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The purpose of this study was to replicate in part and to extend Webb's (1971) findings regarding color as a discriminative stimulus (S^D) for social behavior. The research problem was to assess whether wall color and room size act as S^D's for the social behavior of nursery school children within a structured group task. The Null Hypothesis was predicted for the main effects of color, and room size and for their interaction on the dependent variables Disruptive Behavior, Relevant Behavior, and Noise Level.

Twenty-four 3-4- and 5 year old children attending the morning session, spring semester 1973, of the Nursery School of the School of Home Economics served as subjects for the experiment. An experimental room was created in which simultaneous varying of wall color and room size was possible. Pre-experimental instruments were the Dvorine Pseudo-Isochromatic Plates to test for color blindness and a color preference test based on the experimental colors. Experimental instruments were the Becker, Madsen, Arnold, and Thomas (1967) scale and a sound-level meter.

Each day of the experiment the children were brought in two groups (n=12) to the experimental room and observed for their behavior under different wall color-room size combinations while listening to a story. The first four days were adaptation days under white walls and the two room sizes to reduce novelty effects.

The research design employed was an All Within Fixed-Effects Factorial. The Null Hypothesis failed to be rejected for the main effects of wall color for all dependent variables, except the Disruptive Behavior subcategory Ignoring. The Null Hypothesis was rejected for the main effects of room size for the Disruptive Behavior subcategories Orienting Responses, Other, Sucking, and Ignoring. For all other subcategories, Relevant Behavior, and Noise Level the Null Hypothesis for the main effects of room size failed to be rejected. The Null Hypothesis for the interaction effects between wall color and room size also failed to be rejected.

It was concluded that large room size (12' x 14') did act as an S^D for social behavior of these nursery school children, but that wall color did not. It was further concluded that there was no evidence that wall color and room size exhibit joint control over social behavior.

THE EFFECTS OF WALL COLOR AND ROOM SIZE ON THE CLASSROOM SOCIAL BEHAVIOR OF NURSERY SCHOOL CHILDREN

by

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APPROVAL PAGE

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CHAPTER ONE

INTRODUCTION

Lately there has been a growing awareness of the total classroom environment as having a facilitative or retarding effect on a child's ability to learn. The majority of research has focused on specific environmental cues effecting desired learning, ignoring the possibility that general environmental factors may be equally important in providing conducive learning conditions. Related research (Steinzor, 1950; Hearn, 1957; Sommer, 1969; Freedman, 1971), has suggested that there is a relationship between the physical environment and the performance of and interaction between people within that environment; that certain physical environments have the potential to act as cues to disruptive or educationally non productive behavior (Webb, 1971).

Background and Purpose of Research

Nelson (1972) described classroom activity as forming a matrix which may be divided into social and academic

behaviors and antecedent or discriminative stimuli (S^D)[1] to and consequent or reinforcement (S^R)[2] of behaviors (see diagram below).

Classroom Matrix

	S^D Antecedent	S^R Consequent
Social Behaviors	1	2
Academic Behaviors	3	4

Quadrant 1 represents stimuli or cues that elicit positive or negative social behaviors within the classroom, i.e., wall color, room size, seating and equipment arrangement. Quadrant 2 represents the reinforcement of social behavior, i.e., praise, punishment, attention. Quadrant 3 represents stimuli or cues that elicit desired academic behavior within the classroom, i.e., textbooks, visual aids, teaching methods. Quadrant 4 represents reinforcement for academic behavior, i.e., finding the right answers, class promotion, good grades. Each

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[1]Discriminative stimulus (S^D) is defined by Kendler (1968) as a ". . . cue that evokes and maintains a response (p. 687)." Rachlin (1970) distinguishes S^D from S (both classified as discriminative stimuli) as a stimulus during which there is a correlation between responding and reinforcement as opposed to no correlation occurring (S).

[2]Reinforcement (S^R) is defined by Kendler (1968) as: "An event . . . that increases the tendency of a given stimulus to evoke a given response (p. 695)."

quadrant is recognized as contributing equally to the classroom learning experience, however, research has not reflected this. Educational research has focused on quadrant 3 and psychological research (particularly behavior modification) has focused on quadrants 2 and 4. Few studies have investigated quadrant 1 or the structural components of the classroom environment that act as S^Ds for social behavior.

Webb (1971) investigated wall colors as an S^D for social behavior of nursery school children in a structured group setting. Her study measured the effects of red, blue, pink, and light blue walls, as solid and intracolor combinations (blue stripes on a light blue background and red dots on a pink background) on the social behavior of 2-3 and 4 year olds (N=24). One way analyses of variance performed on her dependent variables, Relevant Behavior and Noise Level, showed that wall color did effect the behavior of children. The experimental group exhibited less relevant behavior and were more noisy as compared with the control group exposed only to white wall conditions. Webb's dependent variables Disruptive Behaviors and Orienting Responses were found not to differ between the two groups.

The purpose of this current investigation was to replicate in part and to extend Webb's findings regarding color as an S^D for social behavior. Partial replication was achieved through the use of her dependent variables Disruptive Behavior, Relevant Behavior, and Noise Level. Two of Webb's dependent variables, Orienting Responses and Vocal Interruptions were relocated under the categories of the dependent variable Disruptive Behavior (See Table 3.1, categories 0 and !). Further attempt at replication was made through the use of the same observation coding categories (Table 3.1).

Extension of the study involved expanding Webb's colors to include the three primary colors (red, yellow, blue) and three lighter variants of the primary colors (light red, light yellow, light blue) normally found in institutional settings. Latex paint was used rather than oil base paint, as oil based paints are prohibited in institutional settings due to flame ignition factors. Further extension of the study involved the addition of a second variable room size, to assess its function as an S^D on social behavior.

Research Question and Hypotheses

The research question posed for study was: Does wall color and room size affect the classroom social behavior of

nursery school children? As the literature search in Chapter 2 shows, color and space research has focused primarily on color and size variables in a context other than as structural components of the classroom environment which act as S^Ds for social behavior. What little relevant research there has been within this context has produced contradictory findings.

Based upon the contradictory nature of the limited previous relevant findings it was hypothesized that:

1. There will be no difference in the effect of the six colors (red, blue, yellow, light red, light blue, light yellow) on disruptive behavior, noise level, and relevant behavior of nursery school children in a structured group setting.

2. Room size will not affect the amount of disruptive behavior, noise level, and relevant behavior of nursery school children in a structured group setting.

3. There will be no interaction effect between wall color and room size on disruptive behavior, noise level, and relevant behavior of nursery school children in a structured group setting.

Assumptions and Limitations

The assumptions upon which this study is based are:

1. Three-four-and five year old children can relate to the primary colors, i.e., recognize them and have a primary color set.

2. A room 8'x10' (80 sq. ft.) is a small room and a room 12'x14' (168 sq. ft.) is a large room.

3. The stimulus presentation of wall color and room size within the experimental room provided a stimulus environment similar to the stimulus environment that would have been provided had the stimulus conditions been presented in the regular nursery school classroom.
4. By bringing the children directly into the experimental room through use of an exterior door, the effect of being in a basement would be reduced.
5. Random assignment of subjects to groups controlled for differences among the subjects in activity level and experiences prior to the study.
6. The randomization of children into two groups of n=12 produced groups that were not systematically different.
7. The use of two teachers would not affect the children's responses to the independent variables.
8. A four day adaptation period would remove the novelty effects associated with breaking the normal nursery school routine and leaving the main nursery building to come to the experimental room.

The limitations of the study are:

1. The sample was not randomly obtained. The availability of subjects forced use of an intact group of 24, which precludes statistical generalization to a larger nursery school population.
2. The ceiling of the basement area was exposed to the children and not sound proofed, allowing noise from the nursery school program on the floor above to be heard by the children and registered by the sound-level meter.

CHAPTER TWO

LITERATURE REVIEW

Color

Directly relevant research. Only two studies could be located in the literature that studied wall color as an S^D for behavior. As Armstrong (1968) pointed out, with respect to schools, the environment is conceived of in terms of teaching methods and materials, not the physical structure itself. As mentioned previously, Webb (1971) investigated wall color for its affect upon nursery school children's social behavior in a structured group task and found that wall color affected the group's noise level and relevant behavior. The experimental group was noisier and exhibited less relevant behavior as compared with the control group exposed only to white wall conditions. Disruptive behaviors and orienting responses were found not to differ between the two groups.

Allen and Dilbech (unpublished) studied the effect of wall color on apparent moods of children within a nursery school setting. Using a free play situation, where the

children were allowed to enter and exit at will, red walls were compared with green walls within an ABA[1] design. No evidence was found that affective behavior under red walls was any different than affective behavior under green walls. Allen et al. directed the attention of researchers to the ". . . importance of the more mobile variables, such as kittens, puppies, and hermit crabs as contrasted to the static variable of color as behavioral conditioners for this age group (p. 8)."

Tangential research. Research with infants found that bright colors were watched longer than dull colors, with a preference for red and yellow (Birren, 1961). Three month old infants were found to usually attend to yellow longest, followed by white, pink, and red. Least attention was directed toward black, green, blue, and violet (Birren, 1961, p. 175). Beebe-Center (1931) concluded that infant's color preferences are dependent upon saturation and brilliance (p.

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[1] An ABA research design is a design in which a subject(s)' normal or baseline response in a specific situation is observed and recorded. A treatment condition is then employed with the subject(s)' behavior under the treatment condition observed and recorded. The application of the treatment condition is followed by a return to baseline or cessation of treatment condition. The ABA design is frequently encountered within the behavior modification literature.

306). With older children (grades 1-12) Child, Hanse, and Hornbeck (1968) demonstrated " . . . consistent preferences for cool hues and high saturation; female preference for lighter colors; and with increasing age a decreasing preference for high saturation, an increasing consistency of saturated choices, and an increasing tendency to resolve conflict in favor of hue rather than saturation (p. 237)."

Developmental studies on color frequently have focused on children's preference for color versus form in matching tasks. Brian and Goodenough (1929) found children under three years of age matching on form, children 3-6 years of age matching on color, and children 6 years and into adulthood matching on form. Later studies (Kagan and Lemkin, 1961; Lee, 1965; Suchman and Trabasso, 1966) support Brian and Goodenough's findings. Kagan, et al., found sex as well as age differences, with older boys being more likely to use color and older girls to use form. While no differences were found between boys, younger girls used color more than older girls. Kagan, et al., attributed the sex difference to girls' earlier use of implicit form labels, and Lee attributes the age transition at six as reflecting the child's " . . . learning an adaptive rule about his environment" through his form

dominated school tasks (p. 226). Dale (1969) concluded young children match on color through covert naming.

Two additional studies with children found that orienting response is increased by chromatic changes in the stimuli (Dodd and Lewis, 1969) and that children's drawings of fruit-trees can be influenced by the colors available (Adler, 1970).

According to Eysenck, research on color preference dates back to the work of Cohen in 1894 which found that ". . . among equally saturated colours preference depends exclusively upon individual tastes . . . (and that) . . . the more saturated colours were generally preferred (Eysenck, 1941, p. 385)." Eysenck (1941), in a factor analysis of color preferences, contradicted Cohen somewhat, finding that: Preference is bipolar rather than unidimensional, forming two distinct groups of those that prefer saturated colors and those that prefer unsaturated colors; and that with the exception of females to prefer yellow over orange and males to prefer orange over yellow, there is high agreement between the sexes regarding color preference (p. 394). Mogensen and English (1926), in investigating the psychological warmth of colors, found inconsistent group preferences, but consistent individual preferences.

Color has been investigated for its psychological and physiological effects on adults. Pressey (1921), working with colored lights, found that while hue had no affect upon mental and physical work, brightness did: dim light slowed mental work, bright light stimulated it. Lewinski (1938) also used chromatic illumination to study the relationship between color and affect finding that colors judged warm, i.e., red, yellow, orange, were also judged to be stimulating; purple was judged to be depressing; and blue and green were judged pleasant and cold. Utilizing the theatrical stage and lighting, Ross (1938) demonstrated that hue and brightness are identified separately; brightness was more effective in stimulating behavior; brightness was associated with lively scenes; and saturated colors were associated with "emotional, tense, hot, comic, and melodramatic scenes (p. 183)." According to Webb (1971) body reactions to color have been found. Red light on the face and neck caused outstretched arms to deviate toward the light and to move apart, blue light caused the arms to jerkily move together.

Aaronson's (1964) data support Birren's (1961) theory that "Red, orange, yellow, green, and blue describe a sequence from excitation to inhibition. Purple, white, gray,

and black are emotionally neutral, with black negative and gray passive (p. 30)." Aaronson cautions that the responses may represent culturally conditioned stereotypes. Smit (1969) found that the duration of a red stimulus was perceived as shorter than the duration of a blue stimulus.

Space

Directly relevant research. Space research applicable to this project is generally labeled personal space or "proxemics" (Hall, 1966) and can be categorized into two general headings: Use of space and reaction to space. Apparently little research has been done regarding educational use of space. Haskell (1938) views room size or space requirements as being dependent upon the function that the space is to serve, as well as health standards. With space requirements being determined by expert opinion (Arnote, 1969), the Association for Childhood Education International recommends 50 sq. ft. per nursery school child and 40 sq. ft. per kindergarten child, primary child, and intermediate child (Heinz, 1954). These are above the 35 sq. ft. per child Arnote found in surveying the literature. The size of the classroom has been found to affect seating arrangements, which in turn affect participation (Sommer, 1969). Students in small rooms

left the first row empty, whereas in large rooms the first rows filled first. Greatest participation was found for front and side rows and least participation for middle sections.

Reaction to space has been studied in terms of density. Animal research suggests that an adequate amount of space is necessary for species survival. Calhoun (1962) found that rats allowed to increase in a confined space developed acutely abnormal patterns of behavior that could lead to extinction: aggression and inappropriate sexual behavior increased and territorial defense decreased on the part of the males, and female rats failed to exhibit maternal behaviors. Miscarriages, stillbirths, and infant mortality increased. Population density studies with humans in natural settings showed similar findings. Schmitt (1966) in a census tract study in Honolulu found a relationship between density and mental and physical breakdown. "Multiple correlation coefficients ranged from 0.409 (for infant mortality) to 0.859 (for venereal disease), with a median R of 9.771 (p. 38)." Winsborough (1965) reported similar findings in Chicago.

Data from density studies in controlled settings has produced contradictory results. Although none of the studies

used space as a controlled variable, Jersild and Markey, 1935; Murphy, 1937; and Green, 1933, found conflicts were more numerous where play was restricted. Arnote (1969) in an experimental study with 30 black children enrolled in day care programs, found that aggressiveness increased in preschool children in a free play situation as space was reduced from 50 to 35 to 20 sq. ft. per child. Hutt and Vaizey (1966), in studying the responses of autistic, brain-damaged, and normal 3-8 year old children (N=15) to increased group density in a free play situation, found that as group size increased (from $n \geq 6$ to $n \leq 12$) aggressive and destructive behavior increased for normal and brain-damaged children and social interaction decreased for autistic and normal children.

Freedman, Klavansky, and Ehrlich (1971) found that the degree of density had no affect upon various tasks when confined to rooms of various size. The authors, however, point up that the shortness of the experiment as compared with real life and that the subjects knew eventually they could leave the crowded conditions may have accounted for the results. Freedman (1971) found crowding affected competitiveness, severity of jury sentencing, and feelings of liking, with sex differences existing. Males were more competitive in

crowded rooms, and found small rooms less pleasant, rating others as less friendly and less effective as a jury. Women showed the reverse trend. With mixed-sex groups all density effects disappeared. Freedman concludes regarding density research, "Research has been focusing on the wrong variable . . . that the number of individuals who must interact, rather than density, is the variable that produces substantial effects on human behavior (p. 86)."

Tangential research. The majority of the space research has focused on proxemics in contexts other than as a density variable. Here also the research can be categorized into use of space and reaction to space.

Personal space is defined as an invisible boundary, varying in shape and direction, into which intruders may not come. Hall (1959) delineates eight spatial zones for social interaction, ranging from "very close (3 to 6 inches)" to "hailing distance (20 to 24 feet indoors, 100 feet outdoors)" (p. 764). Guardo (1969) " . . . maintains that four interlocking variables determine the boundaries of these zones . . . the culture, the status, the personality of the individuals involved, and their feelings toward each other (p. 144)."

Systematic study of spatial factors in small groups began in the early 1950's with the work of Steinzor (1950). He found that communication within a group discussion was between members seated opposite rather than along-side each other. James (1951) studied group size observing that in both informal and work groups, 71% of the groups contained only two members, 21% three members, 6% four members, and 2% five or more members. Hearn (1957) found that type of leadership interacted with spatial factors to influence participation: weak leadership involved communication between members sitting opposite each other, strong leadership involved communication between adjacent seats. Sommer (1969) found spatial arrangements in small groups to be " . . . a function of personality, task, and environment (p. 68)." In a study of seating arrangements he found: at rectangular tables cooperating tasks involved side-to-side seating, competitive tasks involved face-to-face seating, and individual tasks involved catty-cornered arrangements. At round tables cooperating tasks involved adjacent chairs, competitive tasks involved face-to-face seating, and individual tasks involved leaving empty chairs between one another. Studies with children follow the above pattern except for lack of face-to-face

seating in competitive situations, attributed to a differential psychological distance scale between adults and children. Support for differential psychological distance is the finding " . . . that sitting across was uncommon among young children, but increased with age, while sitting side-by-side decreased with age (Sommer, 1969, p. 64)." Sex differences were apparent in that girls chose side-by-side arrangements more than boys (Sommer, 1968). Guardo (1969) found through projective techniques that " . . . sixth-graders assume a correlation between physical proximity and psychological closeness (p. 143)."

In studies on the use of space for spatial defense, the shape of the space affects its defense capability, with circular and square territories being easier to defend than irregular boundaries (Sommer, 1969, p. 42). Animal territories generally shrink with plentiful food supply and increase with food shortages (Sommer, 1969, p. 43). In a study of the effectiveness of markers during high room density in defending a seat it was found that personal markers, i.e., jacket or class textbooks, were more effective than impersonal markers, i.e., library materials; that neatly stacked impersonal markers were more effective than randomly scattered

impersonal material; and the status assigned by an adjacently seated person to the vacant seat determines defense effectiveness.

The second broad category of personal space research is the reaction to space. In a spatial invasion study on how people respond to excessive closeness, introverts were found to keep people at greater conversational distance than extroverts. McBride (1965) measured emotionality of spatial invasion through the galvanic skin response (GSR) and found the greatest GSR when the subject was approached frontally, followed by side and rear approach; when the subject was approached by a member of the opposite sex; and when touched by another person as compared with an inanimate object. Similar findings were reported in observational studies of proximity (Argyle and Dean, 1965; Horowitz, Duff, and Stratton, 1964; Sommer, 1959).

CHAPTER THREE

RESEARCH METHODOLOGY

Subjects

Twenty four children, ranging in age from 3 years-3 months to 5 years-1 month, were the subjects in the experiment (Appendix A). The children were attending the morning session, spring semester 1973, of the Nursery School of the School of Home Economics, University of North Carolina at Greensboro. Twelve subjects were females and 12 subjects were males. Ordinal position in their family varied from 1 of 1 to 4 of 4 (Appendix A).

Apparatus

Creation of experimental room. The experimental room was constructed by nailing 2" X 2" fir lumber into six 6' high frames: 14' X 6', 12' X 6', 12' X 6', 9'10" X 6', 8' X 6', and 5'10" X 6'. The 12' X 6', 8' X 6', and 5'10" X 6' frames were supported by two triangular braces (per frame) of the 2" X 2" fir. The 14' X 6' and 9'10" X 6' frames were braced to the 12' X 6' frames by standard metal door hinges. For the regular room size, 12' X 14' (168 square feet), the

12' X 6' frames were attached to the 14' X 6' and 9'10" X 6' frames by the metal door hinges, leaving a 4'2" passageway on one side and a 3 1/2' doorway (built into the 14' X 6' frame) on the opposite side. Two strips of unbleached carton stock paper, 6' X 14', covered the floor surface. The small room size, 8' X 10' (80 square feet), was created by placing the 5'10" X 6' frame perpendicular to the 12' X 6' frame and the 8' X 6' frame perpendicular to the 14' X 6' frame, leaving the same stimulus conditions under both room sizes with respect to a 4'2" passageway and a 3 1/2' built in doorway (see Figure 3.1). The two movable frames (5'10" X 6' and 8' X 6') were placed on the two 6' X 14' strips of unbleached carton stock paper to create the same stimulus conditions under both room sizes with respect to floor surface.

The walls of the room were created by cutting 6 rolls (per color) of unbleached carton stock paper to fit each of the six wooden frames. Each of the six sets of unbleached carton stock paper was then painted one of the experimental colors with Sears latex flat paint: light yellow (8703), yellow (0503), light red (8720), red (0641), light blue (8732), and blue (0761), (Appendix B). Due to the quantity of paint needed, it was necessary to work with pre-mixed

commercial colors. The yellow, red, and blue were selected to approximate the primary colors and the light yellow, light red, and light blue were selected to represent a variation of the three primary colors typical of the color values found in institutional settings. Two inch wide strips of cork were glued and nailed to the top and bottom of the wooden frames. Two nails were driven into the back upper portion of each frame and two holes, corresponding in distance to the nails, were punched in the top of each painted roll of paper. The nylon cord was knotted and placed through the holes in the paper. The painted paper was tied by the nylon cord to the frames and tacked in the corners to form the various wall colors. During the last six days of the experiment the walls were double hung, following the above procedure, by placing two additional nails in the back of the frames and two additional cording holes in the paper.

Natural and artificial lighting was used. A heavy duty insulated extension cord with a plastic plug in bulb socket was extended across the ceiling to create an additional ceiling light source. Forty watt and 75 watt light bulbs were used. Temperature in the rooms was controlled through the use of the space heater prior to each group session. A

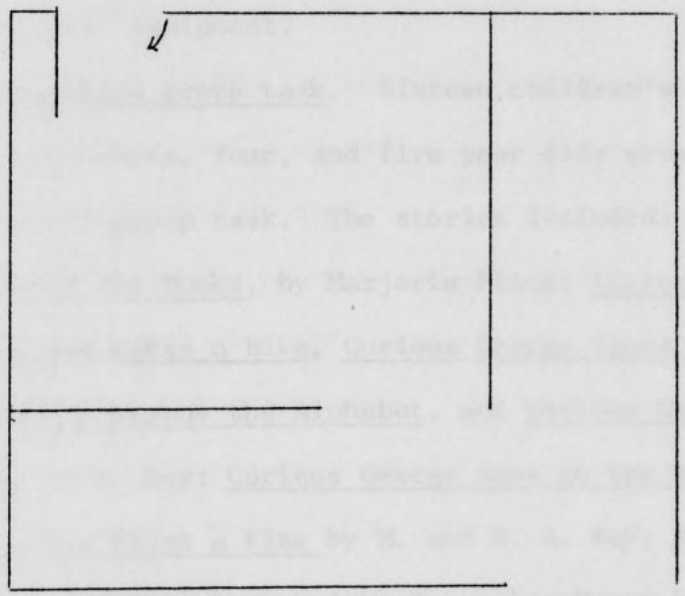

Fig. 3.1. Experimental room.

5' x 6' white area rug was placed over five scatter rugs to provide seating for the children and adjusted to provide the same stimulus conditions under each room size. Four small wooden boxes were used for seating for the teachers, raters, and the raters' equipment.

Structured group task. Sixteen children's stories appropriate for three, four, and five year olds were used as the structured group task. The stories included: Angus Lost and Angus and the Ducks, by Marjorie Flack; Curious George, Curious George Rides a Bike, Curious George Takes a Job, Curious George Learns the Alphabet, and Curious George Gets a Medal by H. A. Rey; Curious George Goes to the Hospital and Curious George Flies a Kite by M. and H. A. Rey; Harry by the Sea, Harry the Dirty Dog, and No Roses for Harry by George Zion; and The Story of Babar, Babar Loses His Crown, The Travels of Babar, and Babar and His Children by Laurent De Brunhoff.

Pre-experimental instruments. Pre-experimental instruments were the Dvorine Pseudo-Isochromatic Plates to test for color blindness and a color preference test based on the wall colors that were used in the experiment. The alternate plates of the Dvorine test were used since the children who served as

subjects were not old enough to respond consistently to the numbers on the regular plate series. The seven alternate plates, plus test plate, consisted of a white cardboard background in the center of which was a circle composed of colored dots with a line of colored dots embedded in it. Color blind individuals fail to perceive the line of dots embedded in the circle. One plate may be missed, due to figure-ground perception difficulties. However, failure to perceive more than one plate correctly indicates color blindness. Additional apparatus associated with the Dvorine test was a one-inch, yellow plastic toy car, note paper, and pencil.

Apparatus for the color preference test consisted of six pieces of manila folder paper, 2" x 4", each painted with one of the experimental wall colors, note paper, and pencil.

Experimental instruments. During the experimental sessions the instruments used to measure the dependent variables were a precoded direct observation time sheet (Appendix C), sound level meter, tape recorder, and tapes. The coding categories for the direct observation time sheet were from Becker, Madsen, Arnold, and Thomas (1967) developed for behavior modification programs in the classroom (Table 3.1). Additional apparatus associated with the experimental

Table 3.1

Coding Categories

Symbols	Category Label	Category Definition
A1. Disruptive Behaviors: General Categories		
X	Gross Motor Behaviors	Getting out of seat; crawling; standing up; running; hopping; skipping; jumping; walking around; rocking in place; disruptive movement without noise; swinging arms; moving body toward neighbor (must involve leaving place).
N	Disruptive noise with objects	Tapping or rattling objects; clapping; tapping or shuffling feet; tapping fingers. Be conservative, only rate if could hear noise with eyes closed.
A	Disturbing others directly and aggression	Hitting; kicking; shoving; pinching; slapping; striking with object; throwing object at another; poking with object; attempting to strike; biting; pulling hair; taking object from another child (rate only if resistance shown).
O	Orienting responses	Turning head or head and body to look at another person; showing objects to another child; attending to another child. Must be of 4 seconds duration to be rated. Not rated unless seated.

Table 3.1 Continued

!	Blurting Out, Commenting and Vocal Noise	Answering teacher without raising hand or without being called on; making comments or calling out remarks when no question has been asked; calling teacher's name to get her attention; crying; screaming; singing, whistling; laughing loudly; coughing loudly. Must not be directed toward another particular child, but may be directed to the teacher.
T	Talking	Carrying on conversations with other children when it is not permitted. Must be directed to a particular child or children.
//	Other	Ignoring teacher's question or command; doing something different from that directed to do; playing with part of face or body. To be rated only when other ratings not appropriate. Child leaving group.

A2. Special Categories

+	Improper position	Sitting back to front (rate as 0 if directed toward another child); leaning on teacher; laying on floor.
S	Sucking	Sucking fingers or other objects.

Table 3.1 Continued

B	Bossing	Aggressive vocal behavior; reading out loud to self or another child (do not rate as ! in this case); acting as teacher to other children, e.g., correcting another child.
I	Ignoring	Sitting and looking at the wall, floor, or ceiling or remaining in the main nursery school.

B. Relevant Behaviors

RB	Relevant Behavior	Time on task, e.g., answers questions; listening; raising hand. Must include whole 10 seconds except for orienting responses of less than 4 seconds duration.

instruments were two stop watches and pencils. A room thermometer was used to measure beginning and ending temperatures in the experimental room. Plastic name tags were used to identify subjects. A full listing of the apparatus and where it was obtained can be found in Appendix D.

Procedure

Pre-experimental conditions. Prior to the start of the experimental sessions the investigator spent a morning in the nursery classes to become familiar with the children. Also, prior to the start of the experiment the two pretest measures were administered. Each child was tested individually, first on the color blindness test, then on the color preference test. The nursery school teacher asked each child to accompany the investigator to play a game. The investigator explained to each child, upon being seated in the testing room, that the game involved finding a path in a circle. The Dvorine book was opened to the alternate test series plates. The investigator held up the test plate and told each child that inside the circle was a path and asked the child whether he saw the path and to tell what color the path was. The investigator then explained to each child where the path went in the circle, first with a finger, then

with the race car. The investigator demonstrated the task to each child, and had each child try the task. The finger was used to trace the path first, as the children's hand-eye coordination made if difficult to differentiate whether the child saw the path or was following some other pattern of dots in the circle. The child was then shown each of the seven plates, in order, with verbal prompts of "Is there a path in the circle?" and "Where does the path go?" and "Run your finger (car) along the path," as they were needed. If the child had a lot of difficulty the test plate was shown again and the instructions and demonstration was repeated. Normally, with a child 3 years-3 months or older repetition of the test plate was not necessary. If a child could not locate the path in a particular plate, the plate was skipped and returned to after all seven plates had been shown.

After each child completed the color blindness test, the six strips of paper, each painted in one of the six experimental colors, were placed on the table in front of the child. The investigator asked the child to "Show me the color you like best" and the child's choice was picked up and the child was then asked to "Show me the color you like next to the best" and this was repeated until the six colors

were ordered as to preference. The child's order of choice was recorded.

Experimental conditions. On days 1-2 of the experiment each group of subjects was under white walls-small room size (8' x 10') and on days 3-4 under white walls-regular room size (12' x 14') to allow for adaptation to the experimental setting. The adaptation period was used as the raters' practice period in which the raters oriented themselves to the instruments and timing sequences and rater reliability was obtained.

For the presentation of the treatment conditions (Table 3.2), the 12 days of treatment conditions (days 5-16) were divided into two sets of six days each. On the first six days color was controlled and room size manipulated to check for order effects in the presentation of the sizes. During the second 6 days room size was held constant and color manipulated to check for order effects in the presentation of color. The order of presentation of the controlled variable was randomized with the manipulated variable assigned to the controlled variable.

The children were randomly assigned to Groups I and II. There were twelve subjects per group. Monday was omitted from the experimental calendar, as behavior on this day was atypical

Table 3.2

Order of Presentation of Treatment Conditions

Day	Color	Group I Size S_1	Group I Size S_2	Group II Size S_1	Group II Size S_2
1	C_0	*		*	
2	C_0	*		*	
3	C_0		*		*
4	C_0		*		*
5	C_1	*			*
6	C_2	*			*
7	C_3	*			*
8	C_4		*	*	
9	C_5		*	*	
10	C_6		*	*	

Day	Size	Group I Color 1	2	3	4	5	6	Group II Color 1	2	3	4	5	6
11	S_1						*	*					
12	S_2			*							*		
13	S_1					*				*			
14	S_2		*									*	
15	S_1				*					*			
16	S_2	*											*

Note: Color: C_0 = white, C_1 = light blue, C_2 = red, C_3 = light yellow, C_4 = blue, C_5 = light red, C_6 = yellow

Size: S_1 = small room, S_2 = regular room

of nursery school children's behavior the rest of the week (Canaday, 1972). Each day of the experiment (1-16) Groups I and II were brought to the test situation for 20 minutes. Group I was scheduled from 9:15-9:35 a.m. on adaptation days and days 5-10 of the treatment conditions and Group II from 10:30-10:50 a.m. The schedule was reversed on days 11-16 to control for order effects resulting from the time of day (Appendix E).

During the test situation the children sat on the rug facing the teacher and two raters, who recorded the children's behavior on the direct observation time sheet. The raters were in the room and observable by the children as a one-way observation booth did not exist in the nursery building used in the study. On day 1 of the experiment the raters were introduced to the children by the teacher, who explained to the children that the raters were there just to watch them play during storytime rather than to play with them (Appendix F). The teachers were instructed to ignore the raters and the raters were instructed not to respond to the children (Appendix G). These measures in conjunction with the four day adaptation period were expected to help reduce participant observer effects.

The children were observed for the dependent variables Disruptive Behavior and Relevant Behavior, as defined by the coding categories (Table 3.1). The dependent variable Noise Level was measured by the sound-level meter, which was set at 70 throughout the observation period. The tape recorder was set beside a rater to act as alternate backup measure for sound-level and provide general information regarding the interaction in the experimental room.

The time sheet the raters used was precoded with the coding category symbols (Appendix C). Within both groups, the order of the subjects observed was randomly assigned for each of the sixteen days of the experiment. The raters were given two time sheets per day, which resulted in six ten second observations on each child per day. The breakdown of the observation timing sequence was 8 second observation-2 second record for the observation categories and 4 second observation-1 second record for the sound-level meter. Stop watches were stopped and resynchronized at the end of each observation block or at 3 minute intervals. A temperature reading was taken from the thermometer prior to beginning the rating sequence and immediately concluding the rating sequence.

During the test situation the children were read one of the sixteen stories, with finger play, songs, and body activity following the story as the structured group task. The stories were randomly assigned to a treatment condition, i.e., light blue walls-small room size, so that each group received the same story under the same test condition (Appendix H). Two women, each assigned a time period (teacher 1, 9:15-9:35 a.m., teacher 2, 10:30-10:50 a.m.), acted as teachers for the experiment.

CHAPTER FOUR

DATA ANALYSIS

Research Design

The design applied was an All Within Fixed-Effects Factorial (Figure 4.1).[1] Both of the independent variables studied were active variables.[2] Due to the constraint of a sample size of N = 24, use of a repeated measures design allowed for maximization of the data collected by permitting the entire sample to be used as experimental subjects without sacrificing control. Control was provided over unique subject characteristics. More precisely,

> In this type of experiment, treatment effects for subject i are measured relative to the average response made by subject i on all treatments. In this sense each subject serves as his own control--responses of individual subjects to the treatments are measured in terms of deviations about a point which measures the average

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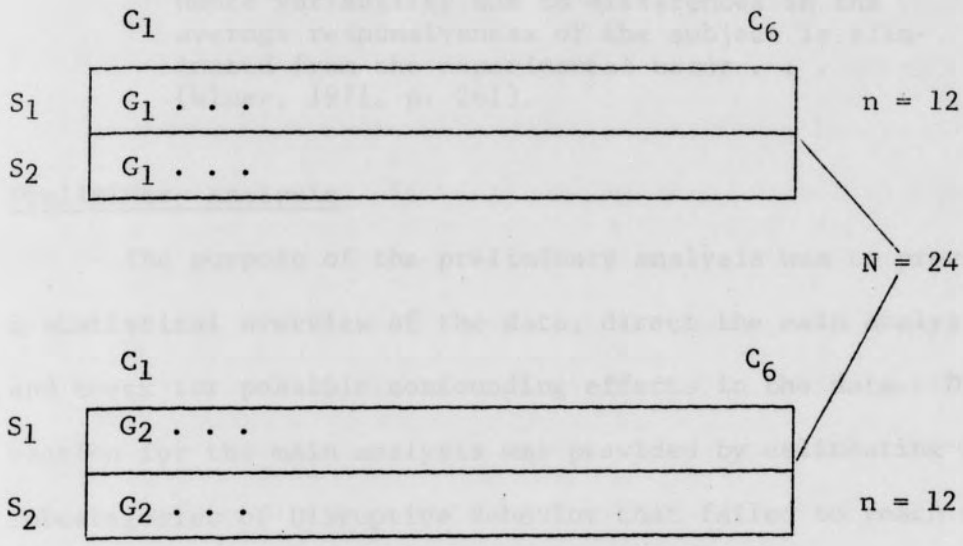
[1] Separate analyses, each within the format of an All Within Fixed-Effects Factorial, were performed on each of the dependent variables.

[2] An active variable is a manipulated variable, as opposed to an assigned variable where subjects are assigned to cells on the basis of differential possession of characteristics (Kerlinger, 1964, p. 325).



Note. S = room size; C = wall color; G = group

Fig. 4.1. All Within Fixed-Effects Factorial

> responsiveness of that individual subject. Hence variability due to differences in the average responsiveness of the subject is eliminated from the experimental error . . . (Winer, 1971, p. 261).

Preliminary Analysis

The purpose of the preliminary analysis was to provide a statistical overview of the data, direct the main analysis, and check for possible confounding effects in the data. Direction for the main analysis was provided by delineating the subcategories of Disruptive Behavior that failed to reach the established 10% criterion of occurrence.[3] Room temperature, teacher effects, and group effects were quantitatively checked as possible confounding factors in the data collected.

Descriptive analysis. The first step in the preliminary analysis was the running of two programs from the Statistical Package for the Social Sciences (SPSS) to obtain descriptive information on the eleven subcategories of Disruptive Behavior, Relevant Behavior, Noise Level, and beginning and ending room temperature readings (designated Temperature 1 and 2,

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[3]The 10% criterion of occurrence was chosen for two reasons. First, with a low number of observations the power of the significance test would be low. Second, with a low number of observations the assumptions of homogeneity of variance and normality underlying the analysis of variance could be seriously violated.

respectively). From the first SPSS program, Codebook[4], run on the Disruptive Behaviors and Relevant Behavior, it was found that four of the eleven disruptive behavior subcategories--Disruptive Noise with Object, Disturbing Others Directly and Aggression, Talking, and Bossing--failed to reach the 10% criterion of occurrence (Table 4.1). These four subcategories were dropped from further analysis. Additional information provided by Codebook was that of the 288 possible active cells (subject x size x color), 33 contained missing observations (subject absent from the nursery school on that cell day).

The second SPSS program, Condescriptive,[5] was run on the group measures noise level and temperature levels to provide descriptive information on these variables (Table 4.2). The mean sound level reading over the twelve conditions was 70.16 decibels (db). The mean beginning and ending temperature readings were 73.04 degrees and 73.08 degress, respectively.

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[4]Codebook provides one-way frequency distributions, histograms (optional), and related statistics.

[5]Condescriptive provides descriptive statistics for continuous variables which are at least ordinal in scale.

Table 4.1

DESCRIPTIVE ANALYSIS OF DISRUPTIVE BEHAVIORS AND RELEVANT BEHAVIOR

Statistics	Category					
	Gross Motor Behavior	Disruptive* Noise with Object	Disturbing* Others Directly and Aggression	Orienting Responses	Blurting Out, Commenting and Vocal Noise	Talking*
Mean	0.694	0.031	0.031	0.624	0.353	0.106
Mode	0.0	0.0	0.0	0.0	0.0	0.0
Median	0.0	0.0	0.0	0.0	0.0	0.0
Standard Error	0.064	0.011	0.016	0.051	0.040	0.024
Standard Deviation	1.016	0.175	0.249	0.808	0.634	0.388
Skewness	1.858	5.377	9.328	1.233	1.862	4.243
Kurtosis	3.846	26.907	95.003	0.932	3.232	20.120
Variance	1.032	0.031	0.062	0.653	0.403	0.150
Range	5.0	1.000	3.0	3.0	3.0	3.0
Minimum	0.0	0.0	0.0	0.0	0.0	0.0
Maximum	5.0	1.0	3.0	3.0	3.0	3.0
Valid Observations	255	255	255	255	255	255
Missing Observations	33	33	33	33	33	33

*Dropped from further analysis

Table 4.1 Continued

Statistics	Category					
	Improper Position	Sucking	Bossing*	Ignoring	Relevant Behavior	Other
Mean	0.255	0.765	0.0	0.584	3.224	0.498
Mode	0.0	0.0	0.0	0.0	2.0	0.0
Median	0.0	0.0	0.0	0.0	3.250	0.0
Standard Error	0.041	0.084	0.0	0.051	0.112	0.050
Standard Deviation	0.653	1.340	0.0	0.808	1.784	0.798
Skewness	3.166	1.951	0.0	1.429	-0.089	1.660
Kurtosis	11.258	3.327	0.0	1.782	-1.053	2.601
Variance	0.427	1.795	0.0	0.653	3.182	0.537
Range	4.0	6.0	0.0	4.0	6.0	4.0
Minimum	0.0	0.0	0.0	0.0	0.0	0.0
Maximum	4.0	6.0	0.0	4.0	6.0	4.0
Valid Observations	255	255	255	255	255	255
Missing Observations	33	33	33	33	33	33

*Dropped from further analysis

Table 4.2

DESCRIPTIVE ANALYSIS OF SOUND LEVEL AND TEMPERATURE

Statistics	Variable		
	Sound Level	Temperature 1	Temperature 2
Mean	70.163	73.042	73.083
Variance	3.750	4.565	5.038
Range	6.979	7.000	10.000
Standard Error	0.395	0.436	0.458
Kurtosis	-22.822	1.458	1.118
Minimum	65.638	70.000	68.000
Standard Deviation	1.936	2.137	2.245
Skewness	- 0.336	0.018	-0.240
Maximum	72.617	77.000	78.000
Valid Observation	24	24	24
Missing Observation	0	0	0

Regression analysis on temperature. As the data was collected in an area not serviced by the building's heating system, it was of concern whether the temperature differences between treatment conditions were confounded with the effects of the independent variables on the children's responses on the dependent variables. The dependent variable Noise Level was chosen to test the relationship between noise and temperature, since noise was felt to indirectly reflect the other dependent variables. That is, high noise level would be associated with increased disruptive behavior and low noise level would be associated with increased relevant behavior. Two regression equations were run, one for the relationship between Noise Level and Temperature 1 and the other between Noise Level and Temperature 2. No relationship was found between noise and temperature as assessed by the slope of the regression lines.[6]

Hotelling's T^2 on teachers and on groups. The final step in the preliminary analysis involved the running of the Hotelling's T^2 test on Teachers and Groups to check the

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[6]Had the regression equations found a significant relationship between temperature and noise level, further regressions between temperature and the other dependent variables would have been performed.

assumptions made previously regarding the equality of these two variables (see Chapter One). The test on teachers showed that there was no difference ($p = 0.52$) between the two teachers in their effect on the subjects' responses on the eight observation categories (seven Disruptive Behavior subcategories and Relevant Behavior) retained for testing. Therefore, the assumption made at the start of the study regarding teachers was confirmed.

The Hotelling's T^2 on Groups, however, proved to be significant ($p < .01$), indicating that the two groups responded differently on the eight retained observation categories. Since the alpha value across all eight categories was significant, each of the eight categories was analyzed for its contribution to the significant alpha value. Two categories, Sucking ($p < .001$) and Relevant Behavior ($p < .001$) were found to have produced the significant alpha value.

Several unsuccessful attempts were made to explain the significant difference between the two groups of children's responses on the eight retained observation categories. The two groups of $n = 12$ subjects, as mentioned previously in Chapter Three, were randomly formed from the total sample of $N = 24$. Each group was composed of both females and males

between the ages of 3-5 years. Comparing females in Group I with females in Group II and males in Group I with males in Group II, a significant group difference for sex was found for females, but not for males under the Disruptive Behavior subcategory Sucking and under Relevant Behavior. Comparing the ages of the children in Group I with the ages of the children in Group II, age was found to be significant for Sucking ($p < .001$) and Relevant Behavior ($p < .002$). Age, being significantly different between the two groups and being related to sucking behavior, was used as a covariate to remove its effects from the significant T between the means of the two groups on their responses to Sucking and Relevant Behavior.[7] The means of the two groups after the removal of the effects of age, however, remained significantly different for Sucking ($p < .001$) and Relevant Behavior ($p < .02$). No trend was found for the groups to respond differently due to time-of-day effects.

Analyses of Variance on the Dependent Variables

The Null Hypotheses proposed for the effects of the independent variables on the dependent variables (see Chapter

[7]The covariate was used as randomization does not assure equality between groups; it only provides a probablistic matching between groups (Cox, 1958).

One) were tested by a series of analyses of variance (ANOVAs) performed on each of the dependent variables.

Theoretical models. The theoretical model underlying the analyses of variance performed on the seven subcategories of Disruptive Behavior and on Relevant Behavior is as follows:

$$X_{ijk} = \bar{G} + A_i + B_j + C_k + AB_{ij} + AC_{ik} + BC_{jk} + ABC_{ijk}$$

where: X_{ijk} = Observed response for subject $_k$ under size condition $_i$ and color condition $_j$

$\bar{G}$ = Grand mean common to all subjects

A_i = Main effect of size condition $_i$

B_j = Main effect of color condition $_j$

C_k = Main effect of subject $_k$

AB_{ij} = Interaction effect between size condition $_i$ and color condition $_j$

AC_{ik} = Interaction effect between size condition $_i$ and subject $_k$

BC_{jk} = Interaction effect between color condition $_j$ and subject $_k$

ABC_{ijk} = Interaction effect between size condition $_i$, color condition $_j$, and subject $_k$

The theoretical model underlying the analysis of variance performed on Noise Level is the same as above for Disruptive Behavior and Relevant Behavior, except that the basis for observation is the group rather than the individual and the addition of another error term. The additional error term

is a pure error term based on the fact that there is more than one observation per cell.

ANOVAs for disruptive behavior. A separate analyses of variance was performed on each of the seven retained subcategories of the dependent variable Disruptive Behavior. For the Disruptive Behavior subcategories Gross Motor Behavior; Blurting Out, Commenting, and Vocal Noise; and Improper Position the analyses of variance failed to reach significance ($p = .05$) for either the main effects of room size and wall color or the interaction effects (Table 4.3, 4.4, 4.5). Hypotheses 1, 2, and 3 were therefore not rejected for these subcategories of Disruptive Behavior.

The main effects for room size were significant ($p < .05$) for the Disruptive Behavior subcategories Orienting Responses and Other (Tables 4.6, 4.7). Orienting Responses just failed to reach significance at the $p = .01$ level. For the Disruptive Behavior subcategory Sucking, the main effect for room size was significant at the $p < .01$ level (Table 4.8). The main effects for wall color and the interaction effects for these three subcategories failed to reach significance. Therefore, hypotheses 1 and 3 were not rejected and hypothesis 2 was rejected for these subcategories of Disruptive Behavior.

Table 4.3

ANALYSIS OF VARIANCE FOR CATEGORY GROSS MOTOR BEHAVIOR

Source	df	Ms	F
Subject	23	3.47	
Size	1	0.33	.38
Color	5	1.11	1.81
Subject X Size	23	0.87	
Subject X Color	115	0.61	
Size X Color	5	1.01	.91
Residual	82	1.11	
Total	254		

Table 4.4

ANALYSIS OF VARIANCE FOR CATEGORY BLURTING OUT, COMMENTING AND VOCAL NOISE

Source	df	Ms	F
Subject	23	0.067	
Size	1	0.636	0.14
Color	5	0.305	0.10
Subject X Size	23	0.443	
Subject X Color	115	0.290	
Size X Color	5	0.184	.43
Residual	82	0.424	
Total	254		

Table 4.5

ANALYSIS OF VARIANCE FOR CATEGORY IMPROPER POSITION

Source	df	Ms	F
Subject	23	1.00	
Size	1	0.11	0.20
Color	5	0.25	0.97
Subject X Size	23	0.53	
Subject X Color	115	0.25	
Size X Color	5	0.79	1.56
Residual	82	0.50	
Total	287		

Table 4.6

ANALYSIS OF VARIANCE FOR CATEGORY ORIENTING RESPONSES

Source	df	Ms	F
Subject	23	1.71	7.27*
Size	1	3.34	0.66
Color	5	0.30	
Subject X Size	23	0.46	
Subject X Color	115	0.45	
Size X Color	5	0.60	0.80
Residual	82	0.75	
Total	254		

*$p < .05$.

Table 4.7

ANALYSIS OF VARIANCE FOR CATEGORY OTHER

Source	df	Ms	F
Subject	23	1.44	
Size	1	1.35	4.37*
Color	5	0.71	1.42
Subject X Size	23	0.31	
Subject X Color	115	0.50	
Size X Color	5	0.92	1.32
Residual	82	.70	
Total	254		

*$p < .05$.

Table 4.8

ANALYSIS OF VARIANCE FOR CATEGORY SUCKING

Source	df	Ms	F
Subject	23	14.82	
Size	1	9.28	9.58**
Color	5	0.65	1.33
Subject X Size	23	0.97	
Subject X Color	115	0.48	
Size X Color	5	0.63	0.90
Residual	82	0.70	
Total	254		

** $p < .01$.

The Disruptive Behavior subcategory Ignoring reached significance for both the main effects of room size and wall color ($p < .01$). However, the interaction term failed to reach significance at $p = .05$ level (Table 4.9). Hypotheses 1 and 2 are therefore rejected and hypothesis 3 was not rejected for this subcategory.

Table 4.10 provides the means of the four subcategories of Disruptive Behavior--Orienting Responses, Other, Sucking, and Ignoring--which reached significance ($p < .05$) for room size. The mean orderings show a tendency for these behaviors to occur more under large room size (12' x 14') than under small room size (8' x 10').

ANOVA for relevant behavior. The analysis of variance for the dependent variable Relevant Behavior failed to reach significance at the $p = .05$ level for either the main effects of room size and wall color of the interaction term (Table 4.11). Therefore, hypotheses 1, 2, and 3 were not rejected for this dependent variable.

ANOVA for noise level. The analysis of variance for the dependent variable Noise Level failed to reach significance at the $p = .05$ level for either the main effects of room size and wall color or the interaction terms (Table

Table 4.9

ANALYSIS OF VARIANCE FOR CATEGORY IGNORING

Source	df	Ms	F
Subject	23	1.08	
Size	1	5.13	9.22**
Color	5	1.82	4.11**
Subject X Size	23	0.56	
Subject X Color	115	0.44	
Size X Color	5	0.43	0.54
Residual	82	0.80	
Total	254		

**$p < .01$.

Table 4.10

MEANS FOR ROOM SIZE BY SIGNIFICANT DISRUPTIVE BEHAVIOR SUBCATEGORIES

Subcategories	Size	
	S_1	S_2
*Orienting Responses	0.54	0.75
*Other	0.42	0.55
*Sucking	0.93	0.57
**Ignoring	0.47	0.73

Note: S_1 = small room; S_2 = large room

*$p < .05$

**$p < .01$

Table 4.11

ANALYSIS OF VARIANCE FOR RELEVANT BEHAVIOR

Source	df	Ms	F
Subject	23	17.61	
Size	1	2.24	1.07
Color	5	1.10	0.63
Subject X Size	23	2.08	
Subject X Color	115	1.74	
Size X Color	5	2.33	1.13
Residual	82	2.06	
Total	254		

4.12). Hypotheses 1, 2, and 3 were therefore not rejected for Noise Level.

Post Hoc Analysis

To probe the nature of the difference in treatment means, a Newman-Keuls Test was performed on the overall significant F value for the main effects of wall color for the Disruptive Behavior subcategory Ignoring (Table 4.13). All between mean comparisons were significant ($p < .05$) except the mean comparisons of Blue and Light Red, and Light Red and Yellow (see diagram below).

Red Light Blue Light Yellow Blue Light Red Yellow

The mean orderings (Table 4.13) fail to show a grouping of the three primary colors versus the three lighter variants of the primary colors.

Table 4.12

ANALYSIS OF VARIANCE FOR NOISE LEVEL

Source	df	Ms	F
Size	1	527.60	0.35
Color	5	102.19	0.33
Group	1	95.13	
Size X Color	5	164.88	1.94
Group X Size	1	1489.13	
Group X Color	5	307.02	
Group X Size X Color	5	84.78	
Error	1451	13.32	
Total	1474	2784.05	

Table 4.13

NEWMAN-KUELS FOR CATEGORY IGNORING

	Red	Lt. Blue	Lt. Yellow	Blue	Lt. Red	Yellow
Red	——	8.21**	11.05**	20.73**	22.05**	23.39**
Lt. Blue		——	2.85**	12.52**	13.84**	15.20**
Lt. Yellow			——	9.68**	10.99**	12.35**
Blue				——	.0768	2.67**
Lt. Red					——	1.36
Yellow						

*Significant at .05 level

**Significant at .01 level

CHAPTER FIVE

DISCUSSION

Preliminary Analysis

The descriptive data on the subcategories of disruptive behavior (see Table 4.1) has shown that four subcategories--Disruptive Noise with Object, Disturbing Others Directly and Aggression, Talking, and Bossing--failed to reach the criterion frequency of occurrence of 10%. A probable explanation for the low occurrence of the first three subcategories is that both teachers exhibited potential control over the classroom environment stopping potential disruption of the task before it could occur, i.e., separating children who have exhibited disruptive behavior in the past, either upon seating or early in the story period. With respect to Disruptive Noise with Object, the teachers actively prevented children from bringing objects with them to the experimental room or confiscated them once there. While some shuffling and tapping of feet occurred, it appeared to occur in conjunction with the subcategory Ignoring, and the teachers tended to call the children's attention back to the task. With

respect to the subcategory Talking, the children could be more readily viewed as not attending to the task as it was child directed, whereas, the subcategory Blurting Out, Commenting, and Vocal Noise, being teacher directed and frequently involving the content of the story could more readily be viewed as task oriented and therefore not actively suppressed. The subcategory Bossing failed to be recorded during the experiment. Prior to the research in observation of another preschool group Bossing was also noted to be of low frequency, being the trait of a particular child rather than a group trait. Bossing could also be an age characteristic, as that one child observed previously was older than the others in the group.

The significant group effect found while testing the assumptions made in Chapter One could not be explained. Stratification of the groups by sex, while removing the group differences for males, retained significant group differences for females on Sucking and Relevant Behavior. Age stratification of the groups accounted for only a minimal amount of the group differences, with the groups remaining significantly different on Sucking and Relevant Behavior. No trends in time-of-day effects could be found to account for the groups'

differences. It must be assumed that random and/or unknown variables accounted for the groups differences.

In future research, where a small sample size makes the use of a repeated measures design an optimal research strategy, exposing all subjects simultaneously to the treatment conditions, rather than grouping the subjects, would eliminate the problem of artificially introducing a group effect into the data. However, if sample size and experimental resources permit, a more optimal research strategy would be the repeated measures design with a control group. The major weakness of the repeated measures design, lack of control over history[1] and maturation,[2] would be controlled for along with unique subject response characteristics. Thus, the internal validity of the study would be protected from all forms of extraneous variables (Campbell and Stanley, 1963).

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[1]History refers to ". . . the specific events occurring between the first and second measurement in addition to the experimental variable (Campbell and Stanley, 1963, p. 5)."

[2]Maturation refers to ". . . processes within the respondents operating as a function of the passage of time per se (not specific to the particular events, including growing older, growing hungrier, growing more tired . . . (Campbell and Stanley, 1963, p. 5)."

Wall Color Findings

Objective data. For all subcategories of Disruptive Behavior, except Ignoring, for Relevant Behavior and Noise Level, the main effects of wall color were not significant. The subcategory Ignoring, however, was found to be significant ($p < .01$). The differential magnitude in the F values between Ignoring and the other dependent variables could be a reflection of the sensitivity of this subcategory to any influence that wall color might have had in this experiment. Two reasons could account for this subcategory's sensitivity to wall color effects. First, by definition Ignoring is a sensitive subcategory for it is the only dependent variable defined as looking at the walls. Second, if the teachers were finding it difficult to inhibit their potential control over behavior and create the permissive environment the investigator requested, Ignoring would be a behavior that the teachers could let occur, as its consequences were not seen as potentially as disruptive to the group as the other forms of disruptive behavior, e.g., gross motor behavior, aggression, to create the requested environment.

Unfortunately it is possible that the subcategory Ignoring was confounded by the possibility that the subcategory's definition interacted with the structural characteristics of

the area the research was conducted in. As mentioned in Chapter One under limitations, the investigation was conducted in a basement, with a ceiling that had exposed heating ducts and was not sound proofed. The noise from the children upstairs was variable in intensity, and on a number of occasions took the needle off the high end of the scale (> 76 db) of the sound level meter. Between the novelty of the ceiling and the distraction from the noise upstairs, it is possible that these extraneous variables were confounded with the effects of wall color. It is possible that if Ignoring is confounded by ceiling effects and objective and quantitative removal of ceiling effects were possible, the subcategory would be more in line with the other dependent variables. It is recommended that for future research the study be repeated in the regular classroom area or in an area that does not in itself have unusual characteristics.

From the rank order of the means for each color on each dependent variable it appears that random responding to color occurred with no obvious trends across dependent variables (Table 5.1). The lack of a color trend and the magnitude of the differences in the F values between Ignoring and the other dependent variables suggests that the F value for Ignoring may

Table 5.1

ORDERING OF COLOR MEANS BY DEPENDENT VARIABLES

Observation Category	Color					
	Lt. Blue	Red	Lt. Yellow	Blue	Lt. Red	Yellow
Gross Motor Behavior	1	6	5	4	3	2
Orienting Response	1	5	4	6	3	2
Blurting Out, Commenting and Vocal Noise	5	3	6	2	4	1
Other	1	3	5	4	3	2
Improper Position	6	5	1	4	3	2
Sucking	6	4	2	3	5	1
*Ignoring	2	1	3	4	5	6
Relevant Behavior	1	2	4	5	6	3
Noise Level	1	4	5	3	2	6

Note: 1 indicates the least behavior that occurred; 6 indicates the most behavior that occurred.

*$p < .01$

be artificially inflated. If a consistent pattern, e.g., tendency on the part of the children to respond to the primary colors differently than to the lighter primary variants, had been found it would have lent support to the possibility that the differences in F value magnitude was an indication that Ignoring was highly sensitive to any wall color effects in the experiment.

A direct comparison is possible of the trends for the wall colors light blue, red, blue, and light red between Webb's study and this study. In each case the comparison was made within each dependent variable by ranking the four colors from 1 (least) to 4 (most). Webb's trend finding that ". . . red and pink walls caused less relevant behavior, more disruptions, and more noise to occur than did light blue walls (p. 57)" was tentatively supported for Disruptive Behavior and Noise Level, but not for Relevant Behavior. The subcategories of Disruptive Behavior were averaged to provide one rank per color. There was a trend for red and light red walls to be more disruptive than light blue walls, however, blue walls had the most disruptive effect on behavior (Figure 5.1). For Noise Level, only under red walls was there more noise when red and light red walls were compared to blue and

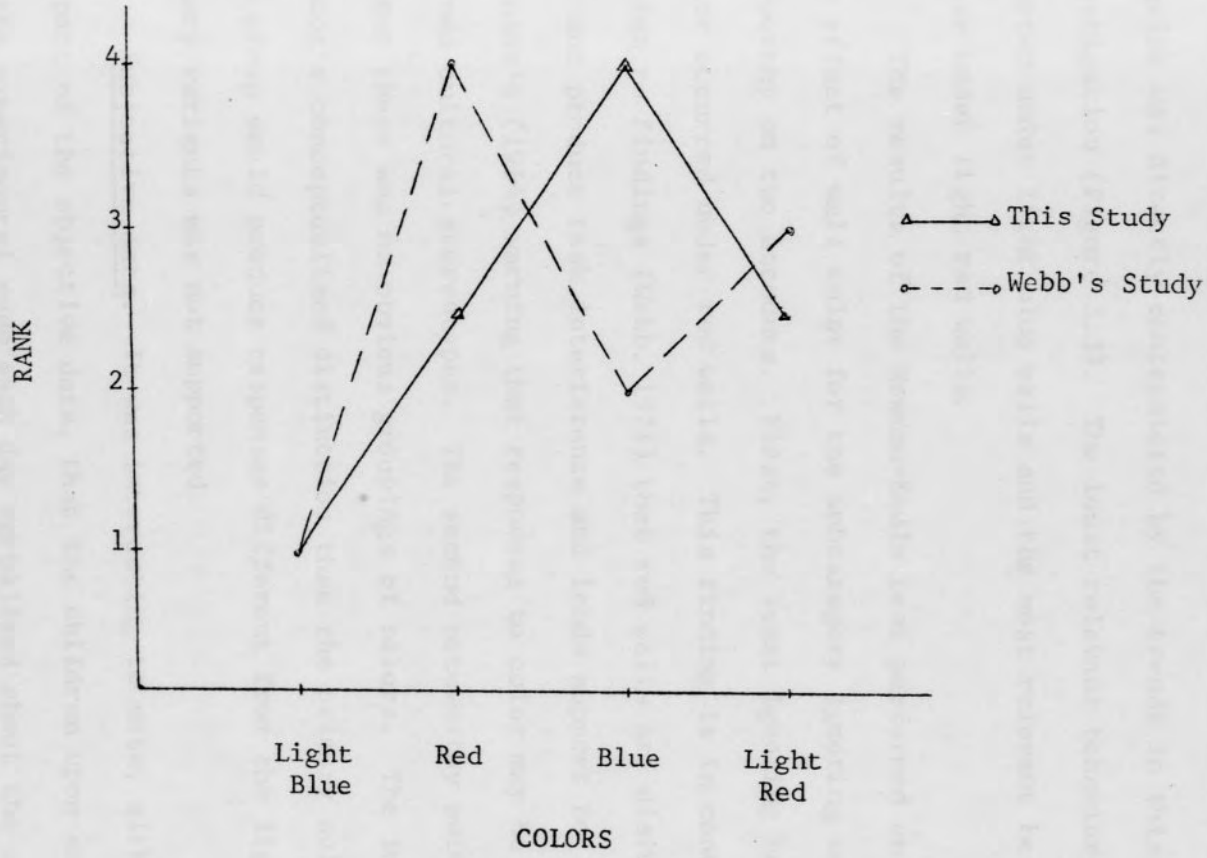

Fig. 5.1. Rank order comparison of Webb's color trend for Disruptive Behavior with the trend from Current Study.

light blue walls (Figure 5.2). Webb's trend for Relevant Behavior was directly contradicted by the trends in this investigation (Figure 5.3). The least relevant behavior occurred under light blue walls and the most relevant behavior under light red walls.

The results of the Newman-Keuls test performed on the main effect of wall color for the subcategory Ignoring was noteworthy on two accounts. First, the least Ignoring behavior occurred under red walls. This finding is in contradiction to findings (Webb, 1971) that red walls are disruptive and produce task interference and lends support to Aaronson's (1964) warning that responses to color may be learned cultural stereotypes. The second noteworthy point is that there was no obvious groupings of colors. The investigator's conceptualized distinction that the primary colors as a group would produce responses different from the lighter primary variants was not supported.

Subjective data. It was interesting to note, although not part of the objective data, that the children upon entering the experimental room each day verbalized about the wall color and ran their hands over the walls. Typical comments by the children picked up by the tape recorder were "Yellow

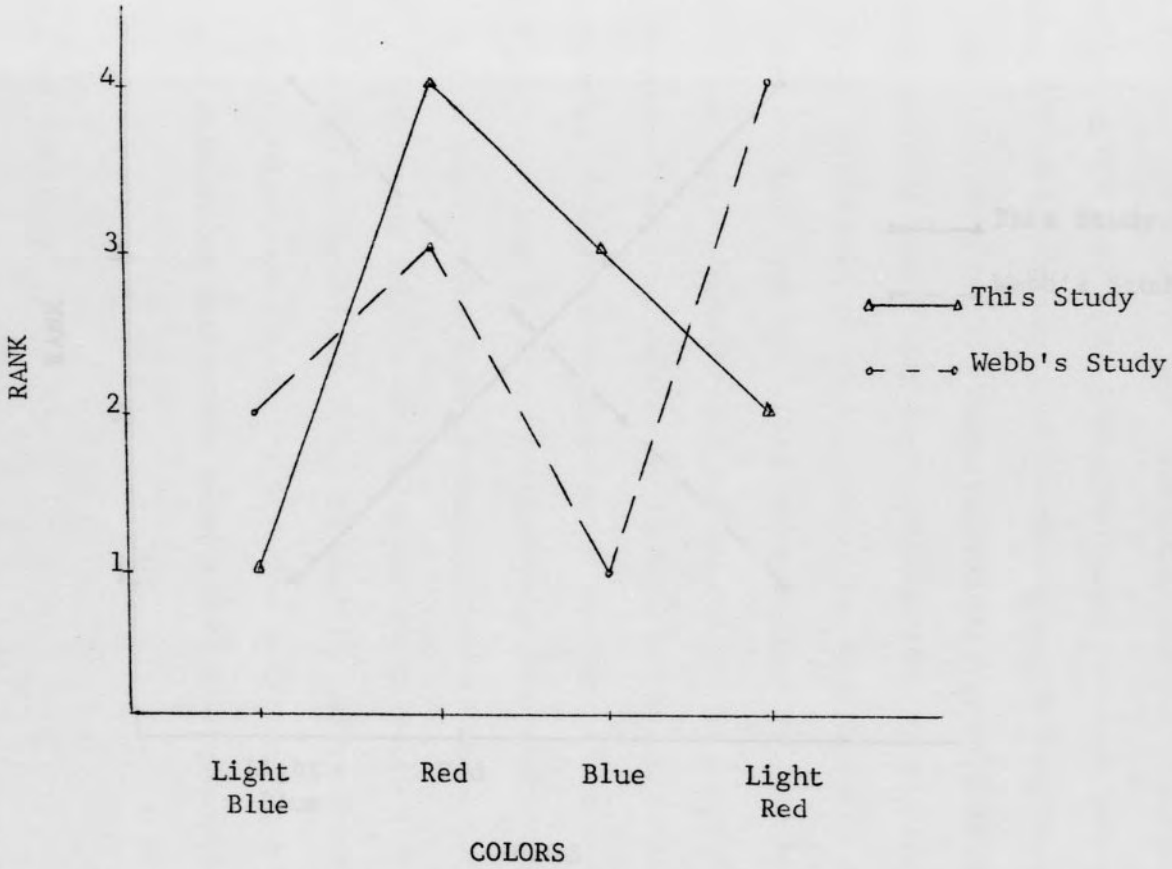

Fig. 5.2. Rank order comparison between Webb's and Current Study's color trend for Noise Level.

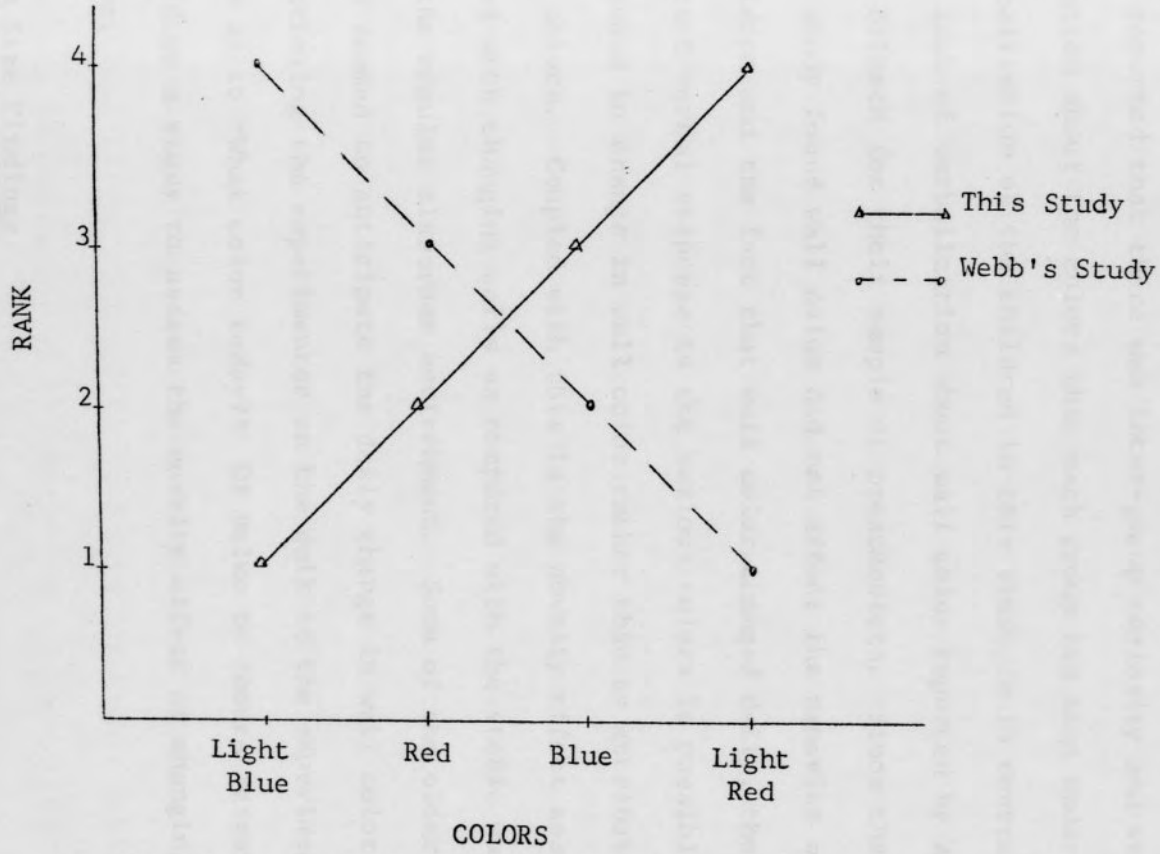

Fig. 5.3. Rank order comparison between Webb's and Current Study's color trend for Relevant Behavior.

walls," "Red, red wall paper," "Pretty, pretty." The teachers reported that there was inter-group curiosity and verbalization about the colors that each group had been under. The verbalization of the children in this study is in contrast to the lack of verbalization about wall color reported by Allen and Dilbech for their sample of preschoolers. Since the present study found wall color did not effect the behavior of the children and the fact that wall color changed daily, the consistent verbal response to the various colors is possibly a response to change in wall color rather than to attributes of the colors. Coupled with this is the novelty effect associated with changing walls as compared with the static walls of the regular classroom environment. Some of the older children seemed to anticipate the daily change in wall color, questioning the experimenter on the walk to the experimental room as to "What color today?" Of value to future research would be a study to assess the novelty effect of changing wall color.

Room Size Findings

Objective data. For four subcategories of Disruptive Behavior--Orienting Responses, Other, Sucking, and Ignoring--the main effects of room size were significant. Comparison

of the effects of size (Table 5.2) show for three of the four significant measures a trend for more Disruptive Behavior to occur in the large room (168 sq. ft.) than in the small room (80 sq. ft.). This finding is contradictory to the research of Arnote (1969), Hutt and Vaizey (1966), Murphy (1937), Jersild and Markey (1935), and Green (1933) and contradictory to the social facilitation literature which suggests " . . . high density may function as an adverse stimulus to arouse drive (Freedman, 1971, p. 13)" and create stress. If a comparison is made between the density per person created in this study with the density per person created in those studies which used space as a controlled variable in the study of children's behavior (Arnote, 1969; Hutt and Vaizey, 1966), the large room as defined here is more comparable with small rooms as defined by the other studies (Table 5.3).

Although both rooms used in this current study appear, in the context of the literature, to be small rooms, still unexplained is the contradiction of more disruptive behavior occurring in the larger of the two rooms. As the current study utilized a structured group task under the direction of the teacher rather than a free play situation, as used by Arnote and Hutt and Vaizey, it is possible that the teachers'

Table 5. 2

COMPARISON OF EFFECTS FOR SIZE

Observation Category	Size	
	S_1	S_2
Gross Motor Behavior	-	+
*Orienting Responses	-.10773	.10773
Blurting Out, Commenting and Vocal Noise	+	-
*Other	-.6852	.6852
Improper Position	-	+
**Sucking	.17953	-.17953
**Ignoring	-.13348	.13349
Noise Level	+	-
Relevant Behavior	+	-

Note: S_1 = small room; S_2 = large room; - = Negative deviation from the Grand Mean indicating less behavior occurring; + = Positive deviation from the Grand Mean indicating more behavior occurring.

*$p < .05$

**$p < .01$

Table 5.3

COMPARISON OF DENSITY (SQ. FT./PERSON) BETWEEN CURRENT STUDY AND OTHER STUDIES

Studies	Room Size	
	Small	Large
Current	5.3 sq. ft.	11 sq. ft.
Arnote	20 sq. ft.	50 sq. ft.
Hutt and Vaizey	34.87 sq. ft.	69.75 sq. ft.

behavior caused the children to be less disruptive in the small room. If the teachers had an expectation set for more disruptive behavior to occur under the small room, they could have exhibited more potential control under small room conditions. Lacking an expectation set for problems within the larger room, they lessened their potential control to provide the permissive environment the investigator requested. One of the teachers in particular frequently verbalized negative feelings regarding reading in the small room. The plausibility of this explanation cannot be objectively assessed as teachers' behaviors were not systematically studied within this experiment.

However, support for the possibility that the teachers were mediating forces in the density effects found in the current study comes from Freedman's (1971) study of the effects of density on adults interpersonal relationships. His study utilized density per person figures comparable with this study's density per person figures and found greater density effects i.e., more competitiveness and less liking by males, less competitiveness and more liking by females, in his small room (4 sq. ft./person) as opposed to his large room (20 sq. ft./person). Both of his rooms, as defined by the literature,

were small rooms. However, the results were in the direction of the other studies with the smallest room exhibiting the greatest density effects. A valuable future study would be the study of both wall color and room size effects on teachers' behavior, as well as, children's behavior.

Further support for teachers being dominant forces in the directionality of the density effects obtained comes from inspection of the definitions of the eleven subcategories of Disruptive Behavior (see Table 3.1). The underlying commonality between the four subcategories--Orienting Responses, Other, Sucking, and Ignoring--which reached significance ($p < .05$) for room size is their passive nature. Except for Sucking, each subcategory involved passive inattentiveness to the task. By their nature, passive acts are less under the control of the teacher and therefore have greater freedom to vary, at least within a structured, teacher-dominated task of listening to a story, than active disruptive acts would have. It would appear that the nature of the task, i.e., teacher dominated task structure, is relevant to the behaviors that can occur. It is felt that a structured group task requiring interaction and less direct teacher control, or a free play situation would be more appropriate settings to study the effects of these

variables on social behavior than the task of listening to a story.

One further point suggesting the role of the teacher in mediating the directionality of the density results is that under both room sizes the same rug area was available for seating and that each child had plenty of room to sit, due to body size, without necessarily having any body contact with another child. It would be interesting in future research to see if body size and room size interact by replicating this study on older groups of children and on adults. Freedman (1971) did find adults in same sex groups were affected by varying room size. It would also be fruitful in future research to vary both group size and room size.

The effects trend for Noise Level found more noise within the small room. Due to sound reflection off the walls, it is possible that the effect is an artifact of measurement.

More Relevant Behavior occurred under the small room size than the large room size, which is in accordance with the directionality of effects for Disruptive Behavior. It should be noted that the directionality of the effects for the Disruptive Behavior subcategory Sucking was the same as those for Relevant Behavior. It would appear that within

the context of the experimental task Sucking was not a disruptive behavior. One likely reason is that the task did not require that the child use his hands. If the use of hands had been required by the task, sucking would have been an inappropriate response. Another likely explanation involves nursery school policy. The staff feel that for this age group sucking is not an inappropriate response and do not interfere with or try to suppress the children's sucking behavior.

Subjective data. It is interesting to note that the children did not verbalize, either while in the room or later back in the main nursery, about the change in room size. This lack of verbalization is the direct opposite of their consistent verbalization regarding the change in wall color. The dominance of color over form in matching tasks for this age group has been noted by a number of developmental studies (Brian and Goodenough, 1929; Kagan and Lemkin, 1961; Lee, 1965; Suchman and Trabasso, 1966) and this could account for the differential verbalization. However, it does not explain the indirect relationship between verbalization and significance of the variables in effecting behavior.

Conclusions

In summary, it was found that wall color did not significantly affect all subcategories of Disruptive Behavior (except the subcategory of Ignoring), Relevant Behavior; or Noise Level. While wall color had a significant influence ($p < .01$) on the disruptive behavior subcategory Ignoring, there is the possibility that this subcategory was confounded by extraneous variables resulting from the structural environment the data was collected in. For this reason it is concluded that wall color failed to act as a discriminative stimulus (S^D) for social behavior of nursery school children within a structured group task.

For four subcategories of Disruptive Behavior--Orienting Responses, Other, Sucking, and Ignoring--room size was significant ($p < .05$). The remaining dependent variables, Relevant Behavior, Noise Level, and the other Disruptive Behavior subcategories failed to reach significance ($p = .05$). Room size can be considered a discriminative stimulus (S^D) for disruptive social behavior of nursery school children within a structured group task. Large room size was an S^D for disruptive social behavior for those nursery school children that acted as subjects in this experiment.

As none of the wall color--room size interaction terms reached significance, it is concluded that there is no evidence that wall color and room size exhibit joint control over behavior. Tentative support, from the Newman-Keuls test and the color trends, was found for no differential responding between the primary colors and the lighter primary variants within the context of cues for behavior by the children in the experiment. It should be noted that all research conclusions were drawn just for the children that acted as subjects for this experiment, as sample limitations precludes statistical generalizations to a larger nursery school population.

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Appendix A

Subject Characteristics

Subject No.	Group	Age	Sex	Ordinal Position
1	I	4 yrs. 1 mo.	F	3 of 3
2	I	3 yrs. 11 mos.	F	1 of 1
3	I	3 yrs. 9 mos.	M	1 of 1
4	I	4 yrs. 2 mos.	M	2 of 2
5	I	4 yrs. 9 mos.	F	3 of 3
6	I	4 yrs. 11 mos.	F	3 of 4
7	I	4 yrs. 5 mos.	F	1 of 2
8	I	4 yrs. 11 mos	M	1 of 2
9	I	4 yrs. 7 mos.	M	2 of 2
10	I	3 yrs. 3 mos.	F	1 of 2
11	I	4 yrs. 8 mos.	F	1 of 2
12	I	4 yrs. 3 mos.	M	3 of 3
13	II	4 yrs. 1 mo.	F	2 of 2
14	II	4 yrs. 1 mo.	M	3 of 4
15	II	3 yrs. 8 mos.	M	2 of 2
16	II	3 yrs. 6 mos.	M	3 of 3
17	II	5 yrs. 1 mo.	F	2 of 3
18	II	4 yrs. 7 mos.	F	3 of 3
19	II	4 yrs. 8 mos.	M	1 of 2
20	II	4 yrs. 8 mos.	M	1 of 3
21	II	3 yrs. 5 mos.	F	4 of 4
22	II	3 yrs. 7 mos.	F	3 of 3
23	II	3 yrs. 4 mos.	M	3 of 3
24	II	3 yrs. 3 mos.	M	4 of 4

Appendix B

Paint Color Swatches

light yellow (8703)

yellow (0503)

light pink (8720)

red (0641)

light blue (8732)

blue (0761)

Appendix C

Observation

Time Sheet

Date__________ Rater__________ Experimental Session__________

Group__________ Time__________ Number Present__________

Subject__________

A1	X	X	X	X	X	X	X	X	X	X	X	X
	N	N	N	N	N	N	N	N	N	N	N	N
	A	A	A	A	A	A	A	A	A	A	A	A
	O	O	O	O	O	O	O	O	O	O	O	O
	!	!	!	!	!	!	!	!	!	!	!	!
	T	T	T	T	T	T	T	T	T	T	T	T
	//	//	//	//	//	//	//	//	//	//	//	//
A2	+	+	+	+	+	+	+	+	+	+	+	+
	S	S	S	S	S	S	S	S	S	S	S	S
	B	B	B	B	B	B	B	B	B	B	B	B
	I	I	I	I	I	I	I	I	I	I	I	I
B	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB

Sound level__________

Subject__________

A1	X	X	X	X	X	X	X	X	X	X	X	X
	N	N	N	N	N	N	N	N	N	N	N	N
	A	A	A	A	A	A	A	A	A	A	A	A
	O	O	O	O	O	O	O	O	O	O	O	O
	!	!	!	!	!	!	!	!	!	!	!	!
	T	T	T	T	T	T	T	T	T	T	T	T
	//	//	//	//	//	//	//	//	//	//	//	//
A2	+	+	+	+	+	+	+	+	+	+	+	+
	S	S	S	S	S	S	S	S	S	S	S	S
	B	B	B	B	B	B	B	B	B	B	B	B
	I	I	I	I	I	I	I	I	I	I	I	I
B	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB

Sound level__________

Subject__________

A1	X	X	X	X	X	X	X	X	X	X	X	X
	N	N	N	N	N	N	N	N	N	N	N	N
	A	A	A	A	A	A	A	A	A	A	A	A
	O	O	O	O	O	O	O	O	O	O	O	O
	!	!	!	!	!	!	!	!	!	!	!	!
	T	T	T	T	T	T	T	T	T	T	T	T
	//	//	//	//	//	//	//	//	//	//	//	//
A2	+	+	+	+	+	+	+	+	+	+	+	+
	S	S	S	S	S	S	S	S	S	S	S	S
	B	B	B	B	B	B	B	B	B	B	B	B
	I	I	I	I	I	I	I	I	I	I	I	I
B	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB

Sound level__________

Appendix D

Apparatus Listing

Item	Place Obtained
2" X 2" Fir	Brooks Lumber Co. 302 W. Lee St. Greensboro, N. C.
Unbleached Carton Stock Paper	Weyerhaeuser Co. Plymouth, N. C.
Latex Paint	DeSota, Inc. 1025 Howard St. Greensboro, N. C. (through: Sears and Roebuck Company 2600 Lawndale Dr. Greensboro, N. C.)
Cork	Sears and Roebuck Co. (Catalog) 2600 Lawndale Dr. Greensboro, N. C.
Hardware	Sears and Roebuck Co. 201 N. Eugene St. Greensboro, N. C. and Boyles HDW Co., Inc. 4813 High Point Rd. Greensboro, N. C.
Children's Stories Wooden Boxes Room Thermometer	Dr. Helen Canaday School of Home Economics University of North Carolina at Greensboro Greensboro, N. C.

Appendix D Continued

Stop Watches	Dr. Robert Muir Physics Department University of North Carolina at Greensboro Greensboro, N. C.
Sound Level Meter	Dr. Roby Kerr Psychology Department Medical University of South Carolina Charleston, S. C.
5' X 6' rug	Ms. Mimi Eller 612 S. Mendenhall St. Greensboro, N. C.

Appendix E

Experimental Schedule

Friday, January 19:	Initial rater training day. Rate children from observation booth at main nursery school building.
Tuesday, January 23:	Adaptation Day 1 at experimental room. Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
Wednesday, January 24:	Adaptation Day 2 at experimental room. Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
Thursday, January 25:	Adaptation Day 3 at experimental room. Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
Friday, January 26:	Adaptation Day 4 at experimental room. Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
Monday, January 29:	No experimental sessions.
Tuesday, January 30:	Experimental Day 1 at experimental room. Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
Wednesday, January 31:	Experimental Day 2 at experimental room. Group I: 9:15-9:30 a.m. Group II: 10:30-10:50 a.m.
Thursday, February 1:	Experimental Day 3 at experimental room. Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
Friday, February 2:	Experimental Day 4 at experimental room.

Friday, February 2: (Continued)	Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
Monday, February 5:	No experimental sessions.
Tuesday, February 6:	Experimental Day 5 at experimental room. Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
Wednesday, February 7:	Experimental Day 6 at experimental room. Group I: 9:15-9:35 a.m. Group II: 10:30-10:50 a.m.
*Thursday, February 8:	Experimental Day 7 at experimental room. Group I: 10:30-10:50 a.m. Group II: 9:15- 9:35 a.m.
Friday, February 9:	Experimental Day 8 at experimental room. Group I: 10:30-10:50 a.m. Group II: 9:15- 9:35 a.m.
Monday, February 12:	No experimental sessions.
Tuesday, February 13:	Experimental Day 9 at experimental room. Group I: 10:30-10:50 a.m. Group II: 9:15- 9:35 a.m.
Wednesday, February 14:	Experimental Day 10 at experimental room. Group I: 10:30-10:50 a.m. Group II: 9:15- 9:35 a.m.
Thursday, February 15:	Experimental Day 11 at experimental room. Group I: 10:30-10:50 a.m. Group II: 9:15- 9:35 a.m.
Friday, February 16:	Experimental Day 12 at experimental room. Group I: 10:30-10:50 a.m. Group II: 9:15- 9:35 a.m.

Monday, February 19--Friday, February 23: Clean up of experimental room by experimenter

*Order of groups presented to experimental room changes.

Appendix F

Instructions to Teacher

Each child will be assigned 2 numbered tags to wear during each session in the experimental room and on the rater training day in the main nursery school building. Put the tags on the chest and back of each child prior to bringing them to the experimental room. Each group will be brought to the exterior door of the basement of the McIver Building at the time specified on the Experimental Schedule.

Upon entering the experimental room seat the children on the rug facing the 3 small box chairs. After indication from the Experimenter that the Raters are ready, begin reading the story assigned to that day (listed on Story Schedule). The story is to be read at a normal rate, stopping to respond to the children as in a normal classroom situation. After the story is completed, engage the children in quiet songs, finger play, and nonrambunctious body activity. This filler activity must be kept constant from day to day with respect to activity level of the children. The Raters will leave the room when they have completed their task, signalling the end of the experimental session.

During the sessions in the experimental room you are to ignore the Raters who will be seated to one side of you. On Adaptation Day 1 introduce the Raters to the children and explain to them that the Raters are there to watch them listen to a story rather than to play with them.

The classroom environment of the children in the experimental room is to be a permissive one. Disruptive and aggressive behavior is to be altered only when it could result in injury to the child or others in the room. If any child, after being asked once, still refuses to accompany the group to the experimental room, the child is to be allowed to remain in the main nursery building.

Appendix G

Instructions to Raters

General Information: The rating of the experiment will involve 17 days. The first day is a practice day and will be conducted at the main nursery school building. It will involve familiarizing oneself with the coding categories, rating time sequence, and sound-level meter and establishing rater reliability.

From the first adaptation day throughout the remainder of the experimental period roughly 2 hours of your time will be required each morning. Starting with adaptation day 1, the experimental sessions will run Tuesday through Friday, omitting Mondays. It is important that the raters be present by 9 a.m. each morning and that they not miss throughout the experimental period, as it can confound the data being collected. The raters during the experimental period are expected not to interact with the children being observed.

Rating Instructions: Attached to this sheet is a time sheet like the one to be used to rate the children's behavior. For each group, each day of the experiment, the rater will be given 2 time sheets. The raters will observe by 3 minute

observation blocks (each page of the time sheet contains 3 observation blocks). Each subject, in assigned order, will be observed for 10 seconds (8 seconds observation-2 seconds record time). After each 10 second observation a 5 second sound-level reading will be taken from the sound-level meter (4 second observation of meter-1 second record time). The sound-level meter is to be set at 70 throughout each experimental session. Watches will be stopped and resynchronized at the end of each observation block.

Normally any 10 second observation will involve only one category of behavior observed. However, within type A more than one category of behavior can be recorded per subject if it occurs. Type B behavior can not be recorded if any type A behaviors were observed during any part of the 8 second observation. To record the behavior, circle or slash out (/) the appropriate symbol that corresponds to the behavior(s) observed. If the rater misses a 15 second period on a subject (10 second observation-5 second sound-level reading) leave the column blank and skip to the subject that is assigned to be observed during that particular observation period.

Appendix H

Story Schedule

Day	Group I	Group II
1	Curious George Flies a Kite	
2	Curious George Goes to the Hospital	
3	Angus Lost	
4	Curious George Rides a Bike	
5	Curious George Gets a Medal	No Roses for Harry
6	Curious George	Curious George Takes a Job
7	The Story of Babar	Harry the Dirty Dog
8	Harry by the Sea	Curious George Learns the Alphabet
9	Angus and the Ducks	Babar Loses His Crown
10	Babar and His Children	The Travels of Babar
11	The Travels of Babar	Curious George Gets a Medal
12	Harry the Dirty Dog	Harry by the Sea
13	Babar Loses His Crown	Curious George
14	Curious George Takes a Job	Angus and the Ducks
15	Curious George Learns the Alphabet	The Story of Babar
16	No Roses for Harry	Babar and His Children