations contained few data points. In addition there were different children in attendance on different days. When the data was collapsed to provide behavior profiles by day there remained only eight data points before and eight after the intervention, too few to allow for a time series analysis (Swaminathan & Algina, 1977; Glass, Willson & Gottman, 1974). Thus, given these limitations of the data, overall hypotheses of changes in behavior were constructed. Median regression analysis was discovered to be a particularly appropriate analysis procedure for data sets with extreme values. The median regression line ignores extreme values by bi-secting the distribution so that half the points fall above and half below a regression or celeration line (White, 1972) which is constructed to minimize the absolute deviations of all the points from the line. This line can be calculated by hand and significance determined by reference to the Binomial Table (Hays & Winkler, 1970).

The procedure is explicit and readily adaptable to naturalistic studies. The implications of median regression analysis for local practitioners are impressive. Early childhood educators can carry out experimental manipulations using the observation system described in this study and analyze the data themselves. A major aspect of median statistics in the eyes of its originator

O. R. White (1972) is its applicability to applied behavior analysis studies. This study takes it a step further to applied research in early childhood settings.

An important conclusion to be drawn from this study involves the special attention to detail that is required in quasi-clinical inquiry (Fisher & Berliner, 1977). Staff must be fully aware and help set the goals for the study as well as design and participate in data collection procedures. Then their participation in an analysis of the data, subsequent design of an intervention and final implementation of it are more likely to be fully carried out. This study suffered from a lack of involvement of the staff in all aspects of the research.

Although methodological and procedural problems flawed this study the intervention design is essentially a sound one for the analysis of child environment interaction. Lewin's prescription to record behavior, alter the environment, and study behavior again is particularly applicable to early childhood settings.

Future research could employ a similar interrupted time series design but the focus would be on a series of interventions. One variable at a time could be isolated and manipulated. Although a reversal of conditions is not advocated, it could be employed if the cooperating teachers would agree. It would be important to schedule sufficient time points so that a time series analysis could be used (Glass, Wilson, & Gottman, 1974; Swaminathan & Algina, 1977). Although median statistics are valuable tools for analyzing a short series of data points, a larger number of observations would allow

for a more accurate evaluation of pre- and post-change data. In a series of interventions the post-change data set from one intervention would become the pre-change data for the following one.

The intervention study described in this paper represents a pilot study of the application of Lewin's behavior-person-environment paradigm to preschool education. Although, it was only partially successful, the research presents a methodlogical and conceptual framework for future work in this area.

Significance and Limitations of the Instrument

Children's Behavior in Social Settings is a practical and reliable instrument for the assessment of child-environment interactions in the preschool. It allows early childhood practitioners to assess the degree to which children are actually utilizing the environment prepared for them. The data summary procedures employ a Behavior Map (Proshansky, Ittleson & Rivlin, 1970) in which profiles of children's behavior, adult behavior and group size are tallied according to various classroom locations and activity segments. Analysis of such a Map provides for the comparison of selected behaviors over different locations.

Figure 6.1 displays a histogram of the proportion of observations in which children were coded as focused on activity or task in each activity segment collapsed over all sixteen days of data collection at Center A.

One can easily pick out the high values of blocks, manipulatives, play dough, art, woodworking, and water play (all above 50%). However,

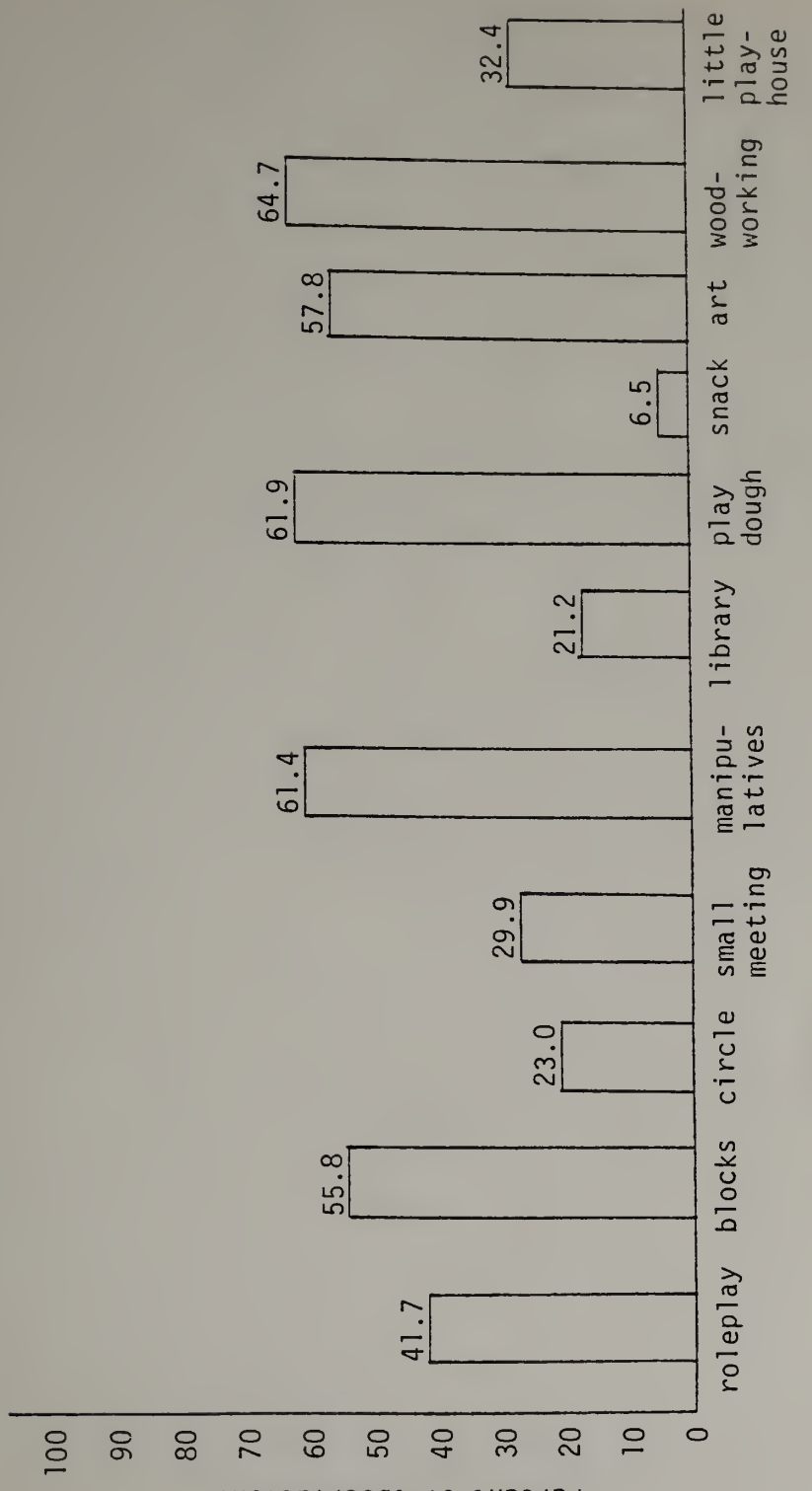


Figure 6.1. Percent of observations in each learning segment that children are coded as Focuses on task, activity indoors and outdoors.

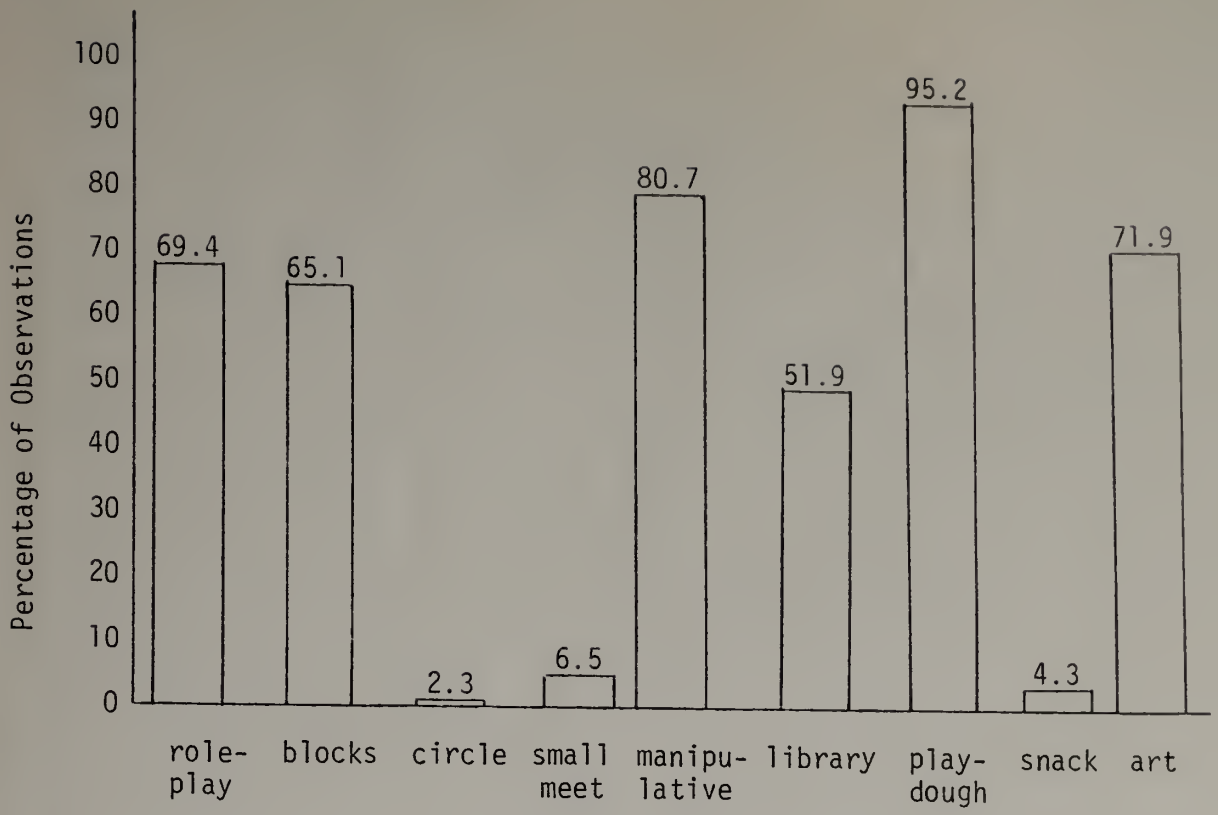
Figure 6.1. (continued)

it would be important to look at the levels of cognitive play associated with each area as a further step in the analysis. Figure 6.2 displays the proportion of observations for each area in which children are coded in any level of play. Role play, blocks, manipulatives, play dough, art, woodworking, and water play and all the outdoor areas achieve higher than the fifty-fifth percentile.

At this point teachers would need to look at the relative freqeuncy of the time children spend in these areas (Figure 5.6). Such statistics provide a basis for the assessment of the educational goals designated for each learning area. Teachers can ascertain to what degree children are engaged in the desired behaviors in each location. The extent to which the schedule constrains children to remain seated and attentive or the scarcity of the materials provided in an area represent ecological concerns that may arise as teachers search for causes of unwanted behavior in dysfunctional aspects in the environment.

If practitioners carry out the data collection, even in part, then environmental variables such as disruptive paths, inappropriate materials, uninvolved adults or undefined boundaries will become more salient as the teachers themselves observe children's behavior in such contexts.

A further examination of the Behavior Map might include a survey of some negative aspects of children's behavior. Figure 6.3 displays the percent of observations in each learning area in which children were coded in passive negative behavior for all sixteen days



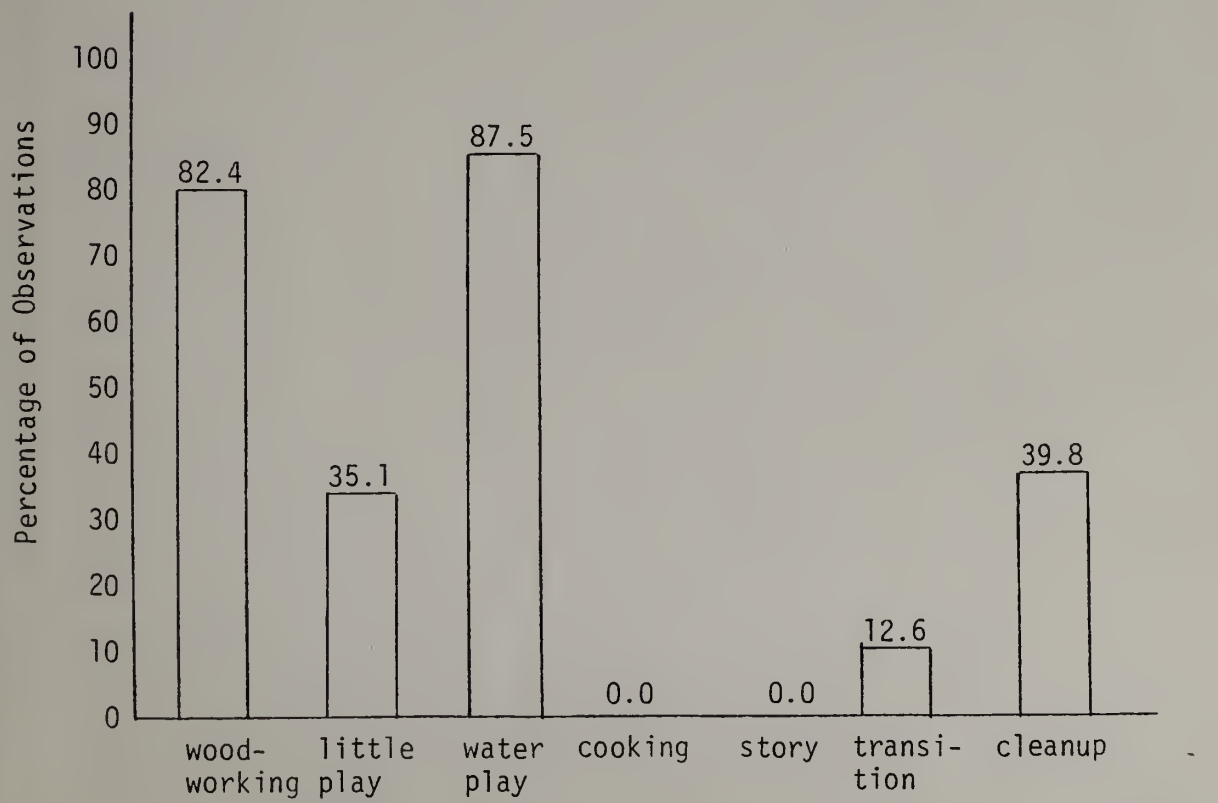


Figure 6.2. Percent of observations in each learning segment in which children are engaged in any level of cognitive play indoors Center A

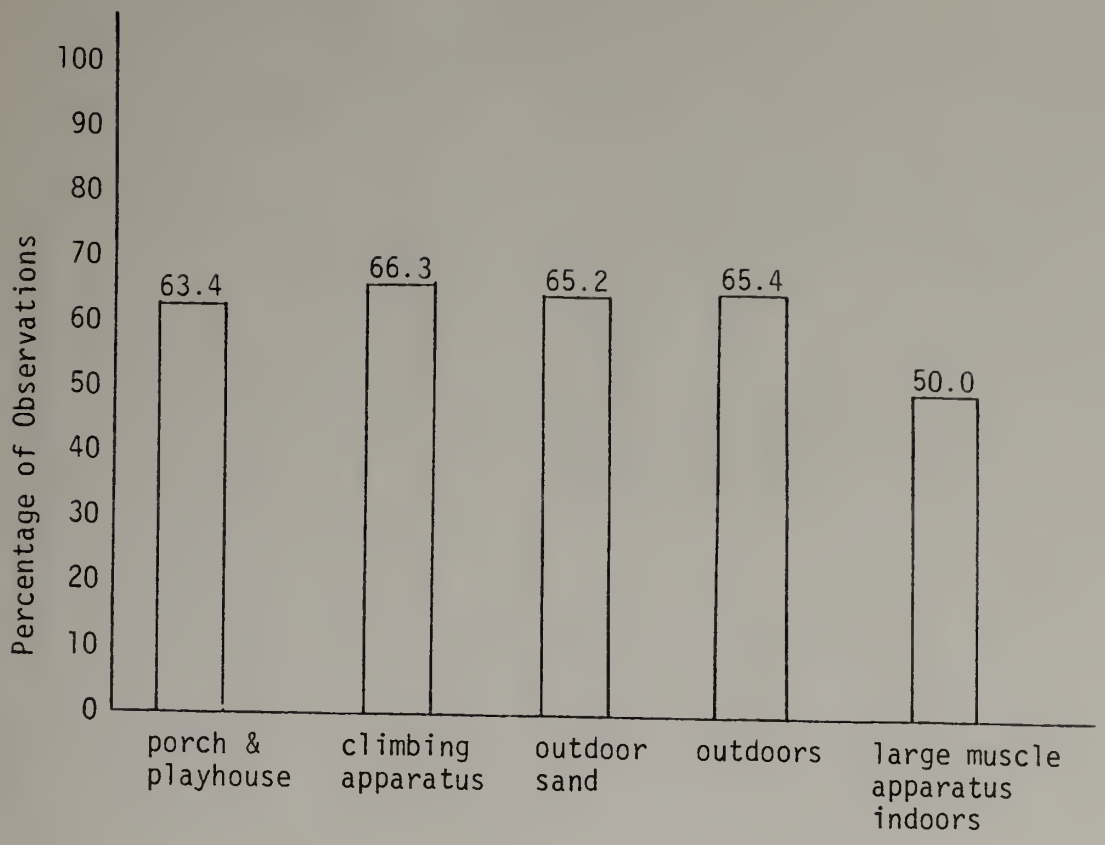


Figure 6.3. Percentage of observations in each learning segment in which children are engaged in any level of cognitive play. Center A (outdoors).

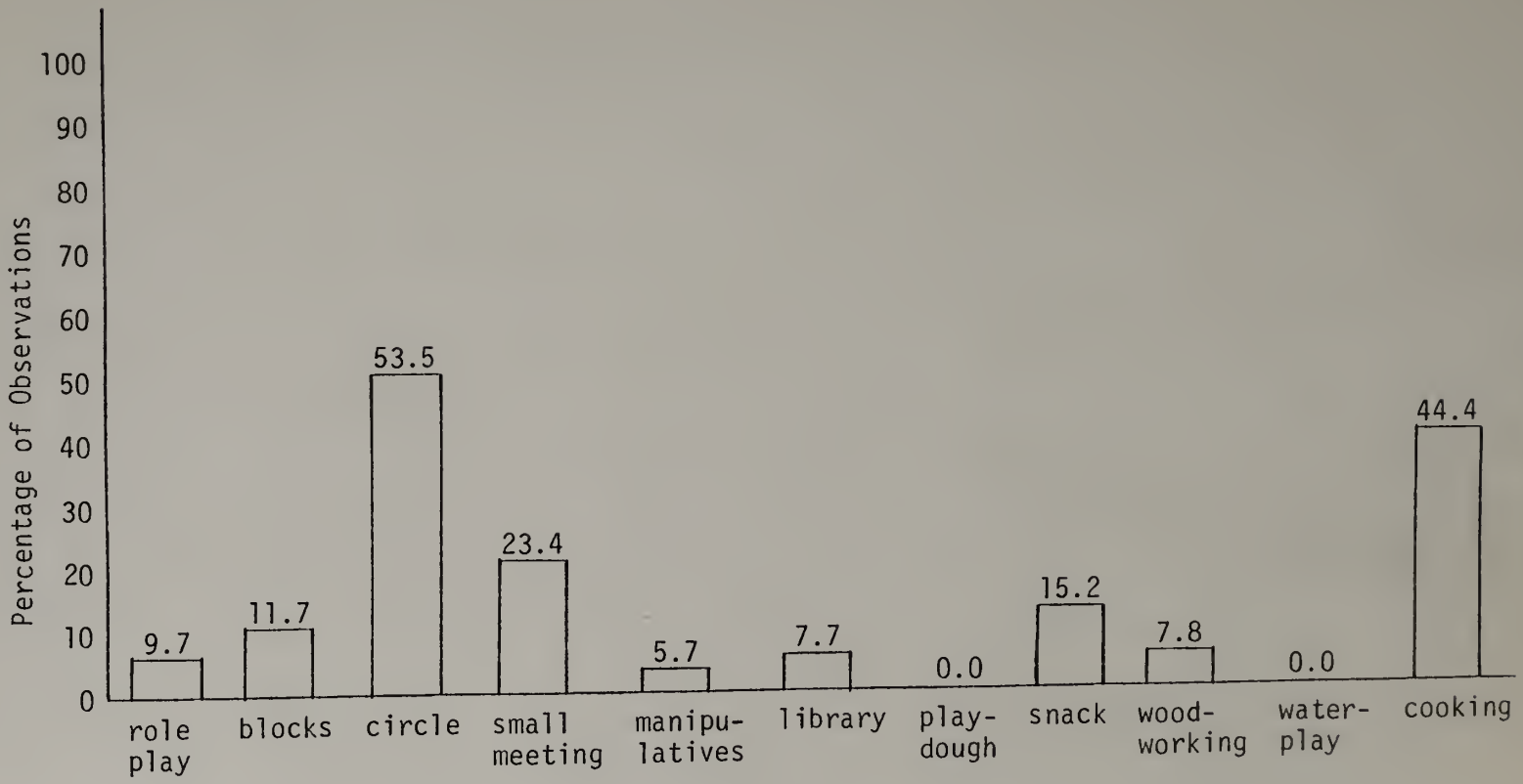


Figure 64. Percent of observations in each learning segment in which children are coded passive negative indoors (either they are coded as unoccupied or waits or both) and outdoors.

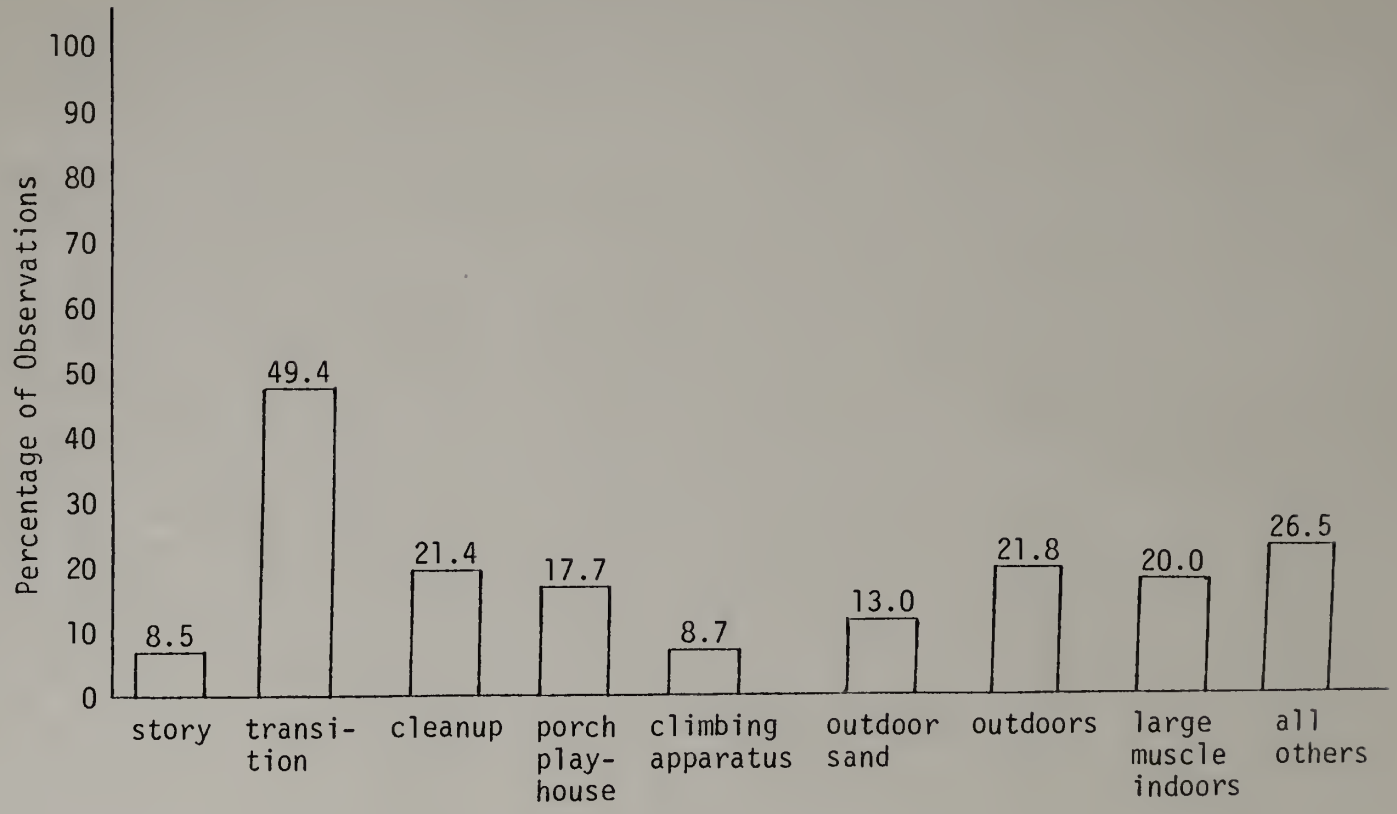


Figure 6.4. (continued)

at Center A. As can be seen circle time has the highest proportion (53.5%) with transitions (49.4%) and cooking (44.4%) following. It would be especially important for the face validity of this data, for the teachers themselves to have coded the children during these activities. The figures may seem to be abstractions especially when they denote unproductive behavior but the fact of coding unoccupied, waits or both more than fifty percent of the time during adult-led circle time highlights the reality of the experience for the children.

Another aspect of the data summary procedures for Children's Behavior in Social Settings include the indices of quality presented in Chapter V. These statistics are designed specifically for use by practitioners. The adult domination/integration index can be interpreted on its own without reference to other programs or to a distribution of values. It seems clear from the research cited (Anderson, 1943; Huston-Stein, 1977; Reichenberg-Hackett, 1962; Thompson, 1944) that integrative participatory adult behavior is associated more with productive child behaviors than is dominative, directing behavior. Thus, a value above one is less to be desired than are values between one and zero. The prosocial index displays the proportion of prosocial to antisocial behavior and thus values greater than one are to be desired. The other indices of autonomy, task involvement, and passivity may need to be compared with the ones provided in this study or with values derived from comparison schools. However, the indices are presented as easily computed descriptive statistics that are concise in their ability to summarize salient aspects of the data.

If, as Paul Gump (1978) has argued, it is important to assess the quality of life of children in schools then it is necessary to develop instruments that can do so in practical and valid ways. Children's Behavior in Social Settings not only provides qualitative behavioral data by location but it also measures adult roles by location. It achieves greater power and validity where teachers, themselves, participate in the observation of children and the analysis of the data. Thus, the development of a methodology for the evaluation of child-environment interactions in early childhood settings was one of the major goals of the study.

Although the instrument was used for research purposes in conjunction with experienced teachers, it could be utilized as a training device for beginning student teachers. The instrument would help people focus on the nature of adult-child interactions simply because one must code both at each time point. In addition, the behaviors associated with each activity area would be emphasized. The instrument would provide a basis for comparing various programs in which students are assigned to volunteer or observe.

In terms of practicing teachers, the instrument can be utilized to explore areas of particular interest to them as well as to generate an overall picture of child-environment interactions. For instance, hypotheses concerning the amount and quality of time devoted to transitions in programs that occupy minimal space (35 square feet per child) could be explored. A teacher may wish to explore the quality of the free play period with the idea of planning some interventions to increase the levels of cognitive play. It

may even be appropriate to summarize the data on a particular child in order to form a preliminary assessment of his/her adjustment to school. An example of the adaptability of the instrument to practical research questions concerns the director of Center B who was very concerned over the replacement of the head teacher (who was coded during this study). The director would now like to test the hypothesis that there would be no difference in the levels of child environment interactions under the condition of the new head teacher. In summary, it seems that Children's Behavior in Social Settings can be directed toward various purposes which practitioners or researchers may have.

Thus, the significance of the methodology developed in this study is derived from its appropriateness to the evaluation of the quality of life of children in early childhood settings and its practicality for use by early childhood practitioners. Children's Behavior in Social Settings can be employed to investigate a variety of questions concerning children's usage of the environment prepared for them. The data collected by the instrument supports the position that at least some of the variability of children's behavior in the preschool can be associated with aspects of the human and physical environment. Adopting such a point of view may encourage teachers and administrators to look for sources of desired and undesirable child behavior in an area they can affect, namely, the educational setting they provide.

Summary Statements and Conclusions

In this study, a review of relevant literature sources lent support to the idea that the physical and human environment can exert a measurable influence on children's behavior. Environmental factors such as the arrangement of semi-fixed feature space, the display type and availability of materials and the behavior of adults have all been studied as independent variables in research on children's behavior.

Following this review in the third chapter a conceptual framework for the application of the behavior-person-environment paradigm (Lewin, 1931) was outlined. First, the importance of the interaction of the child with a stimulating environment was stressed as necessary for full development. Secondly, the concept of the coercive nature of environments on behavior was set forth, based on the work of Lewin (1931, 1951), Barker (1968), Gump (1978), and Proshansky, Ittleson and Rivlin (1970). A review of naturalistic studies of children's behavior consistently upheld the notion that there was more variation of behavior across settings than there was variation among children within settings. In other words, children in various ecological studies tended to act the same way in the same subsettings.

The behaviors chosen as the dependent variables in the Equation B = f(PE) were identified and discussed. The focus of the study was set forth in the form of several major questions. Could behavior environment interactions be recorded in a reliable, practical and valid manner in preschool settings? Could the

observation methodology distinguish between two preschools according to predicted hypotheses of difference? Would there be changes in children's behavior subsequent to an environmental intervention that was designed to alter their behavior in specific directions?

Finally, the methodology and research designs were described and the results reported. The significance and limitations of each aspect of the study have been discussed. The remaining part of this chapter will draw some conclusions regarding the study of behavior-child-environment interactions in early childhood education settings.

Of special importance in an understanding of the influence of physical space on behavior is the need to analyze space in terms of whether it provides for a full-range of children's behavior. Can a tired unhappy child retreat to some private cozy area and regroup his/her forces or does the space provide only continued stimulation and frustration? Can shy children find small enclosed areas where they can flourish with one or two other children or are such children found on the perimeter of activities watching or playing by themselves?

Perhaps the skill of arranging the early childhood environment to support the maximum involvement of children with materials and with each other is a skill that can and should be taught to early childhood practitioners.

In designing the physical space of the preschool, teachers need to consider the interrelationships among activity settings. If more cooperative constructive and dramatic play is desired can the room(s)

absorb the increased activity and noise that will likely result in expanding or adding appropriate materials to the block and housekeeping corners? Are there sufficient workspaces nearby to absorb children, if manipulative materials are taken out of closets and displayed on low shelves?

Although certain activity settings generally elicit characteristic behaviors among children, there can be no one set of prescriptions for the optimal arrangement of space in early childhood settings. The particular group of children enters into an analysis of characteristic patterns of child-environment interactions. Some behaviors may be engendered by stresses in the children's home lives but the provisions made for the children at the center can direct and absorb their frustrations and confusion.

It is important to stress the role of adults as an ecological factor in the early childhood environment. Although the arrangement of the physical space and materials can promote behavioral expectations, teacher behavior and program format constitute major variables in the early educational setting. The role of adults is a complex one involving differing patterns of interaction with children by activity location as well as incorporating the indirect influence of the teachers' skill in preparing activity segments and arranging the environment. It is often difficult to separate out the effects of one from the other as this study has demonstrated.

However, the research reported, herein, supports the principle that behavior settings need to be analyzed for dysfunctional environment factors when one evaluates children's behavior in

preschool settings. Rather than concentrating on getting a child to adapt to various educational subsettings, this study suggests a search for clues in the structure of the setting. Children may be deviating from an expected pattern of behavior because the setting, including the behavior of adults, does not support the expectations that the adults hold for it.

If a goal of the early childhood educator is to enhance the interaction of children with a stimulating environment then one is drawn into the study of the ecology of the preschool. However, as a teacher begins to manipulate the environment he/she may find that interventions designed to reduce a characteristic behavior in one area may lead to its appearance in another less appropriate area. One must carefully consider the interrelationships among adult behavior, program format, materials, physical layout and child behavior. There is an interdependence of behavior throughout the classroom. Further research is needed to assess the practicality of the methodology for use by early childhood teachers to enhance child-environment interactions.

In addition, the instrument Children's Behavior in Social Settings may be appropriate as a test of the quality of daily life of children in schools. To quote Paul Gump (1978): A

> . . .large portion of young lives goes into living in schools—and we would assume that the quality of this living is an important matter. [In addition]. . .it is assumed that the quality of child life is very much affected by the quality of the environments they inhabit. (pp. 131, 169)

Carefully designed studies of children in early childhood settings would be needed to ascertain the applicability of this methodology

to the evaluation of such a broad ecological concept.

A final criterion that may be applied to the assessment of child-environment interactions can be formulated as follows: Do the behavior settings provide for and support developmentally appropriate behaviors of the children enrolled? Perhaps the goal of investigating the interrelationships among children's behavior and the physical and human environment of the preschool was best stated by Pervin (1968):

> A "match" or "best fit". . .of individual to environment is viewed as expressing itself in high performance, satisfaction, and little stress in the system whereas a "lack of fit" is viewed as resulting in decreased performance, dissatisfaction, and stress in the system. (p. 56)

REFERENCES

Anderson, H. H. Domination and Socially Integrative Behavior. In Barker, R. G., Kounin, J., & Wright, H. F. (Eds.), Child Behavior and Development. New York: McGraw Hill, 1943.

Appel, M. H. Aggressive behavior of nursery school children and adult procedures in dealing with such behavior. Journal of Experimental Education, 1942, 11, 185-199.

Arrington, R. E. Interrelations in the Behavior of Young Children. New York: Behavior of Publications Teachers College, Columbia University, 1932.

Barker, R. G. Ecological Psychology: Concepts and Methods for Studying the Environment of Human Behavior. Stanford, CA: Stanford University Press, 1968.

Barker, R., Dembo, T., Lewin, K. Frustration and regression: An experiment with young children. University of Iowa Studies in Child Welfare, 18, no. 1, Iowa City: University of Iowa, 1941.

Barnes, K. E. Preschool play norms: A replication. Developmental Psychology, 1971, 5, 99-103.

Beaver, A. P. The initiation of social contacts by preschool children. Child Development Monograph #7, Teachers College, Columbia University, New York City, 1932.

Bemis, K. A., & Luft, M. Relationships between teacher behavior, pupil behavior and pupil achievement. A paper presented at the annual meeting of the American Educational Research Association, Minneapolis, MN, 1970.

Berk, L. E. Effects of variation in the nursery school setting on environmental constraints and children's models of adaptation. Child Development, 1971, 42, 839-869.

Berk, L. E. How well do classroom practices reflect teachers' goals? Young Children. November 1976, pp. 64-81.

Bloom, Benjamin. Stability and Change in Human Characteristics. New York: John Wiley & Sons, 1964.

Body, M. K. Patterns of aggression in Nursery School. Child Development, 1955, 26, 3-11.

Boger, R. G., & Cunningham, J. L. The observation of social behavior. In Simon Boyer & Karajin (Eds.), Measures of Motivation. Philadelphia: Research for Better Schools, 1973.

Bott, H. Observations of play activities in the nursery school. Genetic Psychometric Monographs, 1928, 4, 44-88.

Bowman, G. Analysis of communication in education. In Simon, Boyer & Karajin (Eds.), Research for Better Schools, Philadelphia: Research for Better Schools, 1973.

Bridges, K. M. B. Occupational interests in three year old children. Pedagogical Seminary, 1927, 34, 415-423.

Bridges, K. M. B. Occupational interests of four year old children. Pedagogical Seminary, 1929, 36, 551-570.

Bronfenbrenner, U. Is early intervention successful? Vol. II. Report on longitudinal evaluations. Department of Health, Education, & Welfare, Washington, D.C., 1974, DHEW Pub. No. 76-30025.

Brophy, J. E., Good, T. L., & Nedler, S. E. Teaching in the Preschool. New York: Harper & Row, 1975.

Bruner, J. Processes of Cognitive Growth: Infancy. Worcester: Clark University Press, 1968.

Bryk, A. S., & Weisberg, H. I. Evaluation methodology for early childhood special education programs. Original proposal submitted to Office of Education, January 1977, Huron Institute, 123 Mt. Auburn St., Cambridge, MA.

Campbell, D. T., & Stanley, J. C. Experimental and Quasi-Experimental Designs for Research. Chicago: Rand McNally Publishers, 1963.

Campbell, F. Preschool behavior study. Architectural Psychology Newsletter, August 1979, 3, 59.

Canter, D., & Kenny, C. The spatial environment. In Canter, D., Environmental Interaction. London: Surrey University Press, 1975.

Cockrell, D. L. A study of the play of children of preschool age by an unobserved observer. Genetic Psychology Monograph, 1935.

Cohen, S., & Lexak, A. Noise and inattentativeness to social cues. Environment and Behavior, December 1977, 9, 559-573.

Day, D. E., & Sheehan, R. Elements of a better preschool. Young Children, 1974.

Derman, A. Children's play: Design, approaches and theoretical issues. In G. Coates (Ed.), Alternative Learning Environments. Pennsylvania: Dowden, Hutchinson & Ross, 1974.

Deutsch, M. Early social environment: Its influence on school adaptation. Hechinger, F. (Ed.), Preschool Education Today. Garden City: Doubleday & Co., 1966.

Dodge, D. T. Room Arrangement as a Teaching Strategy. Washington, DC: Dodge, 1978.

Doke, L. A., & Risley, T. R. The organization of day care environments: Required vs. optional activities. Journal of Applied Behavioral Analysis, 1972, 5, 404-420.

Drew, C. J. Research on the psychological-behavioral effects of the physical environment. Review of Educational Research, 1971, 41, 447-464.

Dreyer, A. S., & Rigler, D. Cognitive performance in Montessori and nursery school children. Journal of Educational Research, 1969, 62, 411-416.

Eastman, C. M., & Harper, J. A study of proxemic behavior: Toward a predictive model. Environment and Behavior, 1971, 33, 418-437.

Ellis, M. J. Play: Theory and Research. Alternative Learning Environments. G. Coates (Ed.). Pennsylvania: Dowden Hutchinson and Ross, 1974.

Elmore, R. E. Design of the follow-through experiment. In Rivlin, A. M., & Timpane, M. P. Planned Variation in Education. Washington, DC: The Brooking Institution, 1975.

Emmerich, W. Evaluating alternative models of development: An illustrative study of preschool personal-social behaviors. Child Development, 1977, 48, 1401-1410.

Fagot, B. I. Variations indensity: Effect on task and social behaviors of preschool children. Developmental Psychology, 1977, 13, 166-167.

Farwell, L. Reactions of kindergarten first and second grade children to constructive play materials. Genetic Psychology Monographs, Vol. VIII, No. 5 & 6.

Featherstone, H. The use of settings in a heterogeneous preschool. Young Children, March 1974, 147-154.

Fisher, C. W., & Berliner, D. C. Quasi-clinical inquiry in research on classroom teaching and learning. Paper presented at AERA, NYC, April 1977.

Fitt, S. The individual and his environment. School Review, August 1974, 617-620.

Forman, G., & Kuschner, D. The Child's Construction of Knowledge. Monterey, CA: Brooks/Cole Publishing Co., 1977.

Franklin, M. B., & Biber, B. Psychological perspectives and early childhood education: Some relations between theory and practice. In Katz, L. G. (Ed.), Current Topics in Early Childhood Education. NJ: Ablex Publishing Co., 1977.

Glass, G. V., Willson, V. L., & Gottman, J. M. Design and Analysis of Time Series Experiments. Boulder: Colorado Associated University Press, 1974.

Gordon, I. J. A home learning center approach to early stimulation. Institute for Development of Human Resources, Gainesville, FL., 1971. (Grant no. MH 16037-02)

Gramza, A. F. Children's preferences for enterable play boxes. In Perceptual Motor Skills, 1970, 31, 177-178.

Gray, S. W., & Klaus, R. A. Experimental preschool program for culturally-deprived children. Child Development, 1965, 36, 887-898.

Green, E. H. Group play and quarreling among preschool children. Child Development, 1933, 4, 302-307.

Gump, P. V. Ecological Psychologists: Critics or contributors to behavior analysis. In Rogers-Warren, A., & Warren, S. F., Ecological Perspecties in Behavior Analysis. Baltimore: University Park Press, 1977.

Gump, P. V. Intra-setting analysis: The third grade classroom as a special case. In Williams, E., & Rausch, H. (Eds.), Naturalistic Viewpoints in Psychological Research. New York: Holt, 1969.

Gump, P. V. Environmental guidalce of the classroom behavioral system. In Biddle, B. J., & Ellena, W. J. (Eds.), Contemporary Research on Teacher Effectiveness. New York: Holt, Rhinehart & Winston, 1964.

Gump, P. V. School Environments. Children and the Environment. In Altman, W., & Wohlwill, J. F. (Eds.). Plenum Publishing Corp., 1978.

Gump, P. V. Ecological psychology and children. In Hetherington, E. M. (Ed.), Review of Child Development Research. Chicago: University of Chicago Press, 1975.

Gump, P. V. Operating environments in schools of open and traditional design. School Review. August 1974, 575-593.

Gump, P. V. The classroom behavior setting: Its nature and relation to student behavior. Midwest Psychological Field Station, Department of Psychology, University of Kansas, Lawrence, Kansas, 1967. (Project no. 2453, Bureau no. 5-0334, Grant no. OE-4-10-107)

Gump, P. V., Schogeen, P., & Redle, F. The Camp Milieu and its immediate effects. Journal of Social Issues, 1957, 13, 40-46.

Gump, P. V., & Sutton-Smith, B. Activity-setting and social interaction: A field study. The American Journal of Orthopsychiatry, October, 1955, xxv.

Hall, E. T. The Hidden Dimension. New York: Doubleday & Co., 1966.

Harms, T., & Clifford, R. M. Day Care Environment Rating Scale. Frank Porter Graham Child Development Center, University of North Carolina at Chapel Hill, 1978.

Harms, T., & Cross, L. Environmental Provisions for Day Care. Frank Porter Graham Child Development Center, University of North Carolina at Chapel Hill, 1977.

Hartup, W. W., & Charlesworth, R. The Hartup-Charlesworth System. In Simon, Boyer, & Karajin (Eds.), Measures of Maturation. Philadelphia: Research for Better Schools, 1973.

Hartup, W. W., & Himeno, Y. Social isolation vs. interaction with adults in relation to aggression in preschool children. Journal of Abnormal and Social Psychology 1959, 17-22.

Hayes, W. L., & Winkler, R. L. Statistics. Probability Inference and Decision. New York: Holt, Rhinehart & Winston, 1970.

Herbert, J., & Atrridge, C. A guide for developers and users of observation systems and manuals. American Educational Research Journal, 1975, 12, 1-20.

Herring, A., & Koch, H. L. A study of some factors influencing the interest span of preschool children. Journal of Genetic Psychology, 1930, 38, 249-279.

Hollenbeck, A. R. Problems of reliability in observational research. In Sackett, G. P. (Ed.), Observing Behavior. Baltimore: University Park Press, 1978, Vol. II.

Hulson, E. L. An analysis of the free play of ten four-year-old children through consecutive observations. Journal of Juvenile Research, 1930, 14, 188-208.

Hunt, J. McV. The Challenge of Incompetence and Poverty. Urbana: University of Illinois Press, 1969.

Hunt, J. McV. Intelligence and Experience. New York: The Ronald Press Co., 1961.

Hunt, D. E. Person-environment interaction: A challenge found wanting before it was tried. Review of Educational Research, 1975, 45, 209-230.

Hutt, C., & Vaizey, M. J. Differential effects of group density on social behavior. Nature, 1966, 209.

Irwin, D. M., & Bushnell, M. M. Replant your learning graden. Day Care and Early Education, February 1976, 3, 33, 46.

Ittleson, W. H., Rivlin, L. G., & Proshansky, H. M. The use of Behavioral Maps in environmental psychology. In Proshansky, H. M. et al. (Eds.), Environmental Psychology. New York: Holt, Rhinehart & Winston, 1970.

Ittleson, W. H. An Introduction to Environmental Psychology. Proshansky, H. M., Rivlin, L. G., & Winkel, H. (Eds.). New York: Holt, Rhinehart & Winston, 1970.

Jersild, A. T. The consistency of certain behavior patterns in young children. American Journal of Psychology, 1933, 45, 125-129.

Johnson, M. W. The effect on behavior of variation in the amount of play equipment. Child Development, 1935, 6, 56-68.

Johnson, M. W. The influence of verbal directions on behavior. Child Development, 1934, 6, 196-204.

Johnson, W. M., & Bolstad, O. D. Methodological issues in naturalistic observations: Some problems and solutions for field research. In Hamerlynck, L. A. et al. (Eds.), Behavior Change: Methodology Concepts and Practice. Champaign, IL: Research Press, 1973.

Jones, N. B. Categories of child-child interaction. In Jones, N. B. (Ed.), Ethological Studies of Child Behavior. London: Cambridge University Press, 1972.

Kagan, J., Kearsley, R., & Zelazo, P. Infancy and Its Place in Human Development. Cambridge, MA: Harvard University Press, 1978.

Karlson, A., & Stodolsky, S. Predicting school outcomes from observations of child behavior in classrooms. Paper presented at AERA annual meeting, February 1973, New Orleans.

Karnes, M. M., Teska, J. A., Hodgins, A. S., & Badgen, E. D. An ameliorative approach in the development of curriculum. In Parker, R. K. (Ed.), The Preschool in Action. Boston: Allyn and Bacon, 1972, 353-381.

Katz, L., Peters, D. L., Stein, N. S. Observing behavior in kindergarten and preschool classes. Childhood Education, 1968, 44, 400-405.

Kawin, E. The function of toys in relation to child development. Childhood Education, December 1934, 122-124.

Kohl, H. On finding private spaces. Grade Teacher, January 1970, 87, 10.

Kounin, J. S. Discipline and Group Management in Classrooms. Huntington, NY: Robert E. Krieger Publishers, 1977.

Kounin, J. S., & Gump, P. V. Signal systems of lesson settings and the task related behavior of preschool children. Journal of Educational Psychology, 1974, 66, 554-563.

Kounin, J. S., & Doyle, P. H. Degree of continuity of a lesson's signal system and the task involvement of children. Journal of Educational Psychology, 1975, 67, 159-164.

Kounin, J. S., & Sherman, L. W. School environments as behavior settings. Theory into Practice, Spring, 1979.

Krantz, P., & Risley, T. The organization of group care environments: Behavioral ecology in the classroom. Lawrence, Kansas: University of Kansas. ERIC Document Reproduction No. ED078 915, 1972.

Kritchevsky, S., & Prescott, E. Planning environments for young children: Physical space. National Association for the Education of Young Children, Washington, DC, 1969.

Landreth, C., Gardner, G. M., Eckhardt, B. C., & Prugh, A. D. Teacher child contacts in nursery schools. Journal of Experimental Education, 1943, 12, 65-91.

LeLaurin, K., & Risley, T. R. The organization of day care environments: "Zone" vs. "Man to man" staff assignments. Journal of Applied Behavioral Analysis, 1972, 5, 225-232.

Lewin, K. Environmental forces in child behavior and development. In Murchison, C. (Ed.), A Handbook of Child Psychology. Worcester, MA: Clark University Press, 1931, 94-127.

Lewin, K. Field Theory in the Social Sciences, Harper, 1951.

Light, R. J. Issues in the analysis of qualitative data. In Travers, R. (Ed.), Second Handbook of Research on Teaching, Chicago: Rand McNally, 1973, 318-381.

Loo, C. Important issues in researching the effects of crowding on humans. Representative Research in Social Psychology, January 1973, 4, 219-226.

Loo, C. M. The effects of spacial density on the social behavior of children. Journal of Applied Social Psychology, 1972, 2, 372-381.

McClure, S. C. The effect of varying verbal instructions on the motor responses of preschool children. Child Development, 1936, 7, 276-290.

McDowell, M. S. Frequency of choice of play materials by preschool children. Child Development, 1937, 8.

McGrew, W. C. An Ethological Study of Children's Behavior. NY: Academic Press, 1972.

McKinney, . An ecological comparative analysis of adult-child interaction between a compensatory preschool and a receiving kindergarten program. Paper delivered at the NAEYC annual meeting, NYC, August 1978.

Mack, D. Privacy: A child's need to be alone in the classroom. Teacher, February 1976, 93, 52-53.

Mangurian, R. A celebration of space. Day Care and Early Education, December 1975, 3, 14-16.

Markey, F. V. Imaginative behavior of preschool children. Monograph of the Society for Research in Child Development, 1938, 18.

Medley, D. M., & Mitzel, H. E. Measuring classroom behavior by systematic observation. In Gage, N. L. (Ed.), Handbook of Research on Teaching. Chicago: Rand McNally, 1963.

Meyers, C. E. Security and conflicting adult authority. Iowa City: University of Iowa, 1940. (Unpublished doctoral dissertation)

Montes, F., & Risley, T. R. Evaluating traditional day care practices: An empirical approach. Childcare Quarterly, 1974, 4, 208-215.

Moore, S. B. The use of commands, suggestions, and requests by nursery school and kindergarten teachers. Child Development, 1934, 18.

Morrison, S. B., & Oxford, R. L. Classroom ecology and kindergarten students task related behaviors: An exploratory study. Paper presented at the annual meeting of the AERA, Toronto, Canada, 1978.

Moyer, K. E., & Gilmer, B. Attention spans of children for experimentally designed toys. Journal of Genetic Psychology, 1955, 87, 187-201.

Murphy, L. B. Sympathetic behavior in young children. Journal of Experimental Education, 1936, 5, 79-90.

Murphy, L. B. Social Behavior and Child Personality. New York: Columbia University Press, 1937.

Muste, M. J., & Sharpe, D. F. Some influential factors in the determination of aggressive behavior in preschool children. Child Development, 1947, 18, 11-28.

Myers, C. E. Security and conflicting adult authority. Iowa City: University of Iowa, 1940. (Unpublished doctoral dissertation)

Nicholson, Simon. The theory of loose parts. Alternative Learning Environments. Coates, G. (Ed.). Pennsylvania: Dowden Hutchinson and Ross, 1974.

Norum, G., Russon, N., & Sommer, R. Seating patterns and group task. Psychology in the Schools, 1967, 4, 276-280.

Osmond, H. Function as the basis of psychiatric ward design. Mental Hospitals (Architectural Supplement), April 1957, 23-29.

Parten, M. B. Social participation among preschool children. Journal of Abnornal Social Psychology, 1932, 27, 243-269.

Parten, M. B. Social play among preschool children. Journal of Abnormal Social Psychology, 1933, 28, 136-147.

Peck, J., & Goldman, R. The behaviors of kindergarten children under selected conditions of the social and physical environment. Paper presented at the annual meeting of AERA at Tornoto, Canada, March 1978.

Peller, L. E. The children's house. Man-Environment Systems.

Perkins, E. P. The effect of the physical environment on the behavior of children in preschool settings. Paper presented at AERA in San Francisco, April 1979.

Perkins, E. P., & Weinthaler, J. Definitions of items in children's behavior in social settings. (first draft) Unpublished paper, University of Massachusetts, 1978.

Perry, G. Cross-cultural Study on the Effect of Space and Teacher Controlling Behavior. ERIC Document Reproduction No. ED131 351.

Pervin, L. A. Performance and satisfcation as a function of individual environment fit. Psychological Bulletin, 1968, 69, 56-68.

Pfluger, L. W., & Zola, J. M. A room planned by children. Alternative Learning Environments. Coates, G. (Ed.). Pennsylvania: Dowden, Hutchinson & Ross, 1974.

Phyfe-Perkins, E. Data collection and analysis in the naturalistic evaluation of early childhood education. Paper presented at AERA, Toronto, Canada, March 1978.

Phyfe-Perkins, E. The compensatory early education movement of the 1960's. Unpublished manuscript, University of Massachusetts, 1977.

Pollowy, A. M. The child in the physical environment: A design problem. In Coates, G. (Ed.), Alternative Learning Environments Pennsylvania: Dowden, Hutchinson & Ross, 1974.

Preiser, W. F. E. Work in progress: The behavior of nursery school children under different spatial densities. Man Environment Systems, 1972, 2, 247-250.

Prescott, E., Jones, E., & Kritchevsky, S. Day Care as a Child-Rearing Environment, Vol. II. Washington, DC: National Association for Education of Young Children, 1972.

Prescott, E. Is day care as good as Home? Young Children, January 1978, 13-19.

Prescott, E., Jones, E., & Kritchevsky. Group day care as a child rearing environment: An observational study of day care programs. Pasadena, CA: Pacific Oaks College, 1967. (Eric Document Reproduction Service No. ED 024 453)

Prescott, E., Jones, E., Kritchevsky, E., Milich, C., & Haselhoef, E. Assessment of Child Rearing Environments: An Ecological Approach Parts I & II. Pasadena, CA: Pacific Oaks College, 1975.

Price, J. M. The effects of crowding on the social behavior of children. Unpublished doctoral dissertation, Columbia University, 1971.

Proshansky, H. M., Ittelson, W. H., & Rivlin, L. G. The influence of the physical environment on behavior: Some basic assumptions. In Proshansky, H. M., Ittelson, W. H., & Rivlin, L. G. (Eds.), Environmental Psychology: Man and His Physical Setting. New York: Holt, Rinehart & Winston, 1970.

Quilitch, H. R., & Risley, T. The effects of play materials on social play. Journal of Applied Behavioral Analysis, 1973, 6, 575-578.

Reichenberg-Hackett, W. Children's attitudes, happiness, and social values in nursery schools. Paper presented at the 4th meeting of the Inter-American Society of Psychology, San Juan, Puerto Rico, December 1956.

Reichenberg-Hackett, W. Practices, attitudes and values in nursery group education. Psychological Reports, 1962, 40, 279-300.

Reuter, J., & Yunik, G. Social interaction in nursery schools. Developmental Psychology, 1973, 3, 319-325.

Risley, T. R. The ecology of applied behavior analysis. In Warren, R., & Warren, S (Eds.), Ecological Perspectives in Behavior Analysis. Baltimore: University Park Press, 1977.

Risley, T. R., & Cataldo, M. F. Planned activity check (PLACHECK): Materials for training observers. Center for Applied Behavior Analysis, University of Kansas, 1973.

Rivlin, L. G., & Rothenberg, M. Design implications of space use and physical arrangements in open education classes. Paper presented at the annual meeting of the Environmental Design and Research Association, Lawrence, Kansas, April 1975.

Rohwer, W. Implications of cognitive development for education. In Mussen, P. (Ed.), Carmichael's Manual of Child Development. 3rd. ed. Vol. I. New York: Wiley, 1970.

Rosen, C. E. The effects of sociodramatic play on the problem solving behavior among culturally disadvantaged preschool children. Child Development, 1974, 45, 920-927.

Rosenshine, B. Evaluation of classroom instruction. R.E.R., 1970, 40, 279-300.

Rosenthal, B. A. An ecological study of free play in the nursery school. Doctoral dissertation, Wayne State University, 1973. (Dissertation Abstracts International, 1974, 37, [7-A], 4004-4005.)

Rowley, G. L. The reliability of observational measures. American Educational Research Journal, 1976, 13, 51-59.

Rubin, K. H. Play behaviors of young children. Young Children, 1977, 16-24.

Rubin, K. H., & Seibel, C. G. The effects of ecological setting on the cognitive and social play behaviors of preschoolers. Paper presented at the annual meeting of AERA, San Francisco, 1979.

Rubin, K. H. The social and cognitive value of preschool toys and activities. Canadian Journal of Behavioral Sciences/Review Canadian Science Compositions, 1977, 9, 382-385.

Santrock, J. W. Affective and facilitative self-control: Influence of ecological setting cognition and social agent. Journal of Educational Psychology, 1976, 68, 529-535.

Shapiro, S. Preschool ecology: A study of three environmental variables. Reading Improvement, 1975, 12, 236-241.

Shapiro, E. Educational evaluation: Rethinking the criteria of competence. School Review, 1973, November, 523-549.

Sheehan, R., & Day, D. Is open space just empty space? Day Care and Early Education, December 1975, 3, 10-13.

Sherman, L. W. An ecological study of glee in small groups in preschool children. Child Development, 1975, 46, 53-51.

Shores, R. E., Hester, P., & Strain, P. S. The effects of amount and type of teacher-child interaction on child-child interaction during free play. Psychology in the Schools, 1976, 13, 171-175.

Shure, M. B. The psychological ecology of a nursery school. Child Development, 1963, 34, 979-992.

Siegel, A. E., & Kohn, L. G. Permissiveness, permission and aggression: The effect of adult presence or absence on aggression in children's play. Child Development, 1959, 30, 131-141.

Smilanski, S. Can adults facilitate play in children?: Theoretical and practical considerations. In Curry, N.E., & Arnaud, S. Play: The Child Strives Toward Self Realization. Washington, D.C.: NAEYC, 1971.

Smilanski, S. The Effects of Sociodramatic Play on Disadvantaged Preschool Children. New York: Wiley & Sons, Inc., 1968.

Smith, P. K. Aspects of the playgroup environment. In Canter, D., & Lee, T (Eds.), Psychology and the Built Environment. England: Architectural Press, 1974.

Smith, P. K., & Connolly, K. J. Social and aggressive behavior in preschool children as a function of crowding. Social Science Information, 1976, 16, 601-620.

Smith, P. K., & Connolly, K. J. Patterns of play and social interaction in preschool children. Jones, N. B. (Ed.), Ethological Studies of Child Behavior. London: Cambridge University Press, 1972.

Smith, P. K., & Connolly, K. J. Toys, space and children. British Psychological Society Bulletin, 1973, 26, 167.

Smith, P. K., & Green, M. Aggressive behavior in English nurseries and play groups: Sex differences and response of adults. Child development, 1975, 46, 211-214.

Sommer, R. Studies in personal space. Sociometry, 1959, 22, 247-260.

Sommer, R. Personal Space: The Behavioral Basis of Design. Englewood Cliffs, NJ: Prentice-Hall, 1969.

Srivastava, R. K., & Good, L. R. Patterns of group interaction in three architectually different psychiatric treatment environments. Research Report, Environmental Research Foundation, Topeka, Kansas, March 1968.

Stallings, J. Implementation and child effects of teaching practices in follow-through classrooms. Monographs of the Society for Research in Child Development, University of Chicago Press, 1975, 40, 7-8.

Stevenson, H. Learning in children. In Mussen, P. (Ed.), Carmichael's Manual of Child Psychology. (3rd ed.) Vol. I. New York: Wiley, 1970.

Swaminathan, H., & Algina, J. Analysis of quasi-experimental time series designs. Multivariate Behavioral Research, January 1977, 12, 111-131.

Swift, J. W. Effects of early group experience: The nursery school and day nursery. In Hoffman, M. L., & Hoffman, L. W. (Eds.), Review of Child Development Research. New York: Russell Sage Foundation, 1964.

Thompson, G. C. The social and emotional development of preschool children under two types of educational programs. Psychological Monographs, 1944, 56, 1-29.

Thomson, C., Holmberg, M., & Baer, D. A brief report on a comparison of time sampling procedures. Journal of Applied Behavioral Analysis, 1974, 7, 623-626.

Tizzard, B., Cooperman, Q., Joseph, A., & Tizzard, J. Environmental effects on language development: A study of young children in long stay residential nurseries. Child Development, 1972, 43, 337-358.

Tizzard, B., Philps, J., & Plewis, I. Play in preschool centres—I. Play measures and their relation to age, sex and I.Q. Journal of Child Psycho-Psychiatry, 1976, 17, 251-264.

Tizzard, B., Philps, J., Plewis, I. Play in preschool centres—II. Effects on play of the child's social class and of the educational orientation of the centre. Journal of Child Psychology Psychiatry. Vol. 17. Great Britain: Pergamon Press, 1976, 265-274.

Updegraff, R., & Herbst, E. K. An experimental study of the social behavior stimulated in young children by certain play materials. Journal of Genetic Psychology, 1933, 42, 372-391.

Vygostsky, L. S. Thought and Language. Cambridge, MA: M.I.T. Press, 1962.

Weikart, D. P. Relationship of curriculum, teaching and learning. In Stanley, J. C. (Ed.), Preschool Programs for the Disadvantaged. Baltimore, MD: Johns Hopkins University Press, 1972.

Weinstein, C. S. Modifying student behavior in an open classroom through changes in physical design. American Educational Research Journal, 1977, 14, 249-262.

Weinstein, C. S. The effect of a change in the physical design of an open classroom on student behavior. Unpublished doctoral thesis, Harvard University, 1975.

Weinstein, C. S. The physical environment of the school: A review of research. Review of Educational Research, December 1979.

Weinstein, C., & Weinstein, N. The effect of noise in an open-space school on reading comprehension. Paper presented at the annual meeting of the AERA in Toronto, Canada, March 1978.

White, B., Watts, J. C., et al. Experience and Environment. Vol. I. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1973.

White, O. R. Working Paper No. 16. A Manual for the Calculation and use of the Median Slope—A Technique of Progress Estimation and Prediction of the Single Case Regional Resource Center of Handicapped Children, College of Education, Special Education, University of Oregon, Eugene, Oregon, March 1972.

White R. W. Motivation reconsidered: The concept of competence. Psychological Review, 1959, 66, 5.

Wright, M. E. Constructiveness of play as affected by group organization and frustration. In Barker, R. G., Kounin, J. S., & Wright, H. F. Child Behavior and Development. New York: McGraw-Hill, 1943.

Wylie, M. Experimental study of negativistic behavior in preschool children. Twelfth Annual Report, Criminology, 1930, 89-91.

Yarrow, L. J. Conceptualizing the early environment. In Dittman, L. L. (Ed.), Early Child Care. New York: Athenton Press, 1968.

Zifferblatt, S. M. Architecture and human behavior: Toward increased understanding of a functional relationship. Educational Technology, 1972, 12, 54-57.

APPENDIX A

Definitions of Items in Children's Behavior in Social Settings

Rules for Coding Children's Behavior in Social Settings

Definitions of Items in Children's Behavior in Social Settings

Location: Prepare a list of one or two letter abbreviations of all the locations to be observed in the educational settings. Enter these at the beginning of the observation of each child.

Group Size:

one (1) - The child is alone in the activity location.
two -three (2) - There are two-three children in the activity location including the "target" child.
four -six (3) - There are four to six children, including the "target" child in the activity location.
seven plus (4) - There are seven or more childen in the activity location.

Adult Behavior:

uninvolved, attention elsewhere (1): The adult is not involved in the activities of the children who are in the location being observed. The adult is not conversing with them. The adult may be out of the room, talking to another adult, or involved in another activity location. The adult may be attending to another child in the activity location (e.g., not the "target" child). In this case do not code uninvolved but do code the adult's involvement appropriately.

watches/helps (briefly) (2): The adult is fairly near the children in the location being observed. She watches their activity, and may help briefly--to locate a certain color magic marker or straighten a hat on a child involved in dramatic play. The adult is peripheral to the activity of the children.

participates (3): The adult is actively involved with the children in the location being coded, although not necessarily with the "target" child. S/He is engaged in a game or fantasy play with the children, perhaps building a block tower or playing a lotto game. The adult is an integral part of the children's play. The adult is coded as participates if s/he is engaged in a conversation with the child being observed.

mediates (4): The adult mediates a dispute between two children, including redirecting one child's behavior, arbitrating, or reflecting one child's feelings to another child.

leads directs (5): The adult directs the behavior of children either singly or in a group. The adult tells a child to take his/her coat off. The adult may be leading a large group circle or singing time, the adult may be reading a story to a child or group of children. If the adult asks the child questions and stimulates conversation, then leads directs is not coded.

Children's Behavior: Task Involvement:

unoccupied: The child is apparently not playing, not engaged in conversation or not directly involved in an activity which surrounds him or her. The child may be sitting with a group but not attending to the group's activity. Instead, s/he occupies him/herself with anything that happens to be of interest, glancing around the room or wandering to watch others briefly. When there is nothing exciting going on the child may fumble with hands or clothing, stand around, hang on equipment or stare off into space.

onlooker: listens, observes intently: The child observes the activity of other children or adults without joining. S/He may make comments to the others. This does not include a momentary glance at others. "Onlooker" includes times when the child listens and watches a teacher or child who is speaking or "showing" during story or group time. The child attends to verbal or visual input without interaction (e.g., in an alert but passive manner). For example, a child watches TV, listens to a record or story, listens to and watches a demonstration.

reads, or looks at a book or poster: The child looks at a book, turning over pages, perhaps talking to him or herself. This does not include a child looking at a book while an adult reads aloud. That behavior would be coded as onlooker: listens, observes intently.

focuses on task, activity: The child's attention is evidenced by eye contact, listening, alert facial expessions and active participation. The child is focused on the materials or persons directly related to the main purpose of the task or activity, although s/he may be listening or thinking for a few seconds. The child may engage in a brief conversation (code simultaneously) or glance elsewhere briefly (not coded). The child may be alone or in a group, involved with materials or engaged in dramatic play, finger plays, songs or dances. The point of this behavior is to code active involvement in activities.

Cognitive and Social Levels of Play (Rubin, 1977)
Solitary functional, solitary constructive, open or closed, solitary dramatic.

solitary play: The child plays alone and independently with toys that are different from those used by nearby children. There is no apparent interest on the target child's part to become aware of the other children's activities. S/He is involved in his/her own play without reference to others.

functional play: The child repeats simple muscular activity with or without materials. The child may manipulate the material without any observable intent. For example the child may repeatedly pound or squeeze playdough, move a toy truck back and forth. The child may repeatedly clap hands without reference to a song or activity. The behavior is repetitive, perhaps imitative, and functions as a sensory motor practice game.

constructive play: The child uses materials to construct something, often with a theme in mind. At the play dough table the child is engaged in molding bits of dough to form an animal. The child may build a castle with sand as opposed to running sand through one's fingers or filling and dumping containers (examples of functional play). In the block corner the child creates a farm, moving toy animals about. This category is coded as O — open-ended if the activity and/or the materials have various possibilities for the end product (e.g., blocks, sand, clay, lincoln logs). The category is coded as coded (X) if the materials or activity permit only one solution (e.g., puzzles, cylinder sets, dressing frames).

dramatic play: The child is involved in a symbolic activity, acting out roles in an imaginary situation, imitating the actions and language of others. The child pretends to be somewhere else or someone else or both. The child may or may not incorporate props or materials in the drama. This activity must have a theme and be more than a brief flight into fancy. In solitary dramatic play it may be hard to distinguish this category from symbolic constructive play unless the child talks or acts out a role for him/herself.

Parallel: Functional
Parallel: Constructive, open/closed
Parallel: Dramatic

parallel play: The child plays beside or in close proximity to other children but s/he does not try to influence the activity of the others. S/He may use similar materials or carry out the same kinds of activities (e.g., in the house corner or during movement with music) but s/he does not interact directly with the others. The children may be using the same supply of

materials, taking turns with paste or scizzors, even making brief comments but there is no sense of a joint endeavor or activity.

Cooperative, group: Functional
Cooperative, group: Constructive, open/closed
Cooperative, group: Sociodramatic
Cooperative, group: Game w. rules

cooperative or group play: The child is engaged with a child or children and/or adults in an activity, task or game. The interaction among the participants is one of mutual give and take. The behavior of the members is concerned with a common goal or theme. Children may attempt to control each other's behavior. Attention is directed toward group members as well as towards the goal of the activity. Frequently, there are group leaders who attempt to organize individual efforts and assign roles. There is a definite sense of a group, of children playing together.

sociodramatic play: The child is involved in dramatic play with other children. This category can only be coded when the child is involved in cooperative, group dramatic play.

game with rules: The child is engaged in a group game. There is an acceptance of prearranged rules and the children adjust their behavior accordingly. They may play picture lotto or Simon Says, for example.

rough and tumble play (N. Blurton-Jones, 1972): The child is engaged in physical "rough housing" with one or more children. There is usually little verbal communication but there may be wrestling, laughing, jumping, running, and hitting at. The behavior is good natured and full of large motor movement. It may disrupt the activity of others which would be coded simultaneously. Actual fighting is not included under this category but would be coded under "disturbs activity of others."

Verbal Interaction:

verbalization directed toward a child or children: The child asks a question of, makes a comment or responds to a child or a group of children. The utterance may go unheard or unanswered but it is still coded if the child's body posture and facial intent indicate s/he directed the comment toward a child. If the child makes a comment to a group containing an adult and if the verbalization is not clearly directed toward the adult then the verbalization is coded as directed toward child(ren).

verbalization directed toward an adult: The child asks a question of, makes a comment or responds to an adult. The utterance may be ignored or even unheard but the child's facial expression indicates s/he was speaking to the adult. If the adult is in a group of children it must be clear that the child is specifically addressing the adult not the group in general. In this case code verbalization directed toward child.

verbalization directed toward self: The child is talking to him/herself about an ongoing activity or fantasy in which s/he is engaged. The child may comment on what s/he is doing. For example while pasting a collage s/he says "Red goes here. . . good. . .OK! Now where's purple?" After piling the blocks a child may say, "I made a tall tower." The self-talk may serve to direct his/her actions as in dramatic play when a child says: "Get out the cups. . .It's time for tea." The remarks may be purposeful and comprehensible but not directed toward another child, although children may be playing in close proximity. This category may include singing or chanting that accompanies play with materials or physical activity. Self talk includes the kind of functional play with sounds that children do when they are unoccupied. The category is coded when the child makes nonsequitor comments in the presence of others or emits unintelligible sounds that are not directed at a child or adult.

Prosocial Behavior:

shares/takes turns: The child shares or takes turns with another child(ren). The child voluntarily offers some food or some materials to another child, or agrees to share at the request of another child or shares upon the gentle reminder of an adult. The child alternates with another child(ren) in the use of equipment or materials or rotates who initiates an activity. Adults may need to structure the situation in order to foster taking turns. For example, the target child will take turns with others on a swing or wait for his/her turn on the slide.

help-comfort-affection: The child voluntarily offers to help another by saying "I'll help you, OK?" S/He comforts another by hugging or patting on the back and standing next to the other. S/He may verbally comfort the other by saying "don't cry." The child may offer a distressed child a toy or defend a child against another. S/He may nonverbally help another zip a coat or get a boot off. The child may show affection by hugging, kissing, patting another, holding hands, putting an arm around someone's shoulders, or saying "I like you. You're my friend." If this category is expressed verbally then "verbalizes to child or adult" is not marked. The behavior is coded as "help-comfort-affection."

disturbs activity, quarrels: The child engages in antisocial behavior that may include teasing another, interfering with the activity of another, taking an object away from another, threatening, shoving or pushing another, quarreling. For example, the child knocks over another's block structure, runs about singing while others are listening to a story or repeatedly tugs at an adult while s/he is busy assisting other children. The child may tease another saying, "You can't do it, ha ha ha." It is not necessary for the other child to react overtly.

misuse, abuse materials: The child may misuse materials by using them inappropriately such as loudly banging blocks together instead of building with them or having hand puppets grab other children instead of creating thematic play. The child may abuse materials by tearing a page from a book, marking on walls, smearing paste on tables, breaking parts off a toy or throwing a doll.

Threatening another child with a unit block is not coded as "misuse-abuse of materials" but rather "disturbs activity, quarrels." This item includes mild misuse such as laying books on the floor as stepping stones or crayoning on the flyleaf of a book.

Autonomy

chooses activity: The child chooses an activity without first seeking adult approval. A child may select an activity without first seeking adult approval. A child may select an activity from the alternatives available. The child may choose during a free play activity time or the adult may structure the opportunities for choice by saying: "In this activity period, you may choose water play, collage at the art table, or making popcorm for snack." The point is that the child independently chooses among acceptable alternatives even though the teacher may prompt the child or structure the choices. The child may choose not to join an expected activity in the daily routine but does choose some nondisruptive activity.

readies, responsibility for maintenance: The child assumes responsibility for the maintenance of the center or care of him/herself. The child gets ready for an activity by distributing cups and napkins for snack or getting out all the musical instruments from the cupboard in preparation for a marching band activity. This does not include selecting a puzzle and carrying it to a table. Such behavior would be coded chooses an activity. The child may put away materials either on his/her own initiative, when clean-up time is announced, or upon the gentle reminder of another. The child may water plants, feed the gerbil, or sponge the tables. The child puts on a coat and boots when outdoor time is announced. This category indicates that children

are involved in running the center rather than waiting while adults carry out these responsibilities.

waits: The child waits during periods of random activity or while adults prepare, organize, or distribute materials. A child sits at a table waiting to use paste which is being distributed to each child. A child is constrained to remain sitting in a circle waiting while a teacher asks another child to be quiet so all can hear. A child waits because there is a decidedly inadequate supply of materials, i.e., too few scizzors or one paste jar. This category is distinguished from brief periods of waiting while taking turns by several factors:

1. Waiting must occur for more than 20 seconds.
2. There must be an absence of a sense of reciprocity: "now it's your turn, then it's mine" that the children are projecting.
3. Waiting is often determined by the situation: e.g., the child has no choice but to wait for the activity to begin.

Rules for Coding Children's Behavior in Social Settings

1. General format for coding:

   10 secs. locate child, write name, learning area, and role of adult nearest to child

   30 secs. observe child

   20 secs. code behavior

2. Role of the Adult:

   The role of the adult is determined mainly by the adult's role in the activity not necessarily in relationship to the target child, e.g., child is at the art table; adult is there also but helping another child; code adult as (2) "watches/helps." A parent who remains in the classroom is coded in an adult role if this is appropriate.

3. Determination of the Learning Area:

   The learning area is determined by the activity as well as the area. See list of abbreviations for the particular center. Locate the child and code the area s/he is in during the first 10 seconds. If the child is clearly wandering code area as T, in transition. However, in the outdoor play yard the child in transition is coded as O, outdoors.

4. Rules concerning task involvement behaviors:

   a. Code only one of "unoccupied"
      "onlooker: observes, listens"
      "reads"
      "focuses"
      chooses the one that is predominant or most characteristic for the 30 second period. One behavior must last 15 seconds in order to be coded. If the child switches among task behaviors don't code any.

   b. You may not necessarily code any of these items if the target child (1) is mainly engaged in conversation
      (2) is disrupting activity of others
      (3) is showing help-comfort-affection

(4) is eating snack—unless the child is not eating and is glancing around then code "unoccupied" the same rule applies for "onlooker: observes listens." "Focuses on task" may be coded if child is carefully spreading peanut butter, etc., for at least 15 seconds.

c. "Unoccupied" or "onlooker" may be coded with "waits" but that behavior must characterize waiting for more than 15 seconds.

d. "Onlooker: observes listens" is coded when a child is in a teacher-led reading group, is in circle time, or is being read to alone, if the child is attending to the adult.

e. "Focuses on activity" is coded when the child participates in a teacher-led circle time either carrying out finger plays, singing songs, or doing exercises. Singing songs is coded as "focuses on activity" not "verbalizes."

5. Rules concerning levels of social and cognitive play:

a. These activities should occur for 15 seconds to be coded at all.

b. Solitary functional
Parallel functional
may be coded with either "unoccupied" or "onlooker: observes" or "focuses on activity"

Functional play may be with materials or with body parts or with body movements. It is a repetitive sensorimotor activity which may be purposeful or rather mindless.

Functional play does not include automanipulative activities such as thumbsucking, nose picking, fidgetting and restless body behavior.

c. With snack do code level of social and cognitive play when appropriate. The behavior must be very clear and last more than 15 seconds.

d. Coop group: Game: includes lotto (teacher led or not), "Simon Says," "Ring around Rosey."

e. Coop group: Functional: occurs on the seesaw in the rocky boat, and sometimes on slides and junglegym.

f. You don't always need to code social and cognitive play even though focuses on activity is coded. They are mainly appropriate for free play, free choice segments rather than snack or circle time.

g. If a child is legitimately involved in two levels of play at the same time for more than 15 seconds you may code both. This is a very unusual occurrence but it may happen.

h. During circle time you may code "parallel dramatic" if the finger play or movement exercise is "pretend you are a leaf blown by the wind", etc.

6. Rules concerning verbalization:

a. Watch the eyes of the child to see whom a remark is directed to. It doesn't matter if the remark is heard or responded to or not. The target child's intent is important.

b. When a child directs a remark to a group of children and adults mark "child" unless you can tell it is directed to an adult.

c. If the child does not look at the adult or the children and the remark is ambiguous, code "verbalizes to self."

d. If the target child directs laughter toward another child, code "verbalizes to child."

7. Rules concerning pro-social behavior:

a. If a child threatens another child with a unit block code "disturbs activity, quarrels" rather than "misuse, abuse materials," e.g., the more "extreme" behavior.

b. If a child expresses "help-comfort-affection" verbally by saying "I like you" or "you're my best friend" then code as "help-comfort-affection" not "verbalizes the child." Other remarks within the 30 second interval may be coded appropriately.

c. "Shares-takes turns" is coded even though an adults may remind the child or structure the turntaking. Routine passing of an empty cup up and down the snack table is not coded. But passing a pitcher of milk to the next child to pour his/her milk is coded. Using the same materials from the same box without argument is coded as sharing.

8. Rules concerning autonomy behavior:

a. "Responsible maintenance readies" may be coded when a child is getting materials out for an activity if it takes 15 seconds or more. Taking a puzzle off a shelf and starting to play is coded as "chooses activity."

b. Responsible maintenance, readies is coded even though the adult may remind the child or structure the clean-up operation.

c. To code "waits" the child must wait for more than 15 seconds as a result of the situation, e.g., waiting for snack to be served, waiting for circle time to begin. "Unoccupied" or "onlooker: observes listens" may be coded with "waits" but it is not necessary. Voluntary waiting for one's turn on the tricycle is not coded as "waits."

APPENDIX B

Center A: Letter to Parents

Center A: Statement of Philosophy

Center B: Letter to Parents

Center B: Statement of Philosophy

Center A: Letter to Parents

November 6, 1978

DEAR PARENTS,

This fall we are cooperating in a research project being conducted by Beth Perkins, a graduate student in Early Childhood Education. This project involves working with the staff on defining specific goals for the classroom and then, through observation determining the extent to which these goals are being met. Beth was a teaching assistant in a UMass course on designing environments for pre-schoolers. Barbara took this course and benefited from Beth's insights. We expect this to be a valuable growth producing process for the staff and school as a whole. The letter included here describes the research procedures and measures taken to assure confidentiality of information. If you would like further information on the project, or if there are any objections or reservations, feel free to contact Nancy or Barbara.

Dear Parents,

This letter is to explain our presence at the South Hadley Child Care Center. I am a graduate student in Early Childhood Education and have worked with Barbara in the Inservice Masters Program. I am doing my dissertation on the relationship between children's behavior and the environment. Therefore, we are looking at various behaviors using stop watches, code sheets, etc. The behaviors include task involvement, type of social play, verbalization, sharing and autonomy. So far the behavior of all the children is very impressive. South Hadley Child Care Center is certainly an excellent facility, in my opinion.

I would like to explain several things about the study: (1) The study focuses on the behavior of the children as a group, not individually. (2) The staff has complete access to all collected data. (3) The names of the children will never be reported nor will individual children be written about. (4) The point of the study is to improve child care settings.

I thank you for letting us observe your children. We should be finished by mid-December.

Sincerely,

Elizabeth Perkins

Center A: Statement of Philosophy

The program at the South Hadley Child Care Center is based on the belief that each child is an individual developing at his/her own pace, and that each child is an active participant in his/her learning experiences. The curriculum is built around the child's needs and strives to enhance the children's development in four basic areas: Physical, Social, Emotional, and Intellectual.

Our specific goals at the Center are:

1. To respect each child and to encourage children to recognize and respect each other's needs.

2. To enhance each child's self-concept by providing challenging activities and fostering independence through creative problem solving.

3. To promote the growth of the child's inner self control by setting reasonable limits.

4. To develop language and communication skills.

5. To stimulate each child's creative self expression.

6. To develop the children's awareness of the world around them.

The day will include quiet and active periods, structured and unstructured time. Children will have the opportunity to play alone or with groups of other children. Children will be allowed to move at their own pace and to have a part in the decision-making process.

Please be sure to let us know of anything that is going on in your child's life that may affect his/her behavior at school. When teachers are aware of the child's total life situation, they can respond more readily to your child's needs.

Center B: Letter to Parents

October 29, 1978

Dear Parents,

This letter is to explain the presence of myself, and Angie and Judy carrying clipboards and watching the children. I am a graduate student in Early Childhood Education and have worked with Shelley in the Inservice Masters Degree Program at UMass. I am doing my dissertation on the relationship between children's behavior and the environment. Therefore, we are looking at various behaviors using stop watches, code sheets, etc. The behaviors include task involvement, type of social play, verbalization, sharing and autonomy. So far the behavior of all the children is very impressive.

I would like to explain several things about the study: (1) The study focuses on the behavior of the children as a group, not individually. (2) The staff has complete access to all collected data. (3) The names of the children will never be reported nor will individual children be written about. (4) The point of the study is to improve child care settings.

I have spoken with the staff at length about the project and would be willing to attend a parent meeting to explain it in more detail. Please feel free to ask any of us questions.

Sincerely,

Elizabeth Perkins

Center B: Statement of Philosophy

Grassroots Cooperative School was established in 1973 by a group of parents in conjunction with the University Day School. The intent of this group was to provide a quality preschool program with maximum parent involvement. Parental control is maintained through working directly in the classroom, establishing school policies, serving as officers and advisory board members, and hiring of professional staff.

The goals and objectives for the children are:

1. To encourage each child to think of him/herself as a social being, to become a responsible member of our community, to develop trust and tolerance for the differences of others.

2. To help children recognize and understand their feelings, to express them appropriately and thereby develop a sense of self-worth.

3. To establish an atmosphere in which children may experiment, gain confidence in their own capabilities, and learn to set realistic goals.

4. To equip children with the basic skills necessary for successful future learning experiences, processing skills, and the desire for knowledge and understanding.

5. To provide children with a learning environment in which they are expected to make choices and direct their own activities as much as possible.

6. To provide physical activities planned around the developmental level and the specific needs of the children in the program.

7. To encourage and develop sensitivity and personal expression.

In addition, the program is designed to enable parents to gain a better understanding and knowledge of developmental levels and of various teaching techniques. The program is also structured to provide support and assistance for parents and opportunities to share common concerns.

Appendix C

Notes accompanying a report to SHCC Staff and Board of Directors concerning the data collected on children's behavior at the Center in November 1978.

Elizabeth Perkins

Children's Behavior can be seen as a function of their Interaction with their Environment — both physical and human

Data was collected for eight days every half-hour from 9:00 a.m. to 12:00 p.m. every other day. Every other day the author started at ten past the hour and half hour so that all parts of the morning were covered equally. The following categories were observed for: the group size, the adult role, task involvement, level of social and cognitive play, verbalizations, prosocial behavior and autonomy. Each child was observed for 30 seconds and then the behavior was coded. Each child was observed once each half hour and his/her location in the center noted. Thus, when we look at the behavior summarized here, we can see how children behave in various learning areas. The major purpose of this study is to test the principle that we can rearrange the environment to bring out more of the growth enhancing behaviors desired. The object of studying the data is to understand the current relationship between the children's behavior and the environment we create for them. This includes the role of adults, the size of the group, and the activity or learning area in which the behaviors occur. Finally, we will decide on some changes in the environment in the hopes of increasing some behaviors and/or decreasing others. Then I will observe the children for another eight days and give you the results.

Some Data — SHCC — November 30, 1978
Perkins

Total number of individual observations = 797

Outdoor play = 35%

Free play activities = 20.3%

Clean-up, circle, small meeting, & transitions = 37%
(Circle & small meeting = 20.5%) (clean-up = 9%) (transitions = 8%)

Miscellaneous (snack, office, story, walk, real library) = 12%

Outdoor Play = 35% of all activity

Task: unoccupied = 14%
observes = 9%

Focuses on task = 23.5%

Total Verbalizations = 84%

Functional = 38.5%
Constructive = 6.7%
Dramatic = 9.6%
Games w. rules = 1.0%

Total Levels of Play = 55.8%

Little waiting: chooses activity & readies = 21.5%
(.02%)

Free Play Activities = 20.3% of all activity

Blocks = 4% of all activity throughout morning

73% boys, 27% girls, 60% = 4-6 children adults = 48% uninv.
27% watch
2% partic.

Focuses on task = 57% Unoccupied = 21%
All levels of play = 66% Constructive parallel = 27%
Verbalizing to child & self = 60% Chooses activity = 18%

Housekeeping = 5% of all activity

66% girls, 33% boys group size 2-3 = 45%; 4-6 = 40%
Adults: uninv. = 50% focuses on task = 42%
watch = 26% unoccupied = 13%

all levels of play = 63%
sociodramatic = 18%

Library = 1.6% of all activity

adult role = 92% uninvolved
coop-group play = 69%
sociodramatic = 38%

reads = 15%
focuses on task = 46%

Art = 34% of all activity

66% girls, 33% boys

focuses on task = 66%
maintenance = 11%

all levels of play = 74%

(solitary & parallel, constructive: open & closed = 55%)

Other Free Play Categories and the % of time they are utilized

cooking = 1.4%
manipulatives = 1.1%
playdough (clay) = 1.6%

water play = 1.0%
large muscle = 1.2% (lots of taking turns = 90%)
little play room = 2%
focuses = 43%
waits = 31%

Clean up, Circle, Small Meetings, & Transitions = 37% of all activity

clean up = 9% of all activity
unoccupied = 22.8%
onlooker = 5%
focuses on task = 18.5%

group size: 1-28%
2-3-44%
4-6-14%
7+ -12%

adults: uninv. 57%
watches 14%
partic. 4%
mediat. 7%
leads 17%

all levels of play = 51%
disturbs activity & misuse = 13%
shares & helps = 4%

respons. maintenance = 30%
chooses activity = 10%
waits = 0%

Circle = 17.3% of all activity

unoccupied = 28%
observes = 24%, total
focuses = 22% } 46%
waits = 33%

group size: 7+ = 100%
adults: leads = 99%

Small Meeting = 3.2% of all activity

unoccupied = 8%
observes = 52% } total
focuses = 16% } 68%
waits = 28%

group size: 2-3 = 12%
4-6 = 52%
7+ = 36%

Transitions (outdoors & inside) = 8% of all activity

chooses activity = 16%
resp. maint., readies - 22%
waits = 40%

adult role: uninv. = 25%
leads = 28%

Miscellaneous = 12% of all activity

snack = 4.5 of all activity

verbalizations = 44%/resp. maint. = 14%/waits = 17%

office = 0.5% of all activity

story time = 3.7% of all activity

unoccupied = 0%/onlooker, listens = 83%/waits = 10%

walk = .006%

real library = 3.3% (should be 6.6% - but I only observed on one Friday)

group size: 7+ children = 100%

adult leads = 89%
waits = 26%
onlooker listens = 66%
unoccupied = 7%

November 30, 1978

Some ideas for environment changes that have been discussed with the Director and Educational Supervisor:

1. Rearrangement of space (for 2 weeks to see if it works)

   A quiet room-would include: a manipulative area
   a reading/library corner
   a skills & science table & display

   An office & snack room would include: desk
   cubbies for clothing
   parent sign in
   cot storage
   snack & cooking table
   and lots of traffic

   Block room: would be rearranged to eliminate the path through the block area

   Art room: would include two art tables (includes playdough)
   art storage
   one easel
   water play table

   Little playroom would include: wood working with rug squares for noise

2. Schedule changes to reduce the amount of time children spend in large groups.

APPENDIX D

Behavioral Map for Center A Phase I

Behavioral Map for Center B

Behavioral Map for Children's Behavior in Social Settings

Phase I from 11/6 to 11/20

Center A

Page 1 of 3 #of obs. 48 (798)

(Phyfe Perkins, 1978)

			Circle	Small Meeting	Snack	Library	Cooking Science	Manipulatives	Water Play	Blocks	Housekeeping	Playdough
# of girls			73	9	17	9	5	4	5	9	25	6
# of boys			65	16	19	4	7	5	3	24	13	7
Total # of children			138	25	36	13	12	9	8	33	38	13
Group size	1	1			2	1	2		3	1	3	1
	2-3	2		3	5	12	7	4	5	6	17	5
	4-6	3		13	11		3	5		20	15	7
	7+	4	138	9	18					6	3	
Adult role	uninv.	1			8	12	1	6	5	16	19	4
	watch/help	2			14			2	3	9	10	7
	partic.	3	1		6	1	2	1		1	7	1
	mediate	4		1						5	2	1
	leads	5	137	24	8		9			2		
Unoccupied			39	7	3					7	5	
Onlooker listens/observes			33	13	2				5		4	1
reads						2					1	
Focuses on activity task			30	4	1	6		4	3	19	16	8
Solitary:	functional									4	3	1
	construc. open									2		
	construc. closed		1			1						
	dramatic		1								5	
Parallel:	functional		1					1		4	1	5
	construc. open							3		9	1	3
	construc. closed			1				2			1	3
	dramatic									1	5	
Coop. group:	functional											
	construc. open					1				2		
	construc. closed					1		1				
	sociodramatic					5					7	
	game w/rules					2						
Rough & tumble											1	
Verbalize to child			12	2	5	8		4	1	10	20	7
	to adult		27	7	9	1		3	7	7	6	3
	to self		6	1	2	2			2	10	5	3
Shares/takes turns			1	3	1	3			2	2	1	3
Help/comfort/affection			8	1	1					1	1	
Disturbs			7	2				1		5	3	1
Misuse/abuse										1	1	1
Chooses activity				1		1		2	2	6	5	1
Readies/reso. maint.			2		5	2				2	3	
Waits			46	7	6				5			

Behavioral Map for Children's Behavior in Social Settings

Phase I from 11/6 to 11/20

Center A

Page 2 of 3 #of obs. _____

(Phyfe Perkins, 1978)

			Large Muscle	Art + Easel	Little Playroom	Office	Story	Transition	Cleanup	Walk	Real Library	Outside
# of girls			5	18	1	1	21	29	12	2	12	18
# of boys			5	9	15	2	9	20	14	3	15	36
Total # of children			10	27	16	3	30	49	26	5	27	56
Group size	1	1		8	2			7	5			24
	2-3	2		17	5	3	1	21	9			25
	4-6	3	2	2	7		4	1	3			7
	7+	4	8		2		25	20	4	5	27	
Adult role	uninv.	1		11	13	2		13	8		1	35
	watch/help	2	5	14				11	5		2	15
	partic.	3		2			1	1	1			5
	mediate	4	1					1	1			
	leads	5	4		3	1	29	23	11	5	24	1
Unoccupied			1	2		1		6	8	2	2	14
Onlooker listens/observes			1	3	2	1	25	8		3	18	3
reads					1	1			1			
Focuses on activity task			2	18	7			1	4			13
Solitary:	functional		1	3	5			1	2			13
	construc. open			7								
	construc. closed			2	1			1	1			
	dramatic								1			2
Parallel:	functional		4	1	1							9
	construc. open			1								
	construc. closed			5					1			
	dramatic								2			
Coop. group:	functional				1			1	1			3
	construc. open			1								1
	construc. closed											
	sociodramatic								1			2
	game w/rules											2
Rough & tumble					1							3
Verbalize to child			5	6	3		1	15	10	1	3	18
to adult			2	10	3	1	8	11	6	1	6	12
to self				3	3	1	1	3	2	2		11
Shares/takes turns			9	1	1				1		1	1
Helo/comfort/affection			1					4				3
Disturbs			1		1		1	3	2			4
Misuse/abuse				1	1			-	2			
Chooses activity			3		2	1		8	2			10
Readies/resp. maint.			1	3	1			10	10		1	3
Waits			1	2	5	2	3	24			7	1

Behavioral Map for Children's Behavior in Social Settings

Phase I from 11/6 to 11/20

Center A

Page 3 of 3 #of obs. _____

(Phyfe Perkins, 1978)

			Sand	Porch Area	Slide + Spools	Firefighter Gym	Jungle Gym	Playhouse	Clean up	Transition	TOTALS
# of girls			9	32	10	6	15	11	18	6	388
# of boys			13	23	5	15	16	11	26	8	410
Total # of children			22	55	15	21	31	22	44	14	798
Group size	1	1	2	10	2		9	3	15	8	108
	2-3	2	18	39	10	13	12	11	22	3	273
	4-6	3	2	5	3	8	10	8	7	1	144
	7+	4		1						2	273
Adult role	uninv.	1	12	40	9	15	21	20	32	8	311
	watch/help	2	9	12	4	3	8	1	5	3	142
	partic.	3	1		2				2	1	36
	mediate	4		2		3	2		4	1	24
	leads	5		1				1	1	1	285
Unoccupied			1	11	1		3	1	8	5	122
Onlooker listens/observes			2	6	1	3	5	1	4		149
reads											
Focuses on activity task			9	11	2	5	11	5	9	1	193
Solitary:	functional		4	9	1	1	5	3	9	1	66
	construc. open			3			1		1		14
	construc. closed										6
	dramatic			1	1			2	3	1	18
Parallel:	functional		5	3	1	6	11	5	7	1	66
	construc. open			3			1				21
	construc. closed		1			1					15
	dramatic		1	4					1		14
Coop. group:	functional		2	2		3		3	2		18
	construc. open		1	2		1	2				11
	construc. closed		1								3
	sociodramatic			7				2	4		28
	game w/rules		1								5
Rough & tumble				1		2	1	1			10
Verbalize to child			12	27	4	14	16	15	19	4	236
	to adult		6	7	5	6	6	2	11	5	178
	to self		2	11	1	4	4	3	7	1	90
Shares/takes turns			1	3	1	1	1		1	1	55
Help/comfort/affection				1			1	1	1		24
Disturbs			3	4	2	4	2		2	1	49
Misuse/abuse			1	1		1			3		13
Chooses activity			2	4	3	1	5	6	5	2	71
Readies/resp. maint.				3			1		11	4	62
Waits				3	1					1	116

Behavioral Map for Children's Behavior in Social Settings

Phase ALL from 10/30 to 12/15

Center B

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(Phyfe Perkins, 1978)

			ART	Woodworking	Water/Sand	Blocks	Role Play	Clean Up	Snack	Circle	Indoor Transitions	Cooking
# of girls			24	1	3	18	35	8	21	22	8	3
# of boys			35	7	16	58	53	15	30	51	22	2
Total # of children			59	8	19	76	88	23	51	73	30	5
Group size	1	1	10	2	1	4	1	4			12	
	2-3	2	21	4	8	17	24	6	3	1	3	1
	4-6	3	23	2	18	52	37	5	11		12	4
	7+	4	5			3	26	8	37	72	3	
Adult role	uninv.	1	12	5	8	5	6	3			12	
	watch/help	2	34	3	6	50	37	3	17	1	15	2
	partic.	3	9		4	16	42	2	24			
	mediate	4			1	3	3	3				
	leads	5	4			2		7	10	72	3	3
Unoccupied			3	1	1	4	16	8	1	15	9	
Onlooker listens/observes			10	1	2	13	15	1	7	30	1	1
reads							2	1				
Focuses on activity task			43	5	12	37	37	4	1	18		
Solitary:	functional		1		3	3	3			1	1	2
	construc. open		6			2	2					
	construc. closed											
	dramatic				1	3	5	1				
Parallel:	functional		2		8	4	4		1			1
	construc. open		30	4		21						
	construc. closed											3
	dramatic					5	17					
Coop. group:	functional				3	1					1	
	construc. open					10	3					
	construc. closed							1				
	sociodramatic					2	13					
	game w/rules					1	2					
Rough & tumble				1			1					
Verbalize to child			14	4	9	22	50	7	13	5	9	2
	to adult		23	2	4	32	42	10	14	12	13	1
	to self		4	1	2	15	9	1	4			
Shares/takes turns			1	1	2	6	7	1			1	2
Help/comfort/affection			2	1	0	1	2			1	1	1
Disturbs				1	1	1		2				
Misuse/abuse			2		2	6	1	1				
Chooses activity			4		2	5	9		3		8	
Readies/resp. maint.			5			13	4	8	16		9	
Waits			1				4		7	15	9	

Behavioral Map for Children's Behavior in Social Settings

Phase ALL from 10/30 to 12/15

Center B

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(Phyfe Perkins, 1978)

			Playdough	Manips.	Reading	Table Games	Listening	Outside/Bush	Moveable Climber	Playhouse	Jungle Gym	Swings
# of girls			7	9	12		3	19	12	11	8	2
# of boys			15	40	12	3	8	42	16	28	11	14
Total # of children			22	49	24	3	11	61	28	39	19	22
Group size	1	1		9	4			14	3			
	2-3	2	3	24	7		10	23	14	16	6	9
	4-6	3	12	15	5	3	1	22	11	16	13	13
	7+	4	7	1	8			2		7		
Adult role	uninv.	1	1	18			6	32	82	12	2	1
	watch/help	2	2	15			4	17	8	23	9	17
	partic.	3	19	15	2		1	4	9	4		3
	mediate	4		1	1				2		2	
	leads	5			21	3		8	8		6	1
Unoccupied				4	1	1		8	4	5		2
Onlooker listens/observes			2	7	18		7	12	2	4	4	2
reads					3							
Focuses on activity task			12	24	1	2	1	22	12	9	1	6
Solitary:	functional		15	3				7	4	3	4	6
	construc. open		4	3				1				
	construc. closed		1	1								
	dramatic							2				
Parallel:	functional			1				3	5	6	6	9
	construc. open			8				2				
	construc. closed			1								
	dramatic							1	2		2	
Coop. group:	functional			3			1		5	5		2
	construc. open			2					2			
	construc. closed			1								
	sociodramatic			2				10		9		
	game w/rules			2		2		2				
Rough & tumble								1		3		
Verbalize to child			9	23	3	1	5	27	14	19	5	8
	to adult		7	14	7	1	3	16	10	14	10	6
	to self		1	7				16	2	2	2	4
Shares/takes turns			1	4		2		3	5	2	4	2
Help/comfort/affection				1				1		1		
Disturbs			1	3					1	3		
Misuse/abuse				1						1		
Chooses activity			2	3			1	11	3	2	2	2
Readies/resp. maint.				3				3		1		1
Waits								1			1	

Behavioral Map for Children's Behavior in Social Settings

Phase ALL from 10/30 to 12/15

Center 8

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(Phyfe Perkins, 1978)

			Outdoor Sand	Transition Outdoors	TOTAL
# of girls			11	6	24.9
# of boys			10	7	49.5
Total # of children			21	13	74.4
Group size	1	1	2	1	67
	2-3	2	6	6	213
	4-6	3	12	5	282
	7+	4	1	1	182
Adult role	uninv.	1	2	2	143
	watch/help	2	12	10	283
	partic.	3	7		157
	mediate	4			16
	leads	5		1	147
Unoccupied			1	1	86
Onlooker listens/observes			4	6	156
reads					
Focuses on activity task			13	4	268
Solitary: functional			1	1	58
construc. open			1		25
construc. closed					2
dramatic					10
Parallel: functional			4	2	56
construc. open			4		82
construc. closed					
dramatic			1		29
Coop. group: functional					20
construc. open					12
construc. closed			4		
sociodramatic			1	1	39
game w/rules					7
Rough & tumble				1	9
Verbalize to child			9	5	195
to adult			9	6	257
to self			4	1	73
Shares/takes turns					49
Help/comfort/affection			1	1	16
Disturbs			1		15
Misuse/abuse			1		15
Chooses activity			1		58
Readies/resp. maint.			1	6	70
Waits				8	44