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AUTHOR Rogers, Carolyn Odom
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ABSTRACT

The purpose of this study is to examine the organization of play space and the effect which this organization has on children's productive and disruptive behavior in an indoor nursery setting. A second purpose was to develop a category system for recording the productive and disruptive behavior of young children in a free play situation. The subjects were 21 4- and 5-year-olds from middle and upper middle class families, attending private nursery school. The effects of two room arrangements were compared: (1) maximum organization, with open paths and one-third to one-half of the available space being an open area, and (2) minimum organization with blocked paths and less than one-third of the available space being an open area. An adapted instrument was developed utilizing categories based on Walters and others and the recording method developed and reported by Caldwell and others. Observations were made over a period of six weeks. Results of the study indicate that during the course of the day children are most often engaged in productive behavior. With maximum organization, children are more verbal than physical, and physical behavior is more productive than disruptive. When the two classroom organizations were compared, significant differences in behavior favoring the maximum organization were found. Sex of the subject was not related to observed behavior. (MS)

THE RELATIONSHIP BETWEEN THE ORGANIZATION OF PLAY SPACE AND CHILDREN'S BEHAVIOR

By

CAROLYN ODOM ROGERS

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

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Scope and Method of Study: One purpose of this study was to develop a category system for recording productive and disruptive behavior of young children in a free play situation. Another purpose was to examine the organization of play space and the effect which the organization has on children's productive and disruptive behavior. The subjects for this study were 21 preschool children, 16 boys and 5 girls. The APPROACH method of recording observed behavior was utilized in conjunction with a category system of productive and disruptive behavior. A record was made of the behavior observed in a free play situation in a classroom arranged with maximum organization (open paths and 1/2 to 2/3 surface covered) and in a classroom arranged with minimum organization (blocked paths and more than 2/3 surface covered). Observed behavior was listed in specific categories of overt physical disruptive, verbal disruptive, overt physical productive and verbal productive.

Findings. (1) Children are most often engaged in productive behavior ($p < .0001$), especially verbal productive behavior ($p < .0001$). (2) With maximum organization the children are more verbal than physical ($p < .0001$) and the physical behavior is more often productive than disruptive ($p < .0001$). (3) When behavior in the situation with maximum organization is compared with the same behavior in the situation with minimum organization, the significant differences all favor the situation with maximum organization: there is more total behavior $p < .005$, more productive behavior $p < .0001$, more verbal productive behavior $p < .0001$, less disruptive behavior $p < .005$, and less verbal disruptive behavior $p < .005$. (4) The sex of the subject is not related to the observed behavior.

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AND CHILDREN'S BEHAVIOR

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CHAPTER I

INTRODUCTION

Problem

Concern with the relationship of space to children's behavior is the basis for the current study. The effects of the arrangement of physical space have been given very little consideration until the study of Kritchevsky and Prescott (1969) called attention to the fact that space and how it is arranged can affect the behavior of people; the amount and arrangement of space can make it easier to act in some ways, harder to act in others. Kritchevsky and Prescott (1969) also pointed out that even though quality of physical space was one of the most effective predictors of program quality, teachers and directors seemed to be completely unaware of this influence.

This investigation has found no other studies which analyzed the aspects of physical space and their effect on children's behavior. More research is needed to determine whether the effects of spatial arrangement are as influential as has been suggested by Kritchevsky and Prescott (1969). If so, there needs to be more effort to disseminate information about these effects to teachers and directors who are in charge of providing and arranging physical space for young children.

In the analysis of play space and related behavior certain specific terms have been used. They are defined as follows:

Pathways -- Empty space on the floor through which people move in

getting from one place to another (Kritchevsky and Prescott, 1969).

Play units -- Areas which contain something to play with and may or may not have tangible boundaries. This includes the surrounding empty space which the unit needs to function effectively (Kritchevsky and Prescott, 1969).

Empty space -- Surface that is not covered by anything. The suggested range of empty space is a range of no less than 1/3 and no more than 1/2 of the floor space (Kritchevsky and Prescott, 1969).

Organization rating -- Rating based on the clarity of paths and surface coverage (Prescott, Kritchevsky and Jones, 1972).

Disruptive behavior -- Behavior exhibited by normal children which interrupts other children's activities or the class routine.

Productive behavior -- Behavior exhibited by normal children which promotes good social relations or group cooperation.

Purpose of Study

The major purpose of this study was to examine the organization of play space and the effect which this organization has on children's productive and disruptive behavior in an indoor nursery school setting. The specific purposes of this study were: to develop a category system for recording productive and disruptive behavior of young children in a free play situation and to examine the following hypotheses.

I. The arrangement of space in a nursery school setting is independent of the amount of behavior observed in the following categories:

(a) total amount of observed productive and disruptive behavior; (b) amount of productive behavior; (c) amount of disruptive behavior; (d) amount of physical produetive behavior; (e) amount of verbal productive behavior; (f) amount of physical disruptive behavior; and (g) amount of verbal disruptive behavior.

II. Within the "maximum organization" (good) situation there is no relationship between: (a) physical behavior versus verbal behavior; (b) productive behavior versus disruptive behavior; (c) physical productive versus verbal productive behavior; (d) physical disruptive versus verbal disruptive behavior; (e) physical disruptive versus physical productive behavior; and (f) verbal disruptive versus verbal productive behavior.

III. Within the "minimum organization" (poor) situation there is no relationship between: (a) physical behavior versus verbal behavior; (b) productive behavior versus disruptive behavior; (c) physical productive versus verbal productive behavior; (d) physical disruptive versus verbal disruptive behavior; (e) physical disruptive versus physical productive behavior; and (f) verbal disruptive versus verbal productive behavior.

IV. There are no differences associated with sex in the following categories of observed behavior: (a) total observed behavior; (b) total physical behavior; (c) total verbal behavior; (d) total disruptive behavior; (e) total productive behavior; (f) physical disruptive behavior; (g) verbal disruptive behavior; (h) physical productive behavior; and (i) verbal productive behavior.

CHAPTER II

RELATED LITERATURE

Physical Space Indoors

Amount and Arrangement of Space

The lack of awareness of the importance of the organization of physical space on children's behavior is disappointing. The majority of textbooks written for study in early childhood education refer to physical space only in terms of square footage (35 to 60 square feet per child) of open floor space which should be provided in a facility housing young children.

Kellogg (1949) pointed out that there should be a combination of paths and open areas in order for children to be easily supervised by one adult. Cooper, Dales, Skipper, and Witherspoon (1974) emphasize pathways for a different reason. Paths arranged so the children can move easily from one piece of equipment to an adjacent play center are stressed.

Segal (1975) explains that children should be able to get in and out of centers of interest without disturbing the other children and that no center should be used as a passageway. Osmon (1971) emphasizes the need for paths to allow children to look over each potential activity and as a bypass route to move quickly from one side of the room to another without disrupting the children engaged in an activity or those

just watching.

Kritchevsky and Prescott (1969) and Prescott, Jones and Kritchevsky (1967) have done considerable research into the design of physical space. These researchers define a path as:

> . . . the space that children use to move from where they are to where they want to go; a clear path is broad, elongated and easily visible. It helps children move quickly and directly from one place to another, and it clearly separates /play/ units from one another (p. 263).

They also emphasized that total absence of a path because of too much equipment placed too close together will cause children to bump into one another and to interfere, accidently and often, in one another's play.

Several studies have connected children's behavior with spatial factors (Johnson, 1935; Murphy, 1937; Muste and Sharp, 1947; Jersild and Markey, 1953; and Body, 1955). Stevens (1968) and Gardner (1968) in bulletins published by the Association for Childhood Education International and the Child Welfare League (1969) indicate that adequate, well-organized, efficient space reduces confusion, disorder and discipline problems. These authors also pointed out that lack of space causes children to get in each other's way and does not provide sufficient areas for individual learning activities. Well-organized efficient space, however, is not defined in terms which actually indicate what causes the problems which are created.

Arrangement of Equipment

Arrangement of equipment is a more frequently recognized area of concern. Generally, though, reference is made to separating quiet and active areas from each other (Haase, 1968; Hymes, 1968; Stevens, 1968;

Child Welfare League, 1969; Segal, 1975; and Leeper, et al., 1974). All emphasized a need for a quiet corner away from other activities in each play room.

Read (1971) stresses the need for centers of interest which have ample space for several children using them at the same time in order to encourage social development. Osmon (1971) explains that children working in a particular area tend to expand into adjacent space which may cause conflicts with the children in the other spaces. He suggests that bounding areas with pathways using movable dividers and shelves may reduce this problem in some situations.

Kritchevsky and Prescott (1969) explain "play unit" as a piece of equipment and the space around it which is necessary to its use. This surrounding space is not free for other uses. If this space is part of a path or overlaps the space of another play unit, there will be conflicts and interruptions of play.

Prescott, et al. (1972) developed the "Center Space Schedule" which rates the physical space of child care centers. Much emphasis is put on the kinds of paths provided, the amount of equipment and the arrangement of the equipment.

One aspect of arrangement of equipment in space, position preference, was studied by Witt and Granza (1969). Observations were of children's uses of a large and small trestle placed in a well-equipped play room, with regard to its position in the room. The results showed a definite preference for a position in the center of the play room. The authors felt this is an area needing much investigation because it could have implications for modifying children's play behavior patterns by the positioning of equipment.

Johnson (1933) investigated how the amount of equipment on a playground affected children's behavior. The results indicated that individual endeavor is encouraged while social contact and undesirable behavior (teasing, crying, quarreling, and hitting) are discouraged by the relatively more extensive equipment.

Behavior Related to Space

The disruptive and productive behavior delineated in this study might be considered to be aggressive and affectional responses as previously reported in the literature. Therefore, literature relating to aggression and affection will be reviewed. This author, however, does not feel that the entire areas of aggressive and affectional behaviors are pertinent to, nor included in the present investigation. Numerous researchers including Gesell and Lawrence (1958), S. Feshbach (1970), Hartup and Feshbach (1971), and Muste and Sharpe (1974) have been concerned with the child's motivation for his behavior and whether or not to be reinforced for the behavior. These aspects of behavior are not considered in the present research.

Boys are usually recognized as being more physically aggressive than girls (Gesell and Thompson, 1941, Walters, Pearce and Dahms, 1957; Garrett, 1943, Mitchell, 1966, Muste and Sharpe, 1974; and Smith and Green, 1975). These findings are much less consistent when other forms of aggression are considered. Verbal aggression has been shown to be [illegible] according to the studies conducted by Muste and Sharpe (1974), Emmerich (1961), Haggett (1973), and Feshbach (1969). It appears from these studies that boys are generally more physically aggressive and girls more indirect forms of aggression.

Muste and Sharpe (1947) found that boys are more aggressive when paired with boys and less aggressive when paired with girls. While girls are more aggressive when paired with boys than when paired with girls. The same results were obtained by Smith and Green (1975) using British subjects.

Affectional and aggressive responses of nursery school and kindergarten children were studied by Walters, Pearce and Dahms (1957). Results indicated affection was much more frequently expressed verbally than physically. At all age levels affectional responses occurred more often than aggressive responses, and at the four and five year age levels, the children tended to express their aggression verbally rather than physically. A tendency for boys to choose boys as recipients of both their affectional and aggressive contacts rather than girls or adults was also found.

Observational Methods

According to Wright (1960):

> The simpliest way of all to study child behavior is observational. One gets within seeing and hearing distance of a child, observes and records something of his behavior or situation or both, and then scores, classifies, summarizes, freely interprets or otherwise does something with the recorded observations (p. 71).

The most commonly used method of observational studies with preschool children involves time-sampling. Time-sampling consists of observations made of children's behavior for a specified length of time. The observations are usually repeated on several different occasions. The behavior is recorded in some manner such as a diary or a coded category system. The period of time specified varies from a few seconds to several minutes. According to Loomis (1931) a five-minute time-sampling

gives an adequate picture of the child's behavioral pattern. Five-minute time samples of preschool children's social relations in a group have been used by Beaver (1932) and Emmerich (1964).

The effect the observer may have on the children being observed has been of concern to the observational researcher. Katz, Peters and Stein (1968) suggest:

> Observers must exercise great care to be quiet and unobtrusive in the classroom and to refrain from interacting with the children. Initially the children often try to engage the observer in conversation: however, if the observers resist the temptation the children will quickly come to ignore their presence (p. 402).

The study of Masling and Stern (1969) reaches two alternative conclusions (a) the teacher and pupil variables under study occur episodically and are more important than observer influence; (b) the effects of the observer are extremely complex and affect various aspects of classroom behavior differently.

Observational studies of children have been complicated because of elaborate check lists, rating scales, or movie cameras which have been used for observational data (information). Over the years, many researchers have tried to develop a simpler method of observing and recording the behavior of children.

A new method of recording observations of behavior was developed and reported by Caldwell (1969) and Honig, Caldwell, and Tannenbaum (1970). These researchers describe APPROACH (A Procedure for Patterning Responses of Adults and Children) as a method which codifies observations of behavior and of the setting in which the behavior occurs. The observer is stationed near the subject and whispers into a tape recorder all the behavior exhibited by the observed subject. Each observation is broken into behavioral clauses, which include a subject,

predicate, objects and a few selected qualifiers. The APPROACH method allows detailed representation of incidents of behavior without requiring the observer to learn complicated coding language.

Walters, et al. (1957) conducted a thorough study of affectional and aggressive behavior in preschool children. An instrument was developed for the purpose of recording behavioral responses of children being observed. The instrument consisted of sets of items in four categories: physical affection; verbal affection; physical aggression; and verbal aggression. The categories included many non-verbal interactions which are an important part of social interchange and therefore are especially useful in describing behavioral responses.

CHAPTER III

PROCEDURE

Subjects

The subjects for this study were 21 preschool children, 16 boys and 5 girls ranging in age from 4 years 9 months to 5 years 11 months. These children were attending a private nursery school located in Tulsa, Oklahoma, in the spring of 1975. Their families were judged to be primarily of the middle and upper middle socio-economic status, most being business and professional people.

Instruments

Categories of Productive and Disruptive Behavior

This investigator has adapted and expanded the instrument developed by Walters, et al. (1957) to serve as a categorized listing of the productive and disruptive responses of the subjects. The expanded instrument was submitted in outline form to a panel of 18 experts. The panel consisted of three groups of teachers: (1) teachers who teach young children, (2) teachers who teach about young children, and (3) teacher educators who teach young children and about young children. The panel consisted of six members from each division. The panel members in the first group were randomly selected from preschools in the Tulsa area; the second and third divisions were made up of teachers from Oklahoma

State University. In order for an item to be included in the final category system it must have been approved by 15 of the 18 panel members. The original instrument developed by Walters, et al. (1957) may be seen in Appendix A, while the expanded and amended instrument may be seen in Appendix B.

Organization of Play Space

The investigator used the "Center Space Schedule" developed by Prescott, et al. (1972) was used to assess the physical space of the classroom in which the subjects were observed. The sections of this schedule pertinent to this investigation may be seen in Appendix C. Assessment is based on scores in the areas of (1) organization, clarity of paths and surface covered; (2) complexity, types of play units; (3) variety, number of different things to do plus scheduled variation; (4) special problems; and (5) number of places per child, based on number and types of play units. The rating determined for the classroom remained constant throughout the study with the exception of the rating for organization. The components of this rating (pathways and surface covered) were rearranged to allow for a comparison of behavior occurring in different classroom arrangements. The classroom was arranged in two ways. The first arrangement had maximum organization (open paths and 1/2 to 2/3 surface covered), the second arrangement had minimum organization (blocked paths and more than 2/3 surface covered). Diagrams of the two different room arrangements may be seen in Appendix D and E.

Coding Method

A modification of the APPROACH method developed by Caldwell et al.

(1969) was chosen as a means of recording the observed behavior of the subjects. All observations were broken into behavioral clauses, which included a subject, predicate, objects, and a few selected modifiers. Each of the four components of the behavioral clause were translated into a numerical code and grouped into a final 5-digit statement reflecting the entire behavioral clause. The first digit describes the subject. The second and third digits represent the verb or action and the fourth digit identifies the object of the action. The fifth digit represents the modifiers which may be used for clarity.

For this investigation, the second and third digits (00 through 70), representing the verb, were assigned to the adapted and expanded categories developed by Walters, et al. (1957). The adaptation of the category system for identifying behavior with the appropriate digits assigned to each category to allow the use of a modified APPROACH system for coding observed behavior may be found in Appendix B.

Approval for Observations

Before the observations of the subjects began, a letter was mailed to the parents of all of the subjects, explaining the study. The parents were told to contact the investigator or the school if they had any questions or concerns about the study. Many of the parents were very interested in the investigation and asked how the results would be used but none expressed any reluctance to having their child included in the study.

Administration and Scoring

Pilot Study

A pilot study was conducted by the investigator to make sure the behavior exhibited by the children was the same behavior as was depicted in the category system, and to experiment with the use of the tape recorder and stop watch. These observations were taken through a one-way glass so that the children would not be disturbed by this initial phase of the study.

During the pilot study, the investigator recognized that one area of behavior, consciously avoiding conflict with other subjects, was often observed but had not been included in the category system. After consultation with four members of the panel, this category was added to the system under the heading of Overt Physical-Productive Behavior.

Collection of Data

Before beginning the observations, the observer visited the class to become familiar with the children and to demonstrate with the children the use of the tape recorder. This was done on three consecutive mornings. On the final morning, the observer explained to the children that she would continue to visit their class and to talk into her tape recorder, but that she would no longer be able to visit with them. If a subject approached the observer during the observations he was quietly told that she could not talk to him now.

Observations were made of the behavior of all subjects in order of alphabetical listing. If a subject was not present when his name came up, he would be skipped until he returned, at which time the missed

observation was made up before the observer returned to her alphabetical listing.

Each subject was observed during a free play period of four non-consecutive 5-minute sessions which were divided into 1-minute segments for accuracy of recording. When the observations began, the organization rating of the classroom was "2" (the paths were clear and the fraction of surface covered was 1/2 to 2/3). After the first set of observations was completed the classroom was rearranged. With the new arrangement the classroom received an organization rating of "6" (the paths were blocked and more than 2/3 of the surface was covered). The subjects were given one week to become accustomed to their new room arrangement. At the end of this week the observer returned and again observed the behavior of all subjects for four non-consecutive, 5-minute intervals of behavior during free play period. The observations were recorded orally using a portable cassette tape recorder and utilizing a modification of Caldwell's (1969) APPROACH method for recording behavior. The observations of behavior were made daily during a period of six weeks.

After the observations were completed, the records of behavior of the subjects were coded and recorded using the adapted instruments previously described. A sample score sheet may be found in Appendix F.

The data were collected during the months of April and May 1975. Observations were made every morning for 2 1/2 to 3 weeks for each room arrangement, requiring total observation time of approximately six weeks. The entire group of children who served as subjects had been together since September, and therefore were very familiar with each other, their teachers, and the physical organization of their classroom.

The observations were made during the indoor free play period of the regular morning nursery school program.

Observer Reliability

In order to establish observer reliability, prior to the collection of data for this study, the investigator and a second person independently observed recorded behaviors. Several preliminary observations were made in order to establish guidelines for recording the behaviors. The two observers then independently observed and recorded 24 5-minute segments of children's behavior during indoor free play period in a group not used as subjects for this study. A percentage of agreement of 88.6% was obtained. This figure was judged to represent an acceptable degree of observer reliability and the investigator then proceeded to collect data independently.

Analysis of Data

The data were examined through the use of nonparametric statistical procedures. The binomial test was used for those hypotheses dealing with all of the subjects and the Mann-Whitney U test was used to compare behavior in the various categories by sex of the subjects.

CHAPTER IV

RESULTS

One purpose of this study was to develop a category system for recording productive and disruptive behavior of young children in a free play situation. The original instrument developed by Walters, et al. (1957) was amended and expanded to fulfill this goal. The general purpose of investigating the relationship of arrangement of space to children's behavior resulted in examining the specific hypotheses discussed below.

Hypothesis I. The arrangement of space in a nursery school setting is independent of the amount of behavior observed in the following categories: (a) total amount of observed productive and disruptive behavior; (b) amount of productive behavior; (c) amount of disruptive behavior; (d) amount of physical productive behavior; (e) amount of verbal productive behavior; (f) amount of physical disruptive behavior; and (g) amount of verbal disruptive behavior.

The binomial test was used to examine these data. Significant differences were found for categories (a), (b), (c), (d), and (g). The probability level of the different aspects of the hypotheses varied from $p < .0001$ to $p < .01$. The total amount of productive and disruptive behavior, the amount of productive behavior and the amount of verbal productive behavior were significantly different at the $p < .0001$. In each of these categories more behavior took place in the maximum

organization situation. The amount of disruptive behavior was also found to be significantly different ($p < .005$) between the two experimental situations, with more disruptive behavior occurring in the minimum organization situation. The amount of verbal disruptive behavior was also significantly different between the two situations at the $p < .01$ level, with more verbal disruptive behavior occurring in the minimum organization arrangement. No significant difference was found in the amount of physical productive or physical disruptive behavior between the two situations.

Hypothesis II. Within the maximum organization situation there is no relationship between: (a) physical behavior versus verbal behavior; (b) productive behavior versus disruptive behavior; (c) physical productive versus verbal productive beh .or; (d) physical disruptive versus verbal disruptive behavior; (e) physical disruptive versus physical productive behavior; and (f) verbal disruptive versus verbal productive behavior.

Using the binomial test a significant difference of $p < .0001$ was found for all relationships except (d). In the maximum organization arrangement there was a greater amount of verbal as opposed to physical behavior and verbal productive as opposed to physical productive behavior. Productive behavior occurred significantly more often than did disruptive behavior in categories (b), (e), and (f). No significant difference was found between physical disruptive and verbal disruptive behavior in the maximum organization situation.

Hypothesis III. Within the minimum organization situation there is no relationship between: (a) physical behavior versus verbal behavior; (b) productive behavior versus disruptive behavior; (c) physical

productive versus verbal productive behavior; (d) physical disruptive versus verbal disruptive behavior; (e) physical disruptive versus physical productive behavior; and (f) verbal disruptive versus verbal productive behavior.

The data were examined by means of the binomial test. Significant differences were found for categories (b), (c), and (f) in the minimum organization situation. In two categories, productive versus disruptive behavior and verbal disruptive versus verbal productive behavior, the behavior was significantly different ($p < .0001$), with productive behavior occurring more often than disruptive behavior. The amount of physical productive behavior was found to be significantly different ($p < .001$) from the amount of verbal productive behavior, with verbal productive behavior observed more often. No significant differences were found between physical versus verbal behavior physical disruptive versus verbal productive behavior or physical disruptive versus physical productive behavior.

Hypothesis IV. There are no differences associated with sex in the following categories of observed behavior: (a) total observed behavior; (b) total physical behavior; (c) total verbal behavior; (d) total disruptive behavior; (e) total productive behavior; (f) physical disruptive behavior; (g) verbal disruptive behavior; (h) physical productive behavior; and (i) verbal productive behavior.

These data were analyzed using the Mann Whitney U test. No significant differences were found in any of the categories. There were, however, some differences in the frequency and average instance of the behavior according to sex (Appendix G).

In addition to information pertaining to the hypotheses, more

information regarding frequencies of behavior are shown in Appendixes H, I, and J. Appendix H lists frequency of observed behavior by sex and arrangement of space, Appendix I covers frequency of observed behaviors and Appendix J lists frequency of observed behavior according to arrangement of space.

CHAPTER V

DISCUSSION AND SUMMARY

The results of this investigation point out some aspects of children's behavior which teachers and administrators should become aware of if they are responsible for arranging play space for young children. These findings indicate that if an early childhood education program (1) wants to encourage children's social growth, (2) feels verbal expression is desirable, (3) wants to encourage productive types of behavior, (4) wants to discourage disruptive behavior and (5) feels children profit from being actively involved in the school program, they should become very much aware of how physical space affects the children's behavior and how to provide an environment of maximum organization.

Summary

One purpose of this study was to develop a category system for recording productive and disruptive behavior of young children in a free play situation. To accomplish this, the category system of affectional and aggressive behavior developed by Walters, et al. (1957) was amended and expanded to more completely cover the areas of productive and disruptive behavior.

The other purpose was to examine the organization of play space and the effect which the organization has on children's productive and

disruptive behavior. Determining children's behavior and its relationship to arrangement of space was done by observing 21 preschool children. The subjects in the study consisted of 16 boys and 5 girls ranging in age from four years nine months to five years and eleven months. These children were attending a private nursery school in Tulsa, Oklahoma.

The APPROACH method of recording observed behavior was utilized in this study. The amended and expanded instrument of Walters, et al, (1957) was applied to this method of recording observations. A record was made of the behavior observed in a free play situation in a classroom arranged with maximum organization (open paths and 1/2 to 2/3 surface covered) and in a classroom arranged with minimum organization (blocked paths and more than 2/3 surface covered). Observed behavior was listed in specific categories of overt physical disruptive, verbal disruptive, overt physical productive and verbal productive.

The data were examined according to the stated hypotheses. The findings of this research are as follows:

1. Children are most often engaged in productive behavior, especially verbal productive behavior ($p < .0001$).
2. With maximum organization the children are more verbal than physical ($p < .0001$) and the physical behavior is more often productive than disruptive ($p < .0001$).
3. When behavior in the situation with maximum organization is compared with the same behavior in the situation with minimum organization the significant differences all favor the situation with maximum organization; there is (a) more total behavior ($p < .005$), (b) more productive

behavior ($p < .0001$), (c) more verbal productive behavior ($p < .0001$), (d) less disruptive behavior ($p < .005$), and (e) less verbal disruptive behavior ($p < .005$).

4. The sex of the subject is not related to the observed behavior.

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APPENDIXES

APPENDIX A

CATEGORIES OF BEHAVIOR DEVELOPED BY WALTERS, PEARCE, AND DAHMS

CATEGORIES OF BEHAVIOR DEVELOPED BY WALTERS, PEARCE, AND DAHMS

Physical Affection:

a. Compliant, i.e. conforms to another's desire or request;
b. Kisses;
c. Pats, Fondles, Hugs;
d. Smiles, Laughs with Someone;
e. Helpful, Shares, i.e. gives assistance to another, divides materials with others;
f. Sympathetic.

Verbal Affection:

a. Accepts, i.e. receives with favor, approves;
b. Asks Permission, Requests;
c. Speaks in Friendly Manner, i.e. talks with another in such a manner so as to reassure, to express warm feelings for the person;
d. Compliments, Praises;
e. Offers to Compromise, Share, Cooperate.

Physical Aggression:

a. Annoys, Teases, Interferes;
b. Hits, Strikes;
c. Competes for Status, i.e. attempts to "show up" another by performing better;
d. Threatening Gesture;
e. Pursues, i.e. runs after or follows with the intent of inflicting a blow;
f. Snatches or Damages Property of Others;
g. Negativism, i.e. refuses to work with or conform to the directions of another;
h. Pushes, Pulls, Holds.

Verbal Aggression:

a. Commands, Demands;
b. Cross-Purpose, i.e. conflict over ways of using equipment;
c. Disparages, i.e. makes remarks indicating dislike for another person, finds fault with or censures or condemns another's behavior, humiliates, laughs at another's misfortune, mocks, expresses desire that another be the victim of imperious events, attributes bad qualities to another;
d. Injury via Agent, i.e. entices another person to injure a third person;
e. Refuses to Comply;
f. Rejects, i.e. denies activity or privilege to another;
g. Shifts Blame;
h. Tattles;
i. Claims Possession;
j. Threatens.

APPENDIX B

ADAPTED INSTRUMENT

ADAPTED INSTRUMENT
(Utilizing Categories From Walters, et al. and the Recording Method of Caldwell, et al.)

Summary of Behavior Categories and Numbers Assigned According to the Modified APPROACH Code

I. Subject of Behavioral Clause (1st digit)
- 0 Central figure (CF)
- 1 The Environment
- 2 Female Adult
- 3 Female Child
- 4 Item
- 5 Male Child
- 6 Group, including CF
- 7 Group, excluding CF
- 8 Male Adult
- 9 Setting alert

II. Behavioral predicates (2nd and 3rd digits)

a. Overt physical disruptive
- 00 hits, strikes, kicks, pinches, bites, pulls hair
- 01 pulls, pushes, holds
- 02 threatening gesture
- 03 teases, annoys, interferes
- 04 pursues, i.e. runs after or follows with intent of inflicting blow
- 05 takes away, snatches
- 06 damages
- 07 messing up i.e. throwing, spilling or purposeful putting out of order
- 08 hiding things
- 09 mis-use of materials
- 10 temper tantrum
- 11 sulking tantrum which is distressing to other children

b. Verbal Disruptive
- 20 commands, demands
- 21 cross-purpose, i.e. clashing over ways of using equipment
- 22 Disparages, i.e. makes remarks indicating dislike for another person, finds fault with or censures or condemns another's misfortune, mocks, expresses desire that another be the victim of imperious events, attributes bad qualities to another
- 23 injury via agent, i.e. entices another person to injure a 3rd person
- 24 rejects, i.e. person or property
- 25 threatens
- 26 annoys, teases
- 27 claims possession
- 28 blames materials or equipment (shifts blame)
- 29 outbursts

c. Overt Physical Productive
   - 40 kisses, pats, fondles, hugs
   - 41 smiles and laughs with another
   - 42 sympathetic
   - 43 invites others to play
   - 44 gives encouragement
   - 45 shares
   - 46 gives assistance.
   - 47 uses materials and equipment as intended
   - 48. puts away
   - 49 cleans up another's things with other child agreeable
   - 50 consciously avoids conflict

d. Verbal Productive
   - 60 accepts, i.e. receives with favor, approves
   - 61 asks permission, requests
   - 62 speaks in friendly manner
   - 63 compliments, praises
   - 64 asks others to play
   - 65 offer to compromise, share, cooperate
   - 66 generalized friendly verbalization
   - 67 gives assistance
   - 68 gives encouragement

e. Miscellaneous
   - 70 calmly engaged in approved behavior

III. Object of behavioral clause (4th digit)
   - 0 - 8 same as for 1st digit
   - 9 no information or self

IV. Supplementary Information (5th digit)
   - 0 ineptly
   - 1 accompanied by verbalization or sound
   - 2 involving interpersonal physical contact
   - 3 with intensity
   - 4 mildly
   - 5 somewhat playfully
   - 6 imitatively
   - 7 in continuation
   - 8 complexity
   - 9 no information

APPENDIX C

CENTER SPACE SCHEDULE DEVELOPED BY

PRESCOTT, KRITCHEVSKY, AND JONES

CENTER SPACE SCHEDULE DEVELOPED BY PRESCOTT, KRITCHEVSKY, AND JONES[1]

I. Organization

The summary rating for organization is based on the rating for clarity of paths and surface coverage.

A. Ratings for organization

1. Path
   a. Clear = 1
   b. Partially clear = 2
   c. Unclear: blocked or dead space = 3
2. Fraction of surface covered:
   a. Neither sparse nor crowded, 1/2 to 2/3 covered = 1
   b. Sparse, 1/3 to 1/2 covered = 2
   c. Very sparse, less than 1/3 covered = 3
   d. Crowded, more than 2/3 covered = 3

B. Calculation of organization

The sum of path and fraction of surface covered equals the organization.

1. Maximum organization (a sum of 2 on the above)
2. Moderate organization (sum of 3 or 4)
3. Minimum organization (sum of 5 or 6)

II. Interest Level

A. Complexity

1. Number of simple units

   A simple unit is defined as a play unit that has one obvious use and does not have sub-parts or a juxtaposition of materials which enable a child to manipulate or improvise. (Examples: swings, gym, rocking horse, tricycle.)

2. Number of complex units

   A complex unit is defined as a play unit with subparts or juxtaposition of two essentially different play materials which enable the child to manipulate or improvise. (Examples: sand table with digging equipment; play house with supplies.) Also included in this category are single play materials and objects which encourage substantial improvisation and/or have a considerable element of unpredictability. (Examples: all are activities such as dough or paints; a table with books to look at; an area with animals such as a dog, guinea pigs, or ducks.)

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[1] E. Prescott, S. Kritchevsky, and E. Jones, The Day Care Environmental Inventory (Copyright Pacific Oaks, Pasadena, 1972), pp. 34-36 and 42-43.

Within the category of complex units, it may be helpful to differentiate among closed, relatively open, and open structure.

Closed complex units - both the goal and mode of relationship among the parts are constrained; e.g., puzzles, form boards, matching games. Number of alternatives are exceedingly limited.

Relatively open complex units - either the goal or the mode of relationship, but not both, is constrained; e.g., unit blocks, lego blocks, crystal climbers. Number of alternatives are greater, but not unlimited.

Open complex units - neither goal nor mode of relationship is constrained; e.g., dough, collage, sand play, water play.

Simple units are not amenable to this sort of distinction since they are not manipulative; super units seem to be inherently invariably open.

3. Number of super units

A super unit is defined as a complex unit which has one or more additional play materials, i.e., three or more play materials juxtaposed. (Examples: sand box with play materials and water; dough table with tools; tunnel, moveable climbing boards and boxes, and large crates.)

B. Amount-to-do-per child

This variable provides a rating for the amount of choice available to children.

1. Number of units. A unit is a definite play area or stuff to do, regardless of whether it is simple, complex, or super.

Examples: Dough, 3 swings, and an unusually elaborate play house area, puzzles. = 4 units.

2. Number of play spaces describes the number of play slots which are provided and is based on complexity of units:

1 simple unit = 1 place
1 complex unit = 4 places
1 super unit = 8 places

Example shown above: 3 swings = 3 places; dough = 4 places, the unusually elaborate play house area = 8 places, and puzzle = 4 places for a total of 19 places.

C. Novelty

1. Daily variety of equipment
   a. Five or fewer different things to do.
   b. Six or more different things to do.
2. Scheduled variation
   a. Activities appear markedly similar from one day to next, variations minimal.
   b. Program is exceedingly predictable, some rotation of activities.

c. Daily changes in activities, although program format and space remain constant.
d. Considerable variation in activities, space may be rearranged.
e. Format for each day markedly different, many novel activities, space frequently rearranged.

VII. Method for Calculating Space Quality

This method for calculating space quality can be used for evaluating both inside and outside space, but it is a much better predictor of behavior for outside space. A predictive rating for inside space must take into account equipment storage patterns and school policies regarding space use. Overall quality for a yard or an inside play room is the sum of score numbers for organization, complexity, variety, special problems, and number of places per child.

A. Organization

See section I B in this schedule for calculation of maximum, moderate, and minimum organization.

	(score number)
Maximum	1
Moderate	2
Minimum	3

B. Complexity

3 or more complex + 1 or more super	1
4 or more complex + 0 super	2
3 or fewer complex + 0 super	3

C. Variety

6 or more	1
5 or fewer	2

D. Special problems

None	1
Lack of shade	2
Broken or shabby equipment	2
Space is used as a pathway for other people	2
Two groups in one space which are interfering with one another	2
No shade and shabby equipment	3
Any combination of 2 or more special problems	3

E. Number of places per child

(See section II, B, 2 of this schedule)

1.6 or more	1
1.1 to 1.5	2
1.0 and fewer	3

F. Calculation of space quality: the scores on each of the above dimensions are summed for each space and differentiated on a 7-point continuum ranging from high to low quality as follows.

Space quality	Sum of quality scores
1. Excellent	5.6
2. Very Good	7
3. Good	8

4. Average 9
5. Poor 10
6. Very Poor 11
7. Bad . . . . . 12 or more

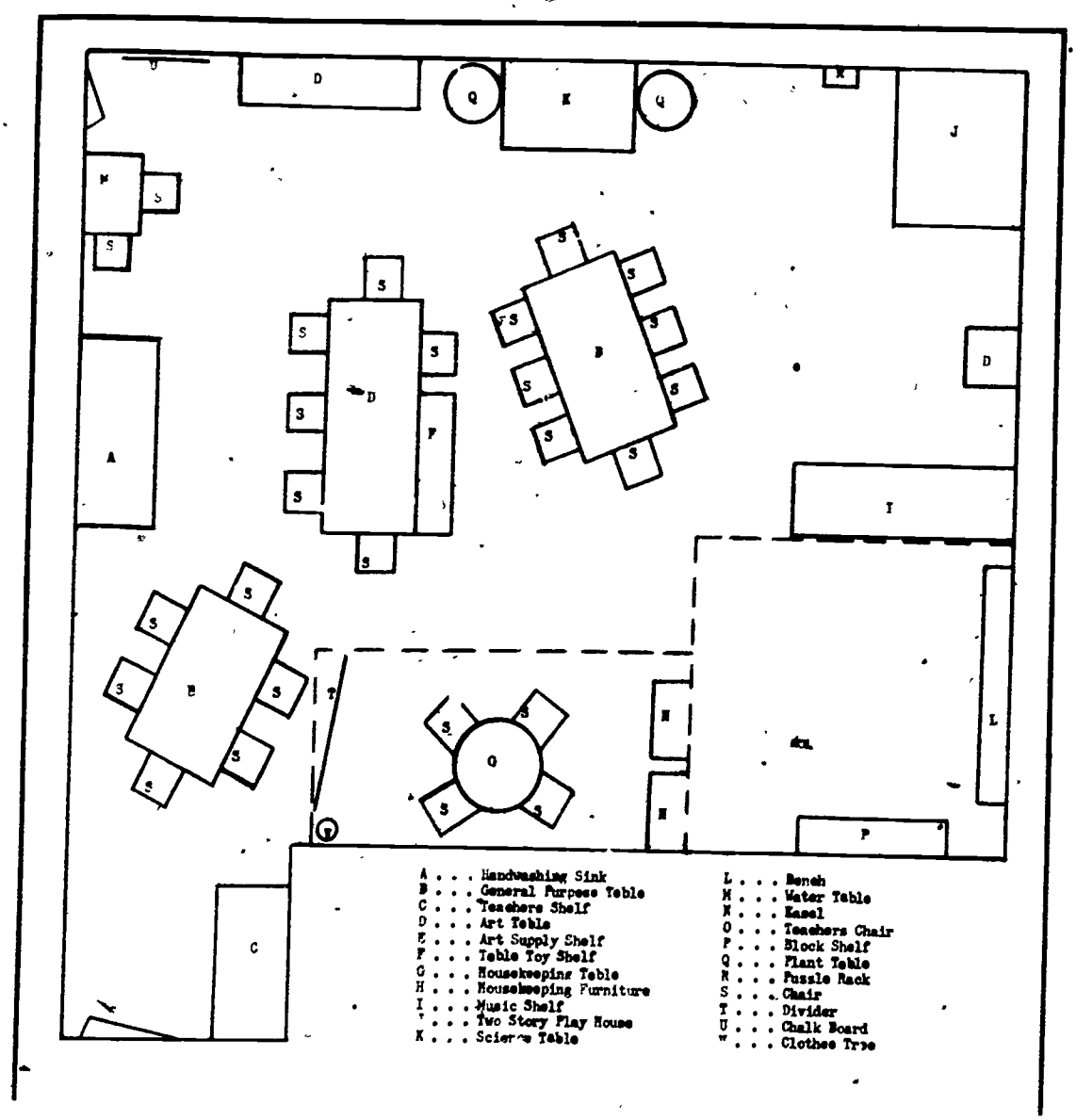
The number assigned to each space quality category is the index used in reporting the results of space analysis.

APPENDIX D

CLASSROOM ARRANGEMENT IN MAXIMUM

ORGANIZATION SITUATION

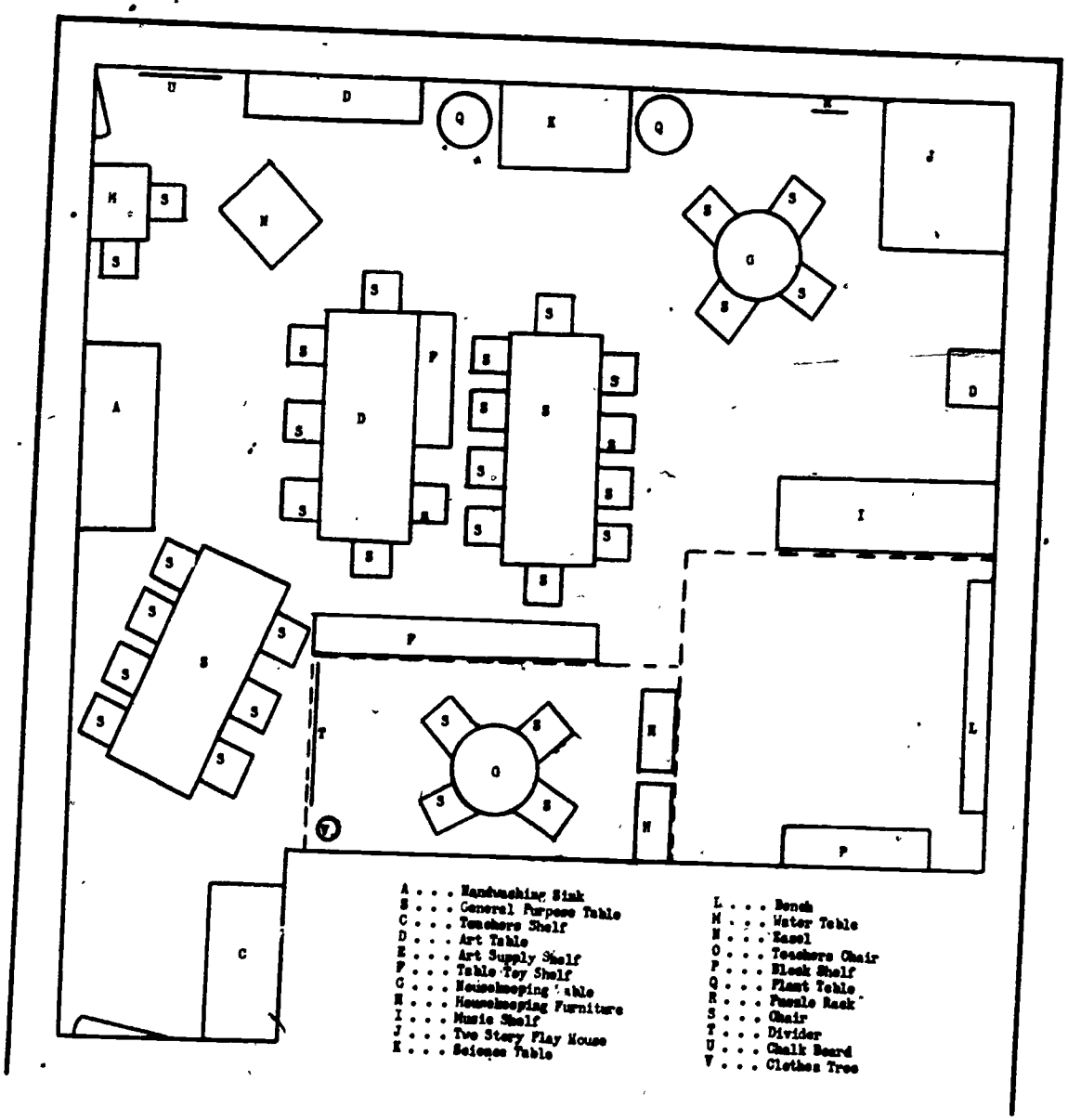
CLASSROOM ARRANGEMENT IN MAXIMUM ORGANIZATION SITUATION



APPENDIX E

CLASSROOM ARRANGEMENT IN MINIMUM ORGANIZATION SITUATION

CLASSROOM ARRANGEMENT IN MINIMUM ORGANIZATION SITUATION



APPENDIX F

SAMPLE SCORE SHEET

SAMPLE SCORE SHEET

CHILD'S NAME Subject # 7 SEX M AGE 5 - 0

Date	MINUTE	SUBJECT	PREDICATE	OBJECT	MOOD
4-11	1	0	62	2	4
		0	47	4	4
	2	0	62	5	4
		0	66	5	4
	3	0	45	5	4
	4	0	41	5	5
		0	66	5	4
		0	05	5	3
	5	0	01	5	4
4-23	1	0	66	5	4
		0	47	4	4
		0	41	5	5
	2				
	3	0	65	5	5
	4	0	01	5	5
		0	64	5	5
		0	41	5	5
	5	0	50	5	5

Date	MINUTE	SUBJECT	PREDICATE	OBJECT	MOOD
4-16	1	0	41	3	5
		0	62	3	4
		0	62	5	4
	2	0	20	5	4
		0	00	5	5
	3	0	62	5	5
	4	0	66	6	4
		0	41	6	5
	5	0	01	5	5
		0	62	5	4
4-21	1	0	50	5	4
	2	0	50	4	5
	3	0	62	2	4
		0	60	2	4
	4	0	62	2	4
	5	0	66	5	4

APPENDIX G

BEHAVIORS OF BOYS AND GIRLS BY FREQUENCIES AND

AVERAGE INSTANCE IN VARIOUS CATEGORIES

DURING 40 MINUTES OF OBSERVATION

BEHAVIORS OF BOYS AND GIRLS BY FREQUENCIES AND AVERAGE INSTANCE IN VARIOUS CATEGORIES DURING 40 MINUTES OF OBSERVATION

Category of Behavior	Boys (N=16)		Girls (N=5)	
	Frequency	Average	Frequency	Average
Total observed behavior	765	47.80	197	39.40
Total physical behavior	325	20.31	63	12.60
Total verbal behavior	440	27.50	134	26.80
Total disruptive behavior	223	13.90	41	8.20
Total productive behavior	542	33.88	156	31.20
Physical disruptive behavior	139	8.69	11	2.20
Verbal disruptive behavior	84	5.25	30	6.00
Physical productive behavior	186	11.63	52	10.40
Verbal productive behavior	356	22.25	104	20.80

APPENDIX H

FREQUENCY OF OBSERVED BEHAVIOR BY

SEX AND ARRANGEMENT OF SPACE

FREQUENCY OF OBSERVED BEHAVIOR BY SEX AND ARRANGEMENT OF SPACE

Behavior Category	Maximum Organization		Minimum Organization	
	Female	Male	Female	Male
Overt Physical Disruptive				
00 hits, strikes, kicks, pinches, bites	1	14	0	19
01 pulls, pushes, holds	0	9	3	13
02 threatening gesture	0	2	0	1
03 chases, annoys, interferes	0	20	2	11
04 pursues	0	2	0	2
05 takes away, snatches	2	5	1	8
06 damages	0	0	0	0
07 messing up	0	3	1	8
08 hiding things	0	0	0	0
09 mis-use of materials	1	7	0	14
10 temper tantrum	0	0	0	0
11 sulking tantrum which is distracting to other children	0	0	0	0
Verbal Disruptive				
20 commands, demands	2	6	5	7
21 cross-purpose	2	6	3	15
22 disparages	1	2	4	5
23 injury via agent	0	0	0	0
24 rejects	2	7	7	10
25 threatens	0	2	0	6
26 annoys, teases	3	8	0	3
27 claims possession	0	1	0	4
28 blames materials or equipment	0	0	0	0
29 outbursts	0	2	1	2
Overt Physical Productive				
40 kisses, pats, fondles, hugs	3	5	2	5
41 smiles and laughs with another	6	23	2	26
42 sympathetic	0	0	0	0
43 invites others to play	0	1	2	0
44 gives encouragement	4	8	0	0
45 shares	7	11	1	4
46 gives assistance	3	2	2	4
47 uses materials and equipment as intended	42	32	40	26
48 puts away	1	6	0	7
49 cleans up another's things with other child agreeable	0	1	0	1
50 consciously avoids conflict	4	16	2	15
Verbal Productive				
60 accepts	1	6	4	0
61 asks permission, requests	4	21	9	19
62 speaks in a friendly manner	33	107	13	45
63 compliments, praises	0	0	0	1
64 asks others to play	4	13	1	9
65 offers to compromise, share, cooperate	2	9	1	2
66 generalized friendly verbalization	20	84	12	39
67 gives assistance	1	4	0	3
68 gives encouragement	0	4	0	0
Miscellaneous				
0 child engaged in approved behavior	0	1	0	0

[illegible]

[illegible]

APPENDIX J

FREQUENCY OF OBSERVED BEHAVIOR BY CATEGORIES

AND ARRANGEMENT OF SPACE

...ORIES

...

...ysical Category	Frequency
40	1
41	1
42	0
43	1
44	2
45	21
46	12
47	80
48	14
49	2
50	33
Total	238

... Category	Frequency
60	1
61	53
62	201
63	1
64	27
65	13
66	139
67	11
68	3
Total	459

Disruptive

Physical Category	Frequency
00	34
01	25
02	3
03	33
04	4
05	16
06	0
07	12
08	0
09	22
10	0
11	0
Total	149

Verbal Category	Frequency
20	20
21	26
22	12
23	0
24	26
25	8
26	12
27	5
28	0
29	5
Total	114

VITA

Carolyn Odom Rogers

Candidate for the Degree of

Master of Science

Thesis: THE RELATIONSHIP BETWEEN THE ORGANIZATION OF PLAY SPACE AND CHILDREN'S BEHAVIOR

Major Field: Family Relations and Child Development

Biographical:

Personal Data: Born in Henryetta, Oklahoma, September 16, 1943, the daughter of Dr. and Mrs. Ray V. Odom.

Education: Graduated from Muskogee Central High School, Muskogee, Oklahoma, in May, 1961; received Bachelor of Science degree from Oklahoma State University in January, 1965; completed requirements for the Master of Science degree in May, 1976.

Professional Organizations: National Association for the Education of Young Children, Southern Association on Children Under Six, Oklahoma Association on Children Under Six, Tulsa Association on Children Under Six, Omicron Nu, Friends of Day Care, Oklahoma Education Association, Oklahoma Kindergarten Teachers Association.