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ROTHENBERG, Marilyn S., 1932-
THE SOCIAL AND SPATIAL ORGANIZATION OF BOYS AND GIRLS IN OPEN CLASSROOMS.

City University of New York,
Ph.D., 1977
Psychology, social

THE SOCIAL AND SPATIAL ORGANIZATION OF BOYS AND GIRLS IN OPEN CLASSROOMS

by

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A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1977

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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ABSTRACT

This research investigated the relationship between space utilization patterns and the social organization of boys and girls in open classrooms. A range of hypotheses derived from previous ethological, anthropological, and psychological research on boys' and girls' environmental patterns was formulated. The hypotheses were tested with data collected through systematic classroom observations and sociogram interviews.

It was predicted that boys and girls would interact more with same sex than opposite sex peers, spend time in different classroom areas, be differently located with respect to adults, and that teachers' spatial patterns and room arrangements would encourage these segregated patterns. Many of the patterns did occur suggesting that even within classrooms in which the most frequent activities were similar for boys and girls, choices of companions and location were likely to entail a consideration of gender.

Analyses of the 15 classrooms revealed that the percentages of children observed in areas associated with their gender ranged from 6.5% to 51.4% and the percentages of integrated pairs ranged from 5.2% to 32.8% of all dyads observed.

Areas associated with boys' or girls' sex-linked areas, were generally located in areas not frequented by the teacher. Male sex-linked areas tended to be located in the back of classrooms and were equally likely to be open space or

desk areas. Female sex-linked areas were generally located in front of the classroom, as were teachers' areas, and were more likely to be desk than open space areas. No physical distance differences were found between teachers' areas and male or female areas.

Children's sociogram selections revealed more same sex choices than opposite sex choices for all play, friendship, math and reading categories. When children were asked to indicate class members who influenced others and those who had greater access to resources the individuals mentioned were also likely to be same sex as the respondent. However, a greater percentage of girls compared to boys chose opposite sex peers as having influence with classmates and access to resources.

Intercorrelations among variables suggest that the classroom organization comprises two systems. One is, at least in part, the result of prior socialization, the way girls and boys respond to each other and the environment. The second is the response to the academic or functional school program, its goals and how they are supported. The positive correlation between the percentages of observed cross-sex interactions and the percentages of children's cross-sex math choices and the lack of relationship between these variables and age illustrates the academic-functional system. The positive correlations between age and the percentage of sex-linked area use, and the negative correlation between age and cross-sex play and friendship choices suggest the in-

fluence of a social system based on other contingencies.

Findings are discussed in terms of the meanings and effects of gender segregation, the range and patterns of social choices and room use across classrooms. Data indicate that although sex-role socialization practices do not originate in the schools, setting-specific variables can temper or exacerbate them. Particular emphasis is placed on future research that would investigate further the relationships between social and spatial patterns through a series of interventions.

ACKNOWLEDGEMENTS

This research was conducted with the support and assistance of many people.

I especially want to thank my committee. My advisor, Lee Rivlin, has contributed significantly at every stage of the work, attending to major issues as well as critical details. Her professional guidance and personal friendship are valued deeply. Susan Saegert and Maxine Wolfe have provided invaluable assistance, offering suggestions and criticisms, while encouraging my interests and perception of the problem.

I would like to acknowledge my appreciation to the children, teachers and principals who welcomed me to their classrooms and participated in the research. Also, I would like to thank many friends and co-workers: Jeff Hayward, Fred Wheeler and Sue Fox for their personal concern and thoughtful reading of the dissertation; John Best for his patient technical assistance with programming; Ellen Proshansky and Sharon Heymann for their sensitive interviewing of children; and Alan Sommerman, Jeff Weiland, Fran Justa and Bill Hilton for collecting the data.

I particularly want to thank the National Institute of Mental Health for their support of the investigation of space utilization patterns in the open classroom of which this research was a part.

Finally, my family deserves special thanks for their encouragement and support of my goals from my return to

graduate school through the sometimes difficult days of writing a dissertation. To my children, Alan, Laurie and Michele, and especially to my husband, Buddy, I would like to express my deepest appreciation.

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Space is a particularly potent resource since its allocation not only reflects the status hierarchy, but further tends to increase the power and control of the occupant. Thus, the house on the hill, the largest office, the private study not only indicate status but provide the possessor with greater options for privacy, control and exploration. Empirical studies suggest that this is not only the case when the resource interacts with a power position, but that the spatial component itself influences behavior, attitudes, and expectations. Thus, when hospital bedrooms are randomly assigned, occupants of single or double bedded rooms have greater behavioral options and control over social contacts than those in multi-bedded rooms (Ittelson, Proshansky, & Rivlin, 1970). Similarly, among children of middle-class backgrounds, private bedrooms have an impact on developing attitudes toward privacy (Wolfe & Laufer, 1974).

This study, based on the recognition of the value of space as both a symbol of status and as a functional resource, proposes to investigate the relationship between social and spatial organization with regard to gender in a public setting. The setting, a number of elementary school classrooms, provides relatively constant groups operating over time in similar physical contexts. The general institutional expectation that resources will be shared by group members provides the opportunity to look at how the social organization of boys and girls is reflected in the

distribution of resources, primarily space. Values, some cultural, some specific to a classroom, are reflected in the way resources are distributed in classrooms. In social groups, the valuing of different attributes contributes to the power and privilege of individuals. In part, the status hierarchies that evolve are based upon individual adaptive capabilities and achieved characteristics. In addition, and pertinent to this study, ascribed characteristics which define individuals as belonging to a particular race, class or sex can operate to limit individual potential.

A number of factors suggest that sex will be a particularly salient dimension of classroom organization. The well-known sex segregation in friendship and play choices of young children (Moreno, 1953; Northway, 1967; Omark, Omark, & Edelman, 1973) predicts a social segregation within the classroom. Further, the recognition by young children in our society of masculine dominance or social power (Guttentag, 1975; Kohlberg, 1966) along with the greater physical aggression by boys (Maccoby & Jacklin, 1974) prompts consideration of a hierarchical order. This study explores the influence of stratification by sex on space allocation and the factors that mediate spatial distribution in a number of open classrooms.

The study of the relationship between social and spatial organization has a meager history with regard to human groups although ethologists have long considered this interaction. Ethological concepts of dominance, which

denote priority access according to individual animal ranking, frequently based on aggression or threat, and territoriality, a system of spatial allocation which relates to the power of the inhabitant, have contributed to understanding the functioning of animal groups. The complexity of the human organism and human lives, the diversity of relationships, perceptions and their interplay in varied groups with varied purposes and sites of action preclude the possibility of a unidimensional dominance or territorial order. One group of studies which attempted to relate ethological concepts of dyadic dominance and territoriality to human functioning has taken place in settings which limit behavioral and spatial opportunities, places such as psychiatric and other institutions (Esser, 1968; Esser, 1969; Esser, Chamberlain, Chapple, & Kline, 1965; Sundstrom & Altman, 1974) and children's camps (Williams, 1975). Beyond the institutional aspect these studies have further narrowed the scope by focusing on all male groups during "free time," that is, segments not confounded by institutional purpose or staff involvement.

A second group of ethological studies has focused on young children partly to delimit the spatial scope and variety of human activities and partly to understand developmental aspects of social organization. The bulk of these studies has taken place in nursery schools, which compared to non-human play groups according to McGrew (1972) are "...not so culturally unique and "artificial" as might be

first supposed." The similarities he posits are the initial age/peer contact of young primates, same sex subgroupings of the larger mixed sex group, displaying different behaviors, and the amount of time spent in free social play in a context monitored and at times interfered with by adult females of the species. In addition, research on dominance has taken place with elementary school children using both playground observations and sociometric interview (Omark et al., 1973; Parker, 1975).

Although these studies have attempted to partial out institutional purpose by emphasizing natural or social groups during free time, the influence of the organization in terms of affiliation with staff or teacher intervention has been shown to interact with social order. Anthropological field studies further indicate the importance of these interactions on children's behavior in their everyday environments (Whiting & Whiting, 1975). Without belaboring the meaning of natural, but rather placing emphasis on children's daily lives, it would seem to be of both theoretical and heuristic value to explore the contingencies which operate within situations in which there is a mix of roles and expectations. Understanding the relationship between social and spatial organization is required to optimize individual potential. The importance of this issue is heightened as space becomes an ever more scarce resource.

Although society offers many settings in which to study the relationships between social organization and shared

resources, such as homes, hospitals, and offices, the public school seems a particularly relevant setting for many reasons. It has a normal and pluralistic population roughly representative of society. It provides an enduring environment for six hours a day for at least ten years, yet it is more reflective of general cultural values than total residential institutions. Further, it is the primary institutional experience for many. Since its program is important in the teaching and guiding of current and future behaviors, attitudes and expectations, it provides a rich field setting in which to explore major variables as well as the potential for interventions based on findings.

A recent change in educational philosophy and physical organization provides an especially relevant opportunity for the study of social and spatial relationships. From the era of the one room schoolhouse until rather recently, the policies of most public school systems have placed responsibility for the distribution of resources, space, equipment and materials upon the teacher. Thus, upon entering a classroom, a child would be presented with a desk or bench space, as well as the books and supplies deemed necessary for mastering the preset curriculum. For the most part, these materials were equal or similar to those received by others and it was expected that they would be used and cared for solely by the child receiving them.

The open classroom method has an inherent potential for a radical departure from this distribution of resources.

The open classroom philosophy, based on a theory of education that stresses children's active involvement with materials and people in pursuit of their own interests, places particular importance on the use of the physical environment, both space and objects, in the context of others, both adults and peers.

Although a wide range of practices exists in the open classroom, a change from traditional classroom furniture arrangement has come to symbolize a teacher's desire to be associated with the open classroom movement. Within communities the same intention is symbolized by the building of open plan schools. In the open classroom situation, the traditional classroom arrangement of rows and columns of desks facing the front or blackboard has been replaced in full or in part by a more varied array of furnishings and their placement. The newer arrangements consist of interest areas such as reading, math, crafts, science, and varied furnishings such as lofts, pillows, rugs, easychairs. In addition, materials are arranged in open display or in cabinets open to children's access. Although classrooms differ considerably, the opportunities for movement and social interaction are enhanced by each of these changes.

In both the traditional and the open classroom, however, the opportunities available for each child are not determined by a listing of resources. Attitudes, expectations and past experiences reflecting social values interact with the classroom resources to influence both

achievement and self-image. A setting which offers children some degree of choice regarding what they learn, where in the classroom they learn it, how they learn, with what materials and with whom they learn, can tend to exacerbate differences in opportunity based on past experiences and cultural attitudes of both teachers and children as they interact with the social and physical classroom setting. Thus, sex stereotyped notions of appropriateness are likely to differentiate between boys and girls with regard to relationships, exploration, activity level and kind of activities. Further, since early elementary schooling coincides with the age at which children become aware that not only are they male or female, but that, in fact, their gender will remain constant, the school experience can further delimit behavior and future expectation according to sex role stereotypes or enlarge the scope in order to optimize each individual's educational experience and future expectation.

A study of the open classroom setting provides the opportunity to consider whether peer interaction by sex continues to be as dichotomized within the classroom as it has previously been revealed in playgrounds (Omark et al., 1973) and in sociometric interviews (Bonney, 1943; Moreno, 1934; Northway, 1967). It also enables consideration of whether social stratification is reflected in spatial organization, that is, disproportionate use of room areas by girls and boys. The selection of a number of classrooms further enables a consideration of not only the cultural values

reflected in the classrooms, but the setting-specific variables, such as teacher behavior and physical arrangement which tend to mediate the resulting spatial and social organization.

REVIEW OF THE LITERATURE

A wide range of empirical work can be drawn upon to aid in understanding the relationship between social and spatial organization. The most direct work done on this topic has been based on the ethological concepts of dominance hierarchy and territoriality. Studies of both human and non-human groups give some indication of the variables to be considered. Field studies, some cross cultural, of the behavior of children in varied environments shed light on the diverse patterns of boys' and girls' social and environmental relationships. Explorations of children's social networks and behavior lead to a consideration of the impact of cultural values and functional or organizational influence on both social organization and spatial patterns. In addition, studies primarily concerned with ecological variables such as spatial configurations, report data on gender differences.

Ethological Studies

The concepts of dominance hierarchy and territoriality represent organizational structures which allow for both intra-group harmony and species survival. As a result of a series of dominance encounters between pairs of animals, a ranking of all animals in a group is established. This

dominance hierarchy which remains relatively stable over time may then be the basis for priority access to one or more important resources. The prototype linear hierarchy is the pecking order of chickens (Schjelderup-Ebbe, 1935). Each chicken pecks only chickens beneath it in rank and the dominant, or alpha chicken, has priority access to resources. Territoriality refers to "any behavior on the part of an animal which tends to confine the movements of the animal to a particular locality" (Etkin, 1964, pp. 21-22). Traditionally, the use of the term has indicated an active defense of the area particularly from conspecifics. Once allocation is established, the occupant is generally dominant over conspecifics within its own territory.

The difficulties encountered by ethologists in their attempts at deriving intra- and cross-species generalizations serve to guard against facile extrapolations to human organization. However, a discussion of the complexities encountered by ethologists can suggest a minimal array of potential influences to consider in human groups as well as provide a context for the interpretation of human studies using dominance and territoriality as major constructs.

A review of ethological literature suggests the pertinence of many situational and environmental variables. Intra-species variation, for example, can result from environmental opportunities or constraints which foster new behavior. Thus, juvenile exploration with water can lead

to group incorporation of food washing or swimming patterns (Zajonc, 1972), or the advent of a peak or extreme resource scarcity experience can evoke a radical change from a territorial organization to a rigid hierarchical one as found by Kinsey (1971) in his laboratory density experiments with woodchucks.

However, results found in laboratory situations may relate only peripherally to group organization in natural environments. This is particularly the case in dominance hierarchies. Attempts to define the specific measures upon which ranking depends has led to an ever increasing list which is still not conclusive (Allee, 1958). Thus, the extrapolation of dominance based on simple measures signaled on sight or established in a brief agonistic dyadic encounter does not represent the full range of important variables in naturally occurring groups, such as seniority and previous social rank, resemblance to another of particular rank (Allee, 1958) and dominance of mother (Koford, 1963) for example. Affiliative bonds and cooperation have also been seen to be important aspects of dominance (DeVore, 1965). In fact, terms such as peck order are considered to be rather misleading in understanding group order as they refer primarily to aggression in birds and to laboratory induced fighting (Etkin, 1964). Further, whether dominance relates only to control of aggression or influences other aspects of group life, such as leadership, needs consideration. For example, "Where dominance is

strongly and aggressively expressed, as in macaque monkeys, baboons or the Indian antelope, the dominant males ordinarily do not maintain any sort of guard for the group and so do not initiate or lead" (Etkin, 1964, p. 17).

With regard to sex differences in social organization, the generalization that males occupy the majority of higher ranked positions, females, the lower in a dominance hierarchy, is likely to be less helpful than a consideration of the variability within and across species, how dominance relates to priority access and how survival needs are served. Thus, in both parakeets (Allee & Masure, 1936) and some ungulates such as red deer (Darling, 1937) there is a strong dominance ordering among the females, with male dominance relating only to breeding. The difficulty with generalization is clearly expressed by a recent study of groups of cercopithecine monkeys (Chalmers, 1973). This investigation of a number of potential organizing influences, among them sex composition of groups, found that of five groups of monkeys, three single male groups and two multi-male, the dominance relationship could not be determined in three of the groups. Further, in a single male group, there appeared to be an ordering of aggressive females and in a multi-male group, a rather complex order among both males and females.

The inefficacy of using one dimension, that of despotic dyadic relationships, to characterize group organization has led some ethologists to describe the social inter-

actions of animals in terms of a variety of social roles which tend to characterize the behavior set of individiuals (Bernstein & Sharpe, 1966; Gartlan, 1968; Rowell, 1966). In addition to the complexities mentioned, dimorphism, the degree of sex differences in size (Tanner, 1962) and the equal division of social labor (McBride, 1971) relate to less hierarchical social organization. In fact, generalization is exceedingly difficult according to McBride (1971) since "Sex can be a whole caste for a season, it can be a single role or just a single interaction..." (p. 131).

Simply, the emphasis on somewhat stereotyped signals between conspecifics determining dyadic dominance has not proven to be sufficient to understand group organization. The recognition that variation in organization is related to a range of environmental factors such as weather, climate, population and predators which influence the availability of food, mating and protective opportunities has led to the development of a branch of ethology called "social ethology" (Crook, 1970; Klopfer, 1962). Thus, a consideration of social relations between individuals and the natural group as they are related to environmental considerations represents an important ethological perspective.

Ethological concepts as studied in human groups

With this broadened perspective in mind, what factors have been shown to influence human dominance or status orders? The obvious complexities of human organization, the diversity of groups, the variety of contexts, the range

of ascribed and achieved status positions and functional roles have tended to restrict empirical studies based on dominance or territoriality to groups whose behavioral and spatial options are limited, that is, institutionalized persons or children.

Esser (1969), testing the hypothesis that human dominance is related to social interactions, constructed an interactional hierarchy in a ward of chronic schizophrenic men against which dominance events were measured. The interactional hierarchy was based on the frequency of initiation and duration of contact of each patient with peers and staff members, and the number of specific others contacted. Esser found that 65% of the time the dominant person in the dyadic encounter was the individual who was higher in the interactional ranking. However, this measure excluded encounters that took place in what were considered to be "obvious physical patient territories" in which those patients associated with the territories dominated others 87.5% of the encounters. The difference in percentages was attributed to the influence of the power structure on the ward, that is, status gained from staff association or favor.

In a similar study in a psychiatric treatment cottage for children, Esser (1968) related patients' contact rank order with the staff's assessment of the boys' pecking order as a means of testing prognosis. One of the findings indicated the existence of a stratification in play groups as well as rankings which related to diagnosis, those children

with primary behavior disorders ranking higher than those with brain damage.

What these studies indicate is that in institutionalized settings, during free (non-work or project) times, a relatively stable social network evolves. The difficulty with relating dominance hierarchy or pecking order with interactional hierarchy is that these are both essentially outcomes. In fact, it is not simply a matter of talking to many people but equally a matter of the willingness of others to listen and respond. In fact, in the boys' cottage the lower correlation between the staff's ranking and the interactional hierarchy was attributed to a boy with good prognosis whose friends had left, and a few children high in contact, but low on the pecking order, one a "talkative, hallucinative schizophrenic," one a "mental defective" who was garroulous and constantly complained to staff. Thus, though the amount of contact is a partial indicator of social status, other factors such as quality of interaction need consideration, as Esser acknowledges.

A study of adolescent boys in a camp situation also stressed verbal interaction as important in dominance ordering although only agonistic encounters were quantified (Williams, 1975). A strong relationship was shown between rankings based on verbal and physical dominance and the boys' sociometric ratings. Williams attempted to relate these scores to a number of the boys' characteristics, but the only significant measures were found to be distance from the

group counselor's bed and hiking position.

What these studies reveal is that stable hierarchies do evolve in these all male groups and are reflected in quantified social interactions whether based solely on agonistic encounters or across all behaviors. Further and most important, these rankings are related to aspects of the social and physical surround such as staff contact or bed location. The relationship between social order and environmental aspects does not suggest directions of causality. The relationship can probably be best understood as an interactive one. The bed next to the counselor's, for example, is not likely to determine leadership, yet when selected by a person of leadership potential may well consolidate his or her position in the group. The important question to be addressed is not how bed position correlates with various personality types, but rather how and in what way does the environment interact with the social order.

Another much used context in the study of groups relatively free from constraints has been the nursery school. These studies have added relevance for the concerns under consideration in that both sexes are generally present. However, McGrew (1972), ranking dominance on the outcomes of agonistic encounters, excluded girls from ranking as girls' dyadic encounters were frequently non-agonistic. McGrew found that most of the group's interactions involved the more dominant males. Blurton Jones (1967) found that

although some individuals regularly won fights, dominance did not explain the social organization of the classroom relating neither to leadership, peacekeeping nor priority access to objects. Whether this points up a difference in the children's behavior or the researcher's definitions is not clear. One researcher examining leadership reported that brute force was used by the highest ranking child although other forms of leadership took place in addition (Parten, 1933). A more recent observational study of preschooler's behavior, which based the dominance structure on only physical attacks and threatening gestures which elicited submissive reactions, found a clear and rigid dominance structure (Strayer & Strayer, 1975). In the latter study a lack of extreme sex stratification was found as the most dominant or alpha child was a girl. Thus, a range of findings concerning dominance hierarchies based on dyadic encounters, particularly among nursery school children, appears to preclude attempts at generalization.

One series of cross-sectional studies, however, stressing the relevancy of verbal report in addition to observation in studies of children, has found consistent developmental awareness of classroom dominance hierarchies based on the dimension of 'toughness' (Omark et al., 1973). When children were asked to compare themselves with each classmate or to rank all class members on attributes of toughness, smartness, niceness, etc., the most linear ranking was revealed on the toughness dimension. Class agreement

on the ranking improved with age, the ability paralleling the development of cognitive ability on seriation of objective measures found by Piaget. The revealed ranking also parallels the generalized primate hierarchy of males at the top of the ranking, females at the bottom with some overlap. The ability to rank all class members in a linear fashion is seen by the authors to depend upon the cognitive development of transitive inference. That is, if child A is dominant over child B and child B over child C, then child A is also dominant over child C. Although there may be general class agreement of a linear order on the toughness dimension, we know little about the influence of this dimension on classroom organization, leadership or priority access to resources. Toughness derived from aggressive encounters is obviously a more uni-dimensional measure than smartness or niceness, since the criteria for these dimensions are less tangible and more influenced by subjective appraisal. On the other hand, toughness is not just a physical characteristic such as height, and indicates the existence of behavioral incidents such as fights, threats and a resulting win/loss ratio to enable ranking.

Children's agreement on boys' high ranking on the toughness dimension as well as the rather consistent findings of the use of physical aggression by boys (see Maccoby & Jacklin, 1974 for a comprehensive review) suggests that this aspect of dominance and its relation to space as a resource is a factor requiring consideration. The open

classroom philosophy rests on the explicit premise that children learn through active involvement with their environment. This requires access to the room and its equipment as well as others, both teacher and peers. Implied is the expectation that resources will be shared. One question to be explored in this study, is how influential "toughness" is in the distribution of resources.

Field Studies of Children in a Variety of Contexts

The observational studies reported so far have deliberately chosen particular groups, sites and situations in an effort to shed light upon social interaction which occurs spontaneously, freed from institutional purpose or constraints, and minimally contaminated by authority interference. Yet as has been noted, institutional purpose and authority structures are pervasive and do influence human relationships even during the most social part of the program (Esser, 1968, 1969; Williams, 1975). Researchers have observed children's behavior over a range of contexts considered natural or usual to their daily living styles. Assessing the range of environmental experiences available to non-institutionalized boys and girls contributes to an understanding of gender differences in social interaction and space use and provides a basis for predicting future behavior based on these experiences.

Some recent anthropological and psychological work in child development have recorded important differences in the environmental opportunities afforded boys and girls.

A number of these studies have shown that home range, that is, the distances traveled from home, is generally greater for boys than for girls (Munroe & Munroe, 1971; Nerlove, Munroe, & Munroe, 1971; Saegert & Hart, 1976; Whiting & Whiting, 1975). Not only does this opportunity to travel and explore the landscape enable a view of the world and oneself through a variety of perspectives, but the opportunity for a range of social and environmental experiences is enhanced.

The physical and social attributes of settings as well as the cultural meanings of settings constrain some behaviors while facilitating others. Thus, considering the home range differentiations, it is not surprising that an outdoor setting removed from adult surveillance containing similar aged children, would present quite a different potential than a within-home setting containing young children and task-involved women. In fact, one might expect that 'rough and tumble' and aggressive behaviors, behaviors frequently characterizing boys, or nurturant behaviors, behaviors frequently characterizing girls, to be distributed differently in these settings. In considering the effects of interaction in different settings with regard to the targets of behavior, the Whitings (1975) found that infants evoke nurturance, parents evoke intimate-dependent behavior and inhibit aggressive behavior, and peers evoke aggressive behavior. The salience of indoor and outdoor settings for behavior was also emphasized when young males in Kenya were

assigned what was considered to be feminine tasks in order to fulfill a family's functional needs in the absence of daughters (Ember, 1973). Interestingly, males generally assigned outdoor feminine tasks were not more feminine in social behavior whereas those assigned feminine work in the home were. The conclusion Ember makes is that the context of the task situation may be more critical than the task itself.

Recent studies of a hunter-gatherer people, the Zhun/twa, or Kung bushmen, give further indication of the wide range of cultural variety as well as place emphasis on the continuity of the lives of children and adults. In a comparison of Bushman and London children, boys revealed more agonistic behavior in both cultures (Blurton Jones & Konner, 1973). In measures of rough and tumble behavior (other than facial gestures) and amount of activity the London boys scored significantly higher than the London girls, although no significant difference was revealed between Bushman boys and girls. Zhun/twa girls engaged in more vigorous activity, rough and tumble and chasing play than London girls. The authors suggest that "...this helps them in their active adult life no less than the London middle-class tradition of rearing sessile women helps them in their house-bound adult life."

Indoor Environments

The differences between socialization patterns in indoor and outdoor environments may suggest that outdoor studies are somewhat tangential to the more circumscribed classroom. There is a basic continuity, however, and systematic differences found between the sexes in the larger environmental scale parallel differences found in children's play choices and area usage in pre-school environments (Fagot & Patterson, 1969; Lay & Meyer, 1973). In addition, in the micro-indoor scale, once a child is located in an area, certain behaviors are more likely than others. Thus, one study found that children in the active play area were more likely to interact with peers, while teacher-child interactions were more likely in the task area (Lay & Meyer, 1973). Boys were more often found in the active area. In addition, expectations varied concerning the behaviors acceptable to teachers in each of three areas of the room. Running was acceptable in the active area whereas walking and sitting were deemed appropriate for the expressive and task areas.

Social Choices and Preferences

Although consideration of context or area choice is infrequent in the literature, there is a long history of evidence of sex separation in play choices by pre-schoolers both from observational data as well as in sociometric choices. The data are quite consistent that boys play

predominately with boys and that girls generally play with girls (Blurton Jones & Konner, 1973; Challman, 1932; Chevalera-Janovskaja, 1927; Clark et al., 1969; Dawe, 1934; Parten, 1933). According to observations made by Parten (1933) two-thirds of two-child groups were unisexual and the majority of the child's favorite playmates were of the same sex. Further, the percentage of unisexual groupings tended to rise over the two years of nursery school.

Since traditional classrooms afforded few options, observations of friendship choices or group composition of elementary school-aged children were frequently made in school yard play periods. One cross-cultural study of Swiss, American and Ethiopian children, indicated that the first nearest neighbor in the schoolyard was significantly more often of like sex (Omark et al., 1973). A sex difference observed in this study as well as others, was in the size of groups, male groups being larger (Omark et al., 1973; Waterhouse & Waterhouse, 1973). In another study which took place in single sex schools, girls were observed playing in larger groups than in mixed sex schools (Parker, 1975). Differences found in the hierarchical orders in same sex schools compared to those in mixed sex schools lead Parker to state, "It would seem that the lack of the opposite sex in the classroom increases the emotional salience of toughness for the girls while for the boys it decreases the stability or clarity of the toughness hierarchy" (p. 5).

Most consistent in the work of Omark and Parker is the

clear hierarchy based on the toughness scale. In mixed classes in elementary schools, boys and girls show similar patterns of choices on the hierarchical ranking which shows boys in the top positions. The small amount of interaction between boys and girls, the differences in size of group and the appearance of a linear hierarchy in boys' groups give more than a slight suggestion that boys and girls are stratified by sex with girls having limited participation in group organization at least on the toughness dimension. Parker's study (1975) suggests that in the absence of boys, girls do, in fact, provide themselves with opportunities such as those available in larger groups to develop a hierarchical organization.

A series of questions are raised by these studies. Do they suggest that status or leadership are in fact based on the toughness dimension? Is this one dimension, perhaps the first from which children are able to learn organization, that will in the future be based on other dimensions such as skills, cooperation, shared purpose? Further, how does the availability of this dimension to children across cultures affect their non-aggressive behavior? Does this ranking pervade other classroom activities, interact with resources, continue to operate in ways which prevent mixed sex or female group formation?

Sociograms frequently used to show individual status or ranking have also been used to determine the relative position in the social order of sub-groups based on race,

religion or sex (Bartel, Bartel, & Grill, 1973; Northway, 1967). By means of the latter sociogram, called a target sociogram, the number of choices received by each person as a member of a subgroup can be shown.

Moreno (1952) explored cross-sex choices in elementary schools and reported in one study that cross-sex choices were 24.3% in first grade, gradually dropping to 14.1% by third grade. Differences found across classes and criteria used for choosing indicate that sociometric results must be considered in terms of the type of question asked and other classroom influences. One study found same sex choices for play, but not for other choices (Mensh & Glidewell, 1958). Bonney (1943) suggested that strict control by the teacher may mask status differentiation. The range of sociometric choices and the effect of teacher control may well be important factors to consider in the open classroom since the possibility of choice is expanded. In fact, these choices are likely to be important in terms of educational goals since the social aspect of play and friendship choices have not before had such a potential for influencing what children study, how it is studied, and with whom it is studied.

Ecological Variables

Empirical investigations focused on ecological variables of spacing patterns, crowding and object use have revealed a range of differences in behavior between the sexes.

Females make more use of side-by-side seating than males (Elkin, 1964; Sommer, 1959) and are more likely to sit down at a small table if the seated occupant is also female rather than male (Sommer, 1971). Among children, females are also more likely to make use of side-by-side or closer seating (Norum, Russo, & Sommer, 1967), to work alone in the center of the room under high density situations (Bates, 1972) and rank order toys differently from males (DeLucia, 1972). A frequent explanation for these differences is that they are preferences. Yet how prior group or peer experience, or cultural conditioning contribute to these preferences needs to be considered. Situational factors such as quantity and type of resources and teacher or authority mediation are possible influences. There is also indication that the particular group composition plays a part (Parker, 1974).

Few human studies, however, have explored the relationship among situation-specific variables. It is unlikely that ethological concepts such as dominance hierarchy or territoriality will increase understanding of human social and spatial organization without simultaneous consideration of how these concepts relate to resources and further, what meanings and values are attributed to these resources. Thus, in considering the relationship between dominance and territoriality, Esser found that in a group of adult schizophrenics the high dominants did not show territorial behavior, but rather moved freely as they wished (Esser et al.,

1965). Territorial behavior, defined as spending at least 25% of the time in an area, was observed in patients in the middle of the rank order. The patients in the lower third, the least dominant patients, were moderately restricted in movement and used relatively secluded places. Reviewing the work of Esser and others, Sundstrom and Altman (1974) found evidence for a negative dominance-territorial-behavior relationship, a positive relationship and no relationship at all. They suggest that situational factors may be influencing the varied results so that, for example, "In a homogeneous environment, highly dominant members may seek large amount of space, while in a differentiated environment, they may attempt to control the most desirable areas" (p. 116). Their study of territorial behavior and dominance over a period of time in which group composition changed, considered the valence or desirability of space as perceived by the users. They found that during the first phase of their study a stable spatial order did, in fact, reflect a stable social order and that there was a positive relationship between high dominance and frequent use of desirable areas.

Summary

In order to explore the range of issues relevant to the study of the relationship between the social and spatial organization of boys and girls in an open classroom setting, empirical work in a variety of fields has been reviewed.

What emerges from the studies is the interdependence of social and spatial orders. Ethological studies have shown that dominance hierarchies are not based solely on aggressive dyadic encounters, but are influenced by environmental variables of resource opportunities and constraints and of social learning. Also, dominance hierarchies may relate to specific aspects of group process, such as controlling group aggression or mating, and not influence other aspects of priority access or group leadership. Sex differences in the hierarchical order are related to group composition, division of labor and sex dimorphism.

Human studies testing ethological concepts have also indicated the need for an expanded consideration of situation-specific variables particularly as they relate to the meaning and purpose of human behavior. Most important are social authority structures and the meaning ascribed to physical areas or objects.

Field studies of children, both indoors and outdoors, have demonstrated that the meaning of sex differences in area usage and range is not solely one of quantity of location or range, but has consequence for the behavioral and interpersonal opportunities of boys and girls. And one study (Blurton Jones & Konner, 1972) emphasizes the relevance of children's activities to society's expectations for adult division of labor.

Interviews and observations with school-aged children reveal important sex differences with regard to group

structure, distance from adults, and social preferences for like-sex peers. Interpersonal assessments reveal an awareness of peers based on a "toughness" dimension.

Thus, the literature reviewed tends to provide a broad overview of the concepts to be considered in the current study, yet research has not directly addressed the problem of how values with regard to gender are revealed and maintained in the social and spatial order within settings.

Some behavioral research has taken place in total institutions, focusing on all male groups in situations considered to be primarily social. Research with children, including males and females, has also taken place in play situations in pre-schools or school yards avoiding, by design, activities and locations imbued with institutional purpose.

An important part of the proposed research is based on the premise that along with the traditional curriculum goals within schools, important aspects of cultural processes are learned. Chief among them is how society distributes its resources in accordance with its values, and how these values are transmitted. The open classroom in which material and human resources are shared provides a setting in which to investigate these concerns. This research proposes to investigate the social and spatial organization of boys and girls in the open classroom during the complete day.

STATEMENT OF THE PROBLEM

Understanding the relationship between social and spatial organization requires a recognition of the systemic nature of settings. In the open classroom, physical arrangement, children's relationships with each other and the teacher, the curriculum demands and the teacher's program and style all operate within the larger cultural context forming patterns of use reflecting the interaction of all these elements.

The open classroom provides a particularly potent setting in which to explore the relationship between social and spatial organization with regard to sex differences. The open classroom approach rests upon the basic assumption that children learn best when actively engaged in pursuing their interests in an environment that provides a variety of resources. Yet, limited classroom resources (especially space) and differences among children in their power to claim resources, suggest that the distribution will be regulated by a social hierarchy. The evolving social order can be expected to be influenced by individual traits and skills, classroom opportunities to demonstrate these skills, and status derived from contact or affiliation with the teacher. The major premise of this research is that, in addition, this social order will be stratified by gender resulting in observable sex differences in spatial and social patterns.

The particular spatial and social patterns of girls and

boys are expected to parallel patterns that conform with the sex role stereotypes common in our culture. As described in the review of the literature, frequently boys and girls are stratified socially, remaining with same sex peers, and environmentally located in different places engaged in different activities. Boys tend to be located farther from home and/or adults, a situation enabling rough and tumble play and physical aggression. Girls are more likely to be found closer to home and/or adults and to children of varied ages, a situation that allows for more adult commands and requests and encourages dependent and nurturant behaviors. These gender differences support and are supported by social consensus concerning adult sex role stereotypes. That is, of traits valued by adults, males are expected to be more independent, worldly and active than females, and females are expected to be more sensitive to others' needs (Broverman, Vogel, Broverman, Clarkson, & Rosenkranz, 1972).

Rousseau in his book, Emile (1964) considers the relationship between environmental experience and sex-role socialization. For Emile, Rousseau prescribes an education based on the child's interest and happiness and constrained not by social relations, but only by the compulsion of necessity:

> Let them jump, run about, and make what noise they please. (p. 93) . . . Give your pupil no lesson in words; he must learn only from experience. (p. 97) . . . as for the study of the physical world, it belongs to the sex which is most active, which sees most objects, possesses most strength, and most often exercised it to judge the laws of nature and of the relations of sensible objects. (p. 282)

For girls, however, Rousseau tempers opportunity for joyful pursuits with training for the docility he feels necessary for domestic duties:

> Girls ought to be energetic and industrious, but this is not all; they should at an early age be inured to constraint. (p. 223) . . . Accustom them to be called away in the middle of their play and return to their work without a murmur. (p. 225) . . . Yet the true mother of a family, far from being a woman of the world, is only less of a recluse in her home than a nun in her cloister. (p. 223)

There appears to be a conflict between the general educational goals of equality of opportunity via a process based on choice, action and interaction and cultural values regarding sex-appropriate behavior. Yet, with a lack of explicit policy with regard to resources, both human and material, it seems likely that cultural sex role patterns will emerge. If so, the opportunities of both boys and girls will be limited to the extent they are pressured to conform to the stereotyped behavior. For girls the overlap between their sex role and the teacher's demands are likely to lead to greater constraints with regard to the use of space and social opportunity. That is, since female teachers reinforce both sexes for feminine behaviors over 80% of the time (Fagot & Patterson, 1969; McCandless, 1973) and girls are located closer to the teacher (Lay & Meyer, 1973; Serbin, O'Leary, Kent, & Tonick, 1973) the sex stereotyped patterns of dependence and passivity are likely to be maintained. For boys, the situation is likely to be more complex. Although there will be pressure on boys, especially from peers, to conform to their sex role stereotype, the

value placed on academic curriculum by the teacher will tend to legitimize a range of activities modifying the male sex role stereotype. Although the situation may present some conflict for boys in the classroom, it may well provide a wider range of activity and spatial options.

If this conceptualization has merit, what would be its consequences? In a system that emphasizes choice, action and interaction, sex role stereotyping would act to constrain choices and actions for boys and girls and lead to communication that would be largely segregated by sex. This certainly raises questions about equal educational opportunity and, in addition, signals other issues which need to be addressed. While girls and boys are engaged in academic learning, they are forming images of themselves in the world, developing expectations about their social potential for sharing in the distribution of resources and the use of the environment. Classroom limitations based on sex stereotypes and experienced over time may well transcend their immediate impact and influence children's perceptions of their own and others' potential.

Sexism in schools has a long history and if it exists in the open classroom, its resolution will not be found in a return to traditional practices. A change strategy rests upon an understanding of the relationship between gender and the social and spatial orders within classrooms. Despite an awareness of the systemic nature of classrooms, it is possible to isolate specific variables, based in part on

previous empirical findings and in part on an understanding of opportunities within the open classroom that may relate to sex role patterns, and analyze their contribution. Effective intervention strategies not only depend on general awareness of the extent to which classroom patterns are similar or the extent to which cultural sex role stereotypes are reflected in the formal education of children, but on the ability to identify the physical and social elements that symbolize and perpetuate these systems.

Despite cultural similarities, experience in classrooms makes it clear that classrooms differ. Each evolves its own social order, value system and way of functioning. A number of factors contribute to these differences. Structural factors such as size of room or physical arrangement are likely to be influential, as are social factors such as the nature of class composition, the mix of ages and sexes. The teacher's attributes are likely to be of prime importance, his or her priorities and values as expressed by the program as well as his or her social and spatial style. Looking at specific classes provides the opportunity to consider differences in the degree of sex stratification, in children's perceptions and preferences and assess the relative contributions of a variety of social and physical factors.

The hypotheses generated can be thought of as three subsets. The first grouping refers to general room patterns. The second set relates to specific variables having

to do with the parts of the room that operate as predominately male or female areas. The remaining hypotheses address themselves to the relationships among variables.

Hypothesis 1. In the open classrooms studied there will be more same sex than mixed sex interaction.

The opportunity in most open classrooms to choose companions suggests that a pattern of affiliation of same sex peers will be evidenced. Same sex choices are evidenced as early as nursery school (Parten, 1933) and are repeatedly affirmed by sociograms throughout elementary school (Moreno, 1934; Northway, 1952). Despite the open classroom value that people are important resources, that through sharing interests children can learn from one another, it is likely that same sex interaction is predominant.

Hypothesis 2. There will be areas in the classrooms studied that will be predominantly used by boys or girls (sex-linked areas).

Social interaction has a spatial component and in many studies spatial segregation accompanied social segregation. These patterns have been observed on the community scale (Whiting & Whiting, 1975), in playgrounds (Omark et al., 1973) and in nursery schools (Clark, Wyon, & Richards, 1969; Fagot, 1975; Parten, 1933). The opportunity to select locations as well as companions suggests that spatial segregation will occur in open classrooms.

Hypothesis 3. Sex-linked areas will be located in segments of the room not usually frequented by the teacher.

Although there is an interaction between choice of companion and choice of location, it is likely that the selection of sex-linked areas is not random, but rather is based on a combination of staff, program and physical features that tends to support the perception of these areas as sex typed.

Previous studies point to the influence of staff communication and program on social organization even in periods designated as free time (Esser, 1969; Sundstrom & Altman, 1974). The teacher in the elementary school classroom, functioning as both institutional authority and major resource person, clearly holds a most powerful position capable of influencing classroom patterns in a variety of ways. It is expected that the location of sex-linked areas will relate to the teacher's spatial style. Since the nature of the teacher's role requires that he or she be accessible to all children, it is unlikely that highly used teacher areas could function as sex-linked areas.

Beyond the expectation that these spatially segregated areas will occur and that they will be areas rarely frequented by teachers, the review of the literature suggests a variety of ways that male and female areas can be expected to differ. The following discussion will relate aspects of the literature to open classroom processes, generating hypotheses with regard to where these sex-linked areas might be located, the kinds of equipment or furnishing they might contain, the behavior or activity that might

be expected and children's perceptions of these areas.

Hypothesis 4. Areas predominantly used by girls are likely to be closer to teacher's predominant areas than are the areas predominantly used by boys.

The maintenance of greater distance from home or adults found for boys on the larger environmental scale (Munroe & Munroe, 1971; Nerlove et al., 1971; Saegert & Hart, 1976; Whiting & Whiting, 1975) is found in distance from teacher in nursery schools (Lay & Meyer, 1973; Serbin et al., 1973) and on playgrounds (Omark et al., 1973) suggesting the possibility of similar patterns in the open classroom.

Hypothesis 5. When areas of the classroom contain sex-stereotyped equipment, these areas will be associated with use by the culturally appropriate sex, i.e. blocks, woodworking by boys; doll play, painting by girls.

Open classrooms generally provide a wide range of materials beyond the usual school equipment of books, papers and pencils. Some of these materials are contained in open shelves, e.g. cuisenaire rods, scales, whereas some provide the basis for an activity corner, e.g. sand table, blocks. But many materials in our culture are defined as appropriate for only boys or girls. In homes, pre-schoolers' bedrooms differ in decor and equipment according to the child's sex (Rheingold & Cook, 1975). In nursery schools, boys are more often observed playing with blocks or transportation toys, girls with painting or dolls (Clark

et al., 1969; Parten, 1933; Fagot & Patterson, 1969). Not only is the sex appropriateness of toys recognized by children, but five year old boys and girls perceive their parents as preferring that they make such choices (Fauls & Smith, 1956).

Again, despite the often stated intention to provide children with tangible learning experiences, despite increased awareness of the school's role in sex stereotyping, it seems likely that materials culturally linked with a particular sex will continue to be used by that sex.

Hypothesis 6. When both open areas and desk areas exist in a classroom, boys' areas are more likely to be open space areas, girls' areas are more likely to be desk areas.

Open classrooms generally provide a variety of spaces for children to use. Most open rooms do not provide a desk for each child. There is an expectation that children will alternate using open areas, generally carpeted space, and areas with working surfaces, generally tables and desks. For a variety of reasons, among them that girls are more likely to be in task areas (Lay & Meyer, 1973), that boys maintain greater distance between self and other (Omark et al., 1973) and that the male stereotype includes the more active mode (Broverman et al., 1972), it seems likely that when open space is an option -- it will be used by boys.

The hypotheses listed so far are based on projections from empirical data on socializing patterns in our culture. When sex role status differences occur similarly in homes,

schools, and neighborhoods, they are inconspicuous because of their very pervasiveness (Bem & Bem, 1970). If these patterns exist in schools, this documentation can serve to increase their visibility. To the extent that these hypotheses prove viable, however, other questions need to be asked concerning the meaning of these sex-linked areas to childrens' behavioral options, preferences and perceptions.

Hypothesis 7. The behaviors in sex-linked areas are likely to be sex stereotyped according to the predominate sex using that area. Differences among male areas, female areas and mixed areas are expected to exist in the kind of activities, the activity level, and the extent of relationship to ongoing curriculum.

If boys and girls select areas consistent with the previous hypotheses, that is based on sex role stereotyped meanings, it is likely that gender appropriate behavior will take place. Although the specific behaviors occurring in sex-linked areas are expected to relate to specific factors, such as distance from teacher, furnishings or combinations of these factors, lack of information concerning these combinations makes a more general hypothesis necessary.

Hypothesis 8. When both boys and girls name a sex-linked area as a favorite of the children in their class, it is likely to be a male-linked area.

The set number of children in a classroom and the relatively closed system, with few opportunities to leave the setting, even fewer for others to enter, suggest that in classrooms with sex-linked areas, there will be a similar

number of male and female areas. The exceptions would be a class with very unequal numbers of girls and boys or sex-linked areas used by very few children of one sex. When children are observed using different areas in a classroom, i.e. girls using paints, boys using blocks, a possible interpretation is that each group is engaged in their preferred activity. Another interpretation is that one group is engaged in the most preferred activity, the other with a lesser choice. Thus, looking at sex-linked areas within a classroom, it would not be clear who did the selecting and who was left using the remaining space. Previous work indicates that when areas are differentiated, preferred areas are used by high dominance individuals (Sundstrom & Altman, 1974). If dominance patterns in the classroom reflect cultural stereotypes, males are likely to be dominant. Adults value male characteristics positively more often than female characteristics (Broverman, et al., 1972). Children recognize the power differential between the sexes (Emmerich, 1961; Guttentag, 1974; Kohlman, 1966) and children of both sexes value masculine things and objects (Brown, 1958). The cross-cultural evidence that boys are perceived as "tougher" by both girls and boys might be interpreted as another indication of dominance (Omark et al., 1973).

Hypothesis 9. Greater use of sex-linked areas within classrooms will be related to less cross-sex interaction in the total classroom.

So far, hypotheses have considered where in the classroom sex-linked areas are likely to occur, whether behaviors in sex-linked areas differ and who expresses preferences for these areas. It is clear that sex-linked areas support same-sex interaction for the predominant sex using that area. The question yet to be considered is whether spatial clustering of same-sex peers effects the degree to which same-sex peers associate. It is possible that despite same-sex proclivities, less use of sex-linked areas would lead to greater cross-sex interaction and that proximity over time would support cross-sex interaction.

Hypothesis 10. The amount of cross-sex choices children express will be related to the amount of cross-sex interaction that exists in classrooms.

Since children's preferences and experiences are likely to be related, it is expected that the more cross-sex interaction that exists in a classroom, the less likely it will be that children will express preferences to work and play with only same-sex peers.

The ranking of all classes on a continuum based on the extent of cross-sex interaction in each class will enable consideration of the differences among classes. In addition, there are two factors that might be helpful to measure against this ranking although the particular parameters and the adequacy of the data make these issues more speculative. Although the present conceptualization emphasizes situational

elements, chief among them the spatial organization of the classroom, teacher attitude and children's level of maturation are two additional factors that are also likely to influence the amount of sex stratification. One way to investigate the more subtle ways that teacher attitude can influence children's peer relationships as compared to the influence of physical arrangement is to look at those specific situations in which the teacher remained the same for two years of the study. Particular classrooms whose physical arrangements differ, although the teacher has remained the same for two years, can be considered in terms of the classroom cross-sex ranking. Similarity in ranking, even with a number of room changes would tend to indicate that teacher attitude is of major importance. Yet a variation in ranking may not differentiate between the importance of room arrangement and a change in teacher attitude. Despite the possible interaction between teacher attitude and room arrangement, a careful consideration of findings will be attempted.

The second factor to be considered is the developmental one. Stone and Church (1957) suggest that sex segregation begins rather casually during the middle years of childhood (six to twelve years) and gradually strengthens until adolescence. Although the authors modify the Freudian notion of the latency period, acknowledging that sexual interest and activity are not totally repressed, they attribute sex segregation to both Oedipal repression and social forces.

Using the available sample, the difference in cross-sex interaction and preferences as children develop will be considered. Although the existence of a developmental increase in the degree of sex segregation would not clarify its etiology, that is, the contribution of psychodynamic or social forces, the lack of clear developmental differences would emphasize the importance of situational or classroom variables.

There is a curious irony to the examination of social and spatial organization with regard to sex differences in the open classroom. To the extent that hypotheses are confirmed, that accessibility is constrained based on sex, the measure of openness in the classroom decreases. The open classroom is based on a belief that action in the environment is crucial in the development of children's cognitive and emotional strength. If cultural sex-role stereotypes are being perpetuated in the open classroom, the specific ways they are transmitted need to be recognized so that appropriate intervention strategies can be developed.

Summary of Hypotheses

1. In the open classrooms studied there will be more same sex than mixed sex interaction.

2. There will be areas in the classrooms studied that will be predominantly used by boys or girls (sex-linked areas).

3. Sex-linked areas will be located in segments of the room not usually frequented by the teacher.

4. Areas predominantly used by girls are likely to be closer to teacher's predominant areas than are the areas predominantly used by boys.

5. When areas of the classroom contain sex-stereotyped equipment, these areas will be associated with use by the culturally appropriate sex, i.e., blocks, woodworking by boys; doll play, painting by girls.

6. When both open areas and desk areas exist in a classroom, boys' areas are more likely to be open space areas, girls' areas are more likely to be desk areas.

7. The behaviors in sex-linked areas are likely to be sex stereotyped according to the predominant sex using that area. Differences among male areas, female areas and mixed areas expected to exist in the kind of activities, the activity level, and the extent of relationship to on-going curriculum.

8. When both boys and girls name a sex-linked area as a favorite of the children in their class, it is likely to be a male-linked area.

9. Greater use of sex-linked areas within classrooms will be related to less cross-sex interaction in the total classroom.

10. The amount of cross-sex choices children express will be related to the amount of cross-sex interaction that exists in classrooms.

METHODOLOGY

This study investigated the relationship between social and spatial organization with regard to sex differences in the open classroom. Systematic observations, log data and sociometric interviews were used to assess these relationships across open classroom settings.

The observational and log data were collected as part of a simultaneous study on space utilization patterns.[1] The sociometric interview was included to provide information on children's preferences and perceptions concerning classroom space use patterns.

Study Sites and Sample

Two schools were selected, one in Manhattan (School 1) and one in Brooklyn (School 2) based on their interest in the open education approach. Both schools were housed in buildings dating back to the early 1900's. School 1 contained approximately 400 children, School 2 approximately 1250 children. Both were public schools whose populations were drawn from the neighborhoods, reflecting a wide range of socio-economic and racial backgrounds. In addition, children from other neighborhoods were transported to each school by bus.

The selection of the four classes in each school was based on each teacher's willingness to participate in the study, interest in the open classroom approach and the

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[1]National Institute of Mental Health Grant MH 23709.

proximity of the classrooms to facilitate observation. All the teachers were women. The average class size was about 30 children, approximately half boys and half girls. Each classroom operated mainly as a separate unit and each was contained within a separate room of the traditional double-loaded corridor buildings. Although each room contained a mix of standard school equipment and furnishings, as well as tables, cabinets, rugs, and easy chairs found or built by the teachers, the arrangements differed according to the teacher's preference and program.

In School 1 the four classes selected were part of a mini-school, an organizational structure of the school in which classes on each floor spanned the range of grades and ages contained in the school. The inter-aged classes contained groupings covering a kindergarten-first grade, a second-third grade, a second-third-fourth grade and a third-fourth-fifth grade. A change in teacher assignment eliminated the second-third-fourth grade from study during the second year.

In School 2, four primary classrooms were selected, three second grades and one first grade. These classrooms were located on the same floor in one wing of the building.

Observation Method

The observational method used was behavioral mapping, a naturalistic time sampling technique for quantifying and describing behavior patterns and use of physical space. The

observations identified participants by sex, role (teacher, student, visitor) and group size, and their activities including materials used, across times and locations.

The activity categories used for the study were developed by the research staff based on intensive observation of the particular settings to be used. All observed behaviors were alphabetized and coded. In addition, new categories were added during the study to enable quantifying all behaviors characteristic of the setting. Practice in using the coded categories resulted in inter-observer agreement of 91% over all measures, activities, sex of participants, room location and size of group. The development of the instrument and training sessions provided the opportunity to both familiarize the observers with classroom procedures and lessen the effect of obstrusiveness for the systematic observation.

Observers moved through each room in a prescribed sequence recording all activity, the number, sex, and type of participants (student, teacher, visitor), and the specific room location by sector. Classroom observations were made every thirty minutes for four consecutive days at three points each school year. The present study utilizes data gathered in May during two school years, a period when activity patterns presumably had coalesced. Observers were unaware of the intent of this study.

In order to locate participants within particular room segments, a grid was superimposed on each classroom floor

plan dividing each room into twelve equal parts. The segments were numbered from one through twelve, area 1 designating the most distant corner from the doorway, which was located in area 12 (only one room deviated from this structural pattern, the doorway being located in area 11). Prior to each mapping, the classroom furnishings were plotted on the grid arrangement. This floor plan served as a guide during mapping and as a record of the functional arrangement of each room.

Log Data

During the study a log was kept, consisting of observers' impressions, newspaper clippings, school newsletters, photographs, and accounts of meetings attended and/or conducted by the research staff. Following visits to the school, staff members would record pertinent information to supplement the behavioral mapping observations. Log information for individual classrooms was filed with data for those rooms.

Sociometric Technique

A sociometric interview was prepared as another means of understanding classroom social organization according to target groups, males or females. Questions were organized to reflect both personal work, play and friendship preferences and perception of classroom influence and dominance patterns. In order to understand influence patterns, children were asked which child in the class was listened to

most often by children when differences arose. Further, children were asked about classroom activity and area preference. In the second year probes were added to determine who used preferred areas, what children wanted to do, and why they didn't do them (see sociometric schedule in appendix).

Interviews were administered individually and outside the classroom in order to eliminate responses based on the immediate situation. The interviewer was not aware of the intent of the study. Before making choices, children and interviewer read through a complete class list, alphabetized to integrate boys and girls in order to insure consideration of all possible choices. The list was placed in view all during the interview and with the younger children, help was repeatedly offered in rereading the list.

Available Data

Behavioral mapping data were reviewed in terms of the questions posed by the study. Log data were also accumulated for each room. The sociogram was administered to two classes in each school the first year. The second year the sociogram, with some additional questions, was administered to all classes studied.

As usual with field studies some changes took place in the schools over the two years that affected the collection of data. In the second year the teacher in room 4 (see table 1) became the school librarian eliminating one classroom from the sample. Two other changes (Rooms 1 and 5 and

Rooms 4 and 7) involved a move to another room. Room 1 was so similar to Room 5 it is unlikely the move had an effect on the analyses. Room 7, essentially two connected rooms was much larger than room 4. The differences in spatial density are considered in the discussion.

Table 1 provides a matrix of data collected over two years by school and room.

Table 1

Available Data by School and Room[a]

	First Year				Second Year			
School	Room Number	Mapping Data	Log Data	Sociogram	Room Number[b]	Mapping Data	Log Data	Sociogram
1	1	X	X	X	5	X	X	X
	2	X	X		6[c]	X	X	X
	3	X	X	X	-	-	-	-
	4	X	X		7[c]	X	X	X
2	8	X	X		12	X	X	X
	9	X	X		13	X	X	X
	10	X	X	X	14	X	X	X
	11	X	X	X	15	x	X	X

[a]X indicates available data.

[b]First and second year classrooms written on the same line indicate same teacher and same physical classroom (see note c).

[c]Classrooms 6 and 7 had the same teacher as Classrooms 2 and 4, respectively, but moved to different spaces.

Data Analysis

Behavioral Mapping

Records of observations were compiled to provide a behavioral profile of each classroom. Each profile includes the number of participants, the nature of participants (teacher, children and visitors), the sex of children with comparisons of all variables by activities and their locations. The classroom floor plan showing furniture arrangement as well as the geometric grid dividing the room into sectors supplements the behavioral profile providing a context for the analysis of interaction, activities and locations of boys and girls and teachers.

Children's locations in the room by sector were used to determine sex-linked areas, areas used predominantly by one sex. In order to apply similar standards across rooms despite slightly varying proportions of boys and girls, the chi square statistic was used to designate areas of significantly greater use by one sex. Thus, the location of boys and girls within each sector of the 12-part grid was considered in terms of the total number of boys and girls observed in each classroom. Teachers' focal areas were operationalized as areas in which teachers were located at least 16.7% of observations. (This was based on twice the percentage of equal use of each sector.)

The data available from classroom profiles, the activity and locations of children and teachers, the percentage of integration by group size, and differences in

activity according to gender and room location, were used to test hypotheses 1, 2, 3, 4, 5, 6, 7 and 9. Recognizing that mapping data does not meet the assumptions of independence, the proportion test and chi square statistic were used heuristically to provide an objective measure of difference.

Sociometric Interview

Sociogram questions regarding children's choices of play and work companions, favorite areas of the room and children's perceptions of others' social power and opportunity were analyzed by sex of child.

Hypothesis 8 and 10 were tested by data derived from sociometric interview.

The Pearson Product Correlation Coefficient was used to test the relationships between the amount of cross-sex interaction, sex-linked area use and the percentage of cross-sex sociogram choices. For each classroom, the measure of cross-sex interaction was the percentage of all dyads observed that contained a boy and girl. Sex-linked area use was based on the proportion of the classroom population observed in areas predominantly used by boys or girls. In addition, the approximate age of children in each classroom was correlated with each of the other measures.

Log Data

Log data were reviewed in terms of the questions posed by this study. Information concerning physical-social, or

organizational aspects of the classroom relevant to the social and spatial organization of boys and girls in the classroom is included.

RESULTS AND DISCUSSION

In order to investigate the relationship between the social and spatial organization of boys and girls in the open classroom both observational and sociometric interview data were collected to test the hypotheses that were raised. In this chapter the results of the analyses are presented for each hypothesis. The hypotheses are considered as falling into three subsets, each responding to slightly different questions.

First, hypotheses 1 and 2 respond to questions regarding the extent of social and spatial segregation in the classrooms. Both general trends and data for all classrooms are presented to provide a context within which other findings may be viewed.

In the second subset, hypotheses 3 through 6 address the question of where female, male and teacher areas are located in the rooms, in relation to each other as well as to the placement of materials and furnishings.

Thirdly, the remaining hypotheses, 7 through 10, respond to questions of how sex-linked areas and the percentages of integrated dyads relate to differences in the activities, perceptions of classroom areas and sociogram choices of girls and boys.

Following the discussion of hypotheses, results are presented relating developmental effects, teacher effects and the issue of inequality.

Generally, hypotheses are tested by data summarized

across classrooms. In order to consider specific variables within particular classrooms, several items are included in the appendices. These items include floor plans for each room illustrating furniture arrangements (Appendix B), room grids denoting sex-linked areas and an index of use by boys and girls (Appendix C), and a summary sheet of classroom variables (Appendix D).

Hypothesis 1. In the open classrooms studied there will be more same-sex than mixed-sex interaction.

As hypothesized, there was more same-sex interaction than mixed-sex interaction in the classrooms studied. Of the 1821 observations containing two or more people, 67.2% were segregated by sex.[1] Although this single percentage suggests that the open classroom value of children as resources, learning from one another, was in practice somewhat limited to same sex peers, closer inspection by size of group is necessary.

Table 2

Percentages[a] of Integrated Groups Observed

Size of Group			
2	3-8	8-15	15+
16.2	37.9	86.7	100.0

[a]Percentages are based on all groups observed in both schools for two years in each group size.

[1]The daily census for the 15 classrooms averaged 809 boys and 775 girls.

Inspection reveals that groups most likely to be integrated were groups of eight or more children (Table 2). Because these groups were generally whole class groups containing boys and girls or teacher-directed or teacher-led groups, they are of less interest than the dyads or smaller groups, which reflect greater choice by children. Although the extent to which we might expect gender to influence interactions in a school setting is not clear, we can compare these findings to theoretical probabilities of random groups to provide some measure of the salience of gender. A smaller percentage of integrated dyads, 16.2, was observed than would have been expected by chance (.50)($\underline{z}$ = 20.5, $\underline{p} < .001$). Similarly, a smaller percentage of integrated small groups (three to eight persons), 39.7, was observed, than would have been expected by chance (using .75 as a theoretical probability for group size of three, $\underline{z}$ = 20.12, $\underline{p} < .001$).

As a context for these data, it should be noted that children spent part of their time alone, accounting for 62.0% of all activities. Next most prevalent was the dyad, accounting for 21.3% of all observations and 56.1% of all groups of 2 or more persons observed. The dyad, therefore, accounted for a greater percentage of groups observed than all other sizes combined. Because it is also the group size least likely to have been organized or directly influenced by the teacher, it is an important indicator of the amount of cross-sex interaction in individual classrooms.

Thus the percentage of integrated dyadic groups is used here to compare classrooms (Table 3).[1]

Table 3

Percentage[a] of Integrated Dyadic Groups

Class	1	2	3	4	5	6	7	
Percentage	7.9	8.8	5.2	22.8	14.5	15.2	12.0	
Class	8	9	10	11	12	13	14	15
Percentage	18.8	22.8	10.2	32.8	12.9	22.5	14.3	12.8

[a]Percentages are based on the number of integrated dyads compared to the total number of dyads observed in each room.

As shown in table 3, dyads that were integrated accounted for 5.2% to 32.8% of the groups of two observed in each classroom. Thus, same sex groups accounted for 94.8% to 67.2% of dyads observed. Interestingly, the range of these percentages suggests that classes differ from one-another in the amount of interaction between boys and girls.

These results demonstrate that the pattern of same-sex choice evidenced in play and social contexts did occur in open classrooms. The questions to be raised as other results are considered are whether setting-specific variables

[1]Table B in Appendix E lists the percentage of activities containing boys and girls for each group size in each room.

contributed to and supported this segregation and if so, how.

Hypothesis 2. There will be areas in the classrooms studied that will be used predominantly by boys or girls (sex-linked areas).

Sex-linked areas, that is, areas predominantly used by boys or girls, did exist in each of the 15 classrooms. A grid superimposed on each classroom floor plan divided each room into 12 equal areas. Areas predominantly used by boys or girls were determined by use of the χ^2 from observed frequencies in each area compared to the expected frequencies (total boys/girls observed divided by 12). The number of sex-linked areas in classrooms ranged from one to six with an average of 2.8 areas.

Thirty-nine of the 41 areas identified by this procedure were moderately or heavily used areas. Areas that were severely underutilized did not generally reach significance regardless of the proportional use by either sex. Figures 5 to 8 in Appendix C contain room outlines that indicate sex-linked areas and an index of the proportional use of those areas, based on boys' and girls' expected use. [Index of equal (expected) use = 1.00, five times expected use = 5.00] As shown in Figures 5 to 8, the index of proportional use ranges from .74 to 5.05 for boys and from 1.04 to 4.24 for girls in their respective sex-linked areas.

Most sex-linked areas were used by both boys and girls. In only three of the 41 sex-linked areas did observations reveal use only by boys or girls; girls only were observed

in Classroom 12, area 2, the only playhouse area, boys only, were observed in Classroom 14, area 2, a science area, and in Classroom 6, area 8, a small open area. Across all sex-linked areas, the mean percentage that predominant users were observed in sex-linked areas was 72.49. The means of male and female areas varied less than .5 from the aggregated mean.

The results indicate that within each classroom one or more areas were disproportionately used by boys and girls. Thus in all classrooms, to a greater or lesser extent, children were stratified by gender, both socially and spatially. This finding of areas habitually and disproportionally used by members of one group suggests constraints for boys and girls on use of the classroom environment and spatial support for interaction with same-sex peers.

Hypothesis 3. Sex-linked areas will be located in segments of the room not usually frequented by the teacher.

There were 41 sex-linked areas across rooms and schools. In 43.9% of the areas teachers were never observed and in 29.3% of the areas teachers were observed only one time. Thus, 73.2% of the 41 sex-linked areas were essentially areas not used by the teacher.

We knew that teachers were not highly mobile in their classrooms. Previous work (Rivlin & Rothenberg, 1976) indicated that teachers used only a few areas heavily. The premise of hypothesis 3 was that room areas not often used

by the teacher would be available to be used as social enclaves in which same-sex peers would gather.

Another way of testing this premise was to hypothesize that teachers did not intentionally support these sex-linked areas, and in fact that their presence in an area lessened social constraints against children entering the area. The data on what occurred when a teacher was observed in a male or female area can be helpful.

Of the five classrooms in which teachers interacted with children in male sex-linked areas, 44.4% of the interactions were with females or mixed groups. Of the eight classrooms in which teachers interacted with children in female sex-linked areas, 46.2% of the interactions were with males or mixed groups. It therefore seems that whether the teacher entered the area with a few children or whether they followed her into the area, a teacher's presence did have the potential of modifying the sex-segregated quality of the area.

These results give some indication of the dynamic between sex-linked areas and teacher's spatial patterns. Same-sex use of 73.2% of the sex-linked areas was supported by teachers' nonuse of these areas. The next question to be considered is how teachers' heavily used areas related to sex-linked areas.

Hypothesis 4. Areas predominantly used by girls are likely to be closer to the teacher's predominant areas than are areas predominantly used by boys.

Although teachers' patterns of room use differed in the degree of mobility observed, each teacher was located in a few room segments a disproportionate amount of time. Further, in rooms of similar structure, teachers were observed more often in the front half of the room, the portion closer to the door and the blackboard (Rivlin & Rothenberg, 1976). Based on those findings this hypothesis was tested in two ways, first using the distance between the teachers' major or focal areas and boys' and girls' sex-linked areas. The second analysis was based on the location of teachers' focal areas and boys' and girls' sex-linked areas in terms of the front and back halves of the room.

For the first analysis the measurement of distance between sex-linked areas and teachers' focal areas presented some problems. One problem to be considered was that children and teachers might have been located in any part of each area so that actual distance between them might vary. Second, distances to and from classroom locations might differ according to the amount and location of furniture and people. It was decided that the measurement of straight line segments between the centers of areas could serve as an approximation of the distance. Distance was computed in feet based on the measurements of each classroom. Average distances between boys' and teachers' areas and girls' and teachers' areas were computed. These averages are listed in the summary table of classroom variables

(Appendix D).

Of the 15 classrooms, three had only one sex-linked area and could not be considered in testing the difference between boys' and girls' average distance to teachers' areas. A Wilcoxon matched-pairs signed-ranks test was computed on the 12 other classrooms. The data did not support the hypothesis that boys' areas were farther from teachers' areas than girls' areas ($T = 23$, N.S.).

The second analysis was based on evidence that teachers' use of the front portion of the classroom was disproportionately heavy. Therefore, teachers' focal areas and boys' and girls' sex-linked areas were analyzed in terms of their location in the front or back half of the classroom. The subset of 13 classrooms selected for examination fit a particular structural model. Each contained only one door, which was located near the blackboard in a portion of the room referred to as the front. Two classrooms, Classroom 3, which had a centrally located door, and Classroom 7, which had two doors, did not fit this model and were omitted from this comparison.

Table 4

Location of Teachers', Boys', & Girls' Major Areas in Classrooms

(Percentages of front and back of room placements)

	Locations		
	Front	Back	Total
Teachers' focal areas	90.9%	9.1%	22
Girls' sex-linked areas	68.8	31.3	16
Boys' sex-linked areas	29.4	70.6	17

$\chi^2 = 16.16$ df = 2, $p < .001$

As shown in Table 4, 90.9% of teachers' areas were located in the front half of the classroom; that is, in areas 3, 4, 7, 8, 11, or 12. The remaining 9.1% were located in back of the room. Neither the boys' nor girls' sex-linked areas were as concentrated in a particular half of the room as were the teacher's areas. Yet over two-thirds of the girls' areas were located in the front and over two-thirds of boys' areas were located in the back of the classroom.

In summary, no significant difference in distance was found between male and female sex-linked areas and teachers' focal areas. However, in terms of front and back of the classroom, there was a pattern of teachers' and female areas being located in the front of classrooms and male areas being located in the back of classrooms. In addition, when observations of teachers in areas other than their focal areas were included, the teachers' orientation was still

toward the front of the classroom.

Hypothesis 5. When areas of the classroom contain sex-stereotyped equipment these areas will be associated with use by the culturally appropriate gender, e.g. blocks, woodworking by boys; doll play, painting by girls.

The sex-stereotyped materials contained in specific areas in classrooms were blocks, playhouse equipment and easels for painting. Nine of the ten areas containing blocks and the one playhouse area were predominantly used by boys and girls, respectively. Areas containing easels however, were not predominantly used by girls, as hypothesized.

In order to test whether areas containing blocks were predominantly used by boys, areas in which blocks were located and generally used were identified. Ten of the 15 rooms had an area containing blocks (Classrooms 1, 2, 3, 5, 8, 9, 10, 12, 14, and 15). In nine of these classrooms the areas containing blocks were predominantly used by boys, as hypothesized ($\chi^2 \geq 3.84$, $p \leq .01$, one tailed). Seven of these areas had previously been identified as sex-linked areas ($\chi^2 \geq 6.64$, $p \leq .01$, two tailed). (The only area not predominantly used by boys was the block area in classroom 14, an under-utilized area in which only 6 boys and 1 girl were observed.) Nine of the ten block areas were in classrooms that were structurally similar (door, blackboard in front). In seven of the nine rooms, the blocks were placed in back of the room.

The only playhouse area was located in classroom 12.

Girls were the predominant users, in fact, the sole users of this previously identified sex-linked area ($\chi^2 \geq 38.99$, $p \leq .001$, one-tailed).

Eight classrooms, all the classrooms in school 2, contained painting easels near the sinks located in area 9. These areas were generally underutilized and were not consistently identified with either sex.

In view of the interactive quality of many of the social and spatial measures being investigated, the relationship between the concentrated placement of sex-stereotyped equipment and the space use of boys and girls is especially important. Since the location of material generally preceded children's arrival in the classroom, a causal relationship based on prior socialization is suggested.

It appears that certain materials the teacher selected, as well as where these materials were placed in classrooms, influenced children's spatial patterns. It is interesting that although a playhouse appeared in only one room, a classroom of young children, blocks were in two-thirds of the classrooms. This suggests that teachers felt that blocks continued to be relevant for older children. Yet as we will see later on building was not a very frequent activity and was essentially a boys' activity. The consistency with which areas containing blocks were predominantly used by boys, suggests that blocks serve as a signal to both boys and girls in identifying appropriate room locations for their use. Furthermore, it is interesting that

boys are the predominant users in the two instances where blocks were placed in front of the room as well as in the more usual instances of blocks placed in the back.

It will be helpful to keep the role of sex-stereotyped equipment in mind, as we continue to analyze children's use of space, favorite areas and companion choices, with regard to areas that were sex-linked.

Hypothesis 6. When both open areas and desk areas are present in a classroom, male areas are more likely to be open space areas, female areas are more likely to be desk areas.

The hypothesis that male areas were more likely to be open space areas in which children usually sit on the floor, carpet, or pillows, and female areas more likely to be desk areas in which children usually sit on chairs was tested by a binomial test. Male areas were as likely to be open space areas as desk areas. Female areas were, however, more likely to be desk areas ($p = .01$).

Table 5

Male and Female Sex-linked Areas by Type of Area

(Open Areas and Desk Areas)

	Room Number[a]	1[b]	2	3	4	5[c]	6	7	8	10	11	12	14	15
Male Areas	Open	X[d]	X	X		X	X		X		X	X	X	
	Desk			X	X,X			X,X					X	X,X,X
Female Areas	Open				X							X	X	
	Desk	X		X,X	X		X	X,X	X	X		X		X,X,X

[a]Classrooms 9 and 13 did not contain an open space area and were excluded from this analysis.

[b]Area 5 did not fit the definitions of open or desk areas and was excluded.

[c]Area 2 did not fit the definitions of open or desk areas and was excluded.

[d]Each X represents one sex-linked area.

Table 5 illustrates the types of areas that were sex-linked in each classroom. Of the 18 male areas, nine were open space and nine were desk areas. Thus, in addition to the shared room space, male areas were as likely to be open space as desk areas and female areas were more likely to be desk areas. Since desk spaces are generally available in classrooms, these findings indicate constraints on girls' opportunity to vary the settings they use. The next question to be considered is how these settings support the range of classroom behaviors.

Hypothesis 7. The behaviors in sex-linked areas are likely to be sex stereotyped according to the predominant sex using that area. Differences between male areas, female areas and mixed areas, are likely to occur in the kind of activities, the activity level and the extent of relationship to the ongoing curriculum.

A comparison of the ranking of the 10 most frequent activities observed in male areas, female areas and areas containing more equal numbers of boys and girls reveals that although the most predominant activities were similar across all areas, there were some differences in the relative proportions of these activities and differences in the types, activity level and relation to the curriculum of less frequent activities. Activities in male areas compared to female areas involved more use of materials, and more play or play-type activities. More drawing and crafts activities took place in female compared to male areas.

Writing, talking and reading (see Table 6) were the three most highly ranked activities in both the male and female areas and represent three of the top four ranked activities in the mixed areas. These activities accounted for 59.1%, 54.9% and 42.5% of the total activities in male, female, and mixed areas, respectively. The main difference between the male and female areas in these activities was in talking, which accounted for 6% more of the total activities in the male areas. Writing and reading accounted for a greater proportion of activities in the male and female areas than in the mixed areas (40.5% in the male areas, 42.3% in the female areas and 29.1% in the mixed areas).

Using Table 6 to look beyond the three highest ranked activities, writing, talking and reading, differences between male and female areas do appear. The quality of the lists reflects an assortment of activities traditionally

Table 6

Ten Highest Ranked Activities Observed in Sex-linked and Mixed Areas

Male Areas	%[a]	Female Areas	%	Mixed Areas	%
Writing	26.6	Writing	27.4	Writing	20.2
Talking	18.6	Reading	14.9	Talking	13.4
Reading	13.9	Talking	12.6	Drawing & Crafts	9.5
Working with Materials	4.7	Drawing & Crafts	11.9	Reading	8.9
Building	4.1	Traffic	4.9	Traffic	6.2
Drawing & Crafts	3.5	Watching Others	3.7	Working with Materials	4.9
Game-sit	3.0	Game-sit	2.8	Teaching	3.7
Playing	3.0	Care of Materials	2.7	Watching Others	3.0
Watching Others	2.8	Teaching	2.2	Playing	2.8
Looking at Objects	2.4	Sitting	2.1	Looking at Objects	2.5
		Working with Materials	2.1		

[a]Percentages based on the occurrence of each activity compared to total number of observed activities in each type of area.

associated with each gender. For example, drawing and crafts accounted for 11.9% of all activities in female areas, yet only 3.5% in male areas.

Activities in male and female areas suggest a qualitative difference in involvement with play-type activities compared to functional activities and activities related to curriculum tasks. The category of playing, e.g., tossing an object, accounted for 3.0% of activities in male areas and 1.3% of activities in female areas. There were additional play-type activities observed; these ranged from block play or fantasy play, to more spontaneous play such as roughhousing. These activities were not considered by the teachers to be high priority or necessary, as were more skill-based tasks. All play-type activities totaled to 8.3% in male areas, 2.3% in female areas.

In male areas there were activities, in addition to the play categories, involving the use of objects, such as working with materials (the use of science and math materials), and looking at objects. The combined percentage of these activities was 7.1%. In female areas, the combined percentage of all activities in these categories, including those not ranked among the ten highest, was 3.8%.

Activities that would be considered more functional or skill related such as care and preparation of materials, teaching/learning and checking work accounted for 4.2% of activities in male areas, 5.7% in female areas, no appreciable difference.

An examination of all classroom behavior reveals that most were sedentary. Those generally requiring higher activity levels were building and roughhousing, already discussed, with a higher percentage of observations in male as compared to female areas, 5.1% and 0.3%, respectively. Traffic, including walking and wandering, also a nonsedentary activity, accounted for 2.1% of activities in male areas, 4.8% in female areas and 6.3% in mixed areas. These figures are interesting in view of our previous finding that boys' areas are generally located in back of the room, girls' areas in front. The front of the classroom was used for entering and leaving, going to the teacher and so forth; therefore front areas were more likely to be used as paths. A benefit accruing from the location of male areas was less intrusion, therefore more privacy and room for its users.

Areas characterized by male or female predominant users showed qualitative differences in the kinds of activities that occurred. Activities in male areas involved less drawing and crafts, more use of materials and more play type activities than those in female areas. The active behaviors of building and roughhousing took place in male areas, whereas more traffic took place in female areas. An important question remains to be asked; that is, who participated in the activities that differentiated male and female areas?

Table 7 shows the percentage of participation by boys, girls or mixed groups for activities that differentiated male and female areas. These percentages are shown for male

Table 7

Boys' and Girls' Participation in Activities that Differentiate Sex-linked Areas[a]

	Male Areas				Female Areas				Totals			
	% of Activity				% of Activity				% of Activity			
	Boys'	Girls'	Mixed	Total	Boys'	Girls'	Mixed	Total	Boys'	Girls'	Mixed	Total
Building	78.6	7.1	14.3	28	0.0	0.0	0.0	0	78.6	7.1	14.3	28
Care/Prep. of Materials[b]	76.9	23.1	0.0	13	23.5	70.6	5.9	17	46.7	50.0	3.3	30
Drawing & Crafts	62.5	29.2	8.3	24	15.5	82.1	2.4	84	25.9	70.4	3.7	108
Fantasy Play	0.0	100.0	0.0	1	0.0	100.0	0.0	6	0.0	100.0	0.0	7
Looking at Objects	43.8	50.0	6.25	16	27.3	72.7	0.0	11	37.0	59.3	3.7	27
Playing	80.0	20.0	0.0	20	11.1	88.9	0.0	9	58.6	41.4	0.0	29
Roughhousing	83.3	0.0	16.7	6	100.0	0.0	0.0	1	85.7	0.0	14.3	7
Teaching/Learning/Checking[c]	40.0	0.0	60.0	15	36.4	31.8	31.8	22	37.8	18.9	43.2	37
Traffic	100.0	0.0	0.0	14	15.2	78.8	6.1	33	40.4	55.3	4.3	47
Working with Materials	65.6	18.8	15.6	32	26.7	66.7	6.7	15	53.2	34.0	12.8	47

[a]These percentages are based on the activities of boys and girls compared to total observations in male areas, female areas and across all sex-linked areas for each activity.

[b]The table presents care of materials and preparation of materials as a single category.

[c]The table presents teaching, learning, and checking work as a single category.

areas, female areas, and totaled across sex-linked areas. The totaled activities of building, playing, roughhousing, and working with materials, more characteristic of male areas reveal greater participation by boys. The activities of drawing and crafts, care of materials, traffic and fantasy play, more characteristic of female areas have greater participation by girls. Only, looking at objects and teaching show reverse trends. That is, more girls were observed looking at objects, more boys were observed in a teaching activity.

The assessment of activity categories demonstrates distinctions between the activities observed in male and female areas, as well as between the areas' predominant users, although the most predominant activities in sex-linked areas were writing, talking and reading. Activities in male areas involved more use of materials (although girls participated more than boys in looking at objects) and more play or play-type activities, some of which were gross motor activities.

In summary, higher proportions of drawing and crafts, and traffic differentiated female from male areas. More teaching/learning and checking work took place in female areas, although boys' participation was slightly higher than girls. (In addition 43.2% of teaching/learning and checking work across all sex-linked areas was with mixed groups.)

It appears that the most frequently observed activities occurred across all classroom areas, and that certain

qualitative differences between male and female areas were those congruent with sex-role stereotypes. Thus, beyond the similarities which accounted for most of the observed activities, behaviors in male areas were more active, object oriented and playful, whereas behaviors in female areas were more expressive or task oriented. These differences are in part related to children's prior experiences, yet it is important to recognize the part the setting plays in supporting certain activities while presenting obstacles to others.

It is also interesting to note that girls in male areas were observed looking at objects and boys in female areas were observed in task related activities. Some of the previous findings about male areas would suggest we might expect more talking and more casual play-type activities to take place in these portions of the room. Male areas, for example, were generally located in the back of the classroom, a portion of the room not frequently used by the teacher. In addition, half the male areas were open space areas which allow greater physical movement than is likely while seated at a desk. These two factors along with the association of blocks in male areas suggest a potential for being less task centered than female areas. The locations sharing front-of-room space with the teacher and furnishings, primarily desk spaces, of female areas, are similarly complementary to the drawing and crafts and task related activities observed in these areas.

Hypothesis 8. When both boys and girls name a sex-linked

area as a favorite of the children in their class, it is likely to be a male-linked area.

In nine of the eleven classes in which the sociogram was given, both boys and girls named the same area as the favorite of the children in their class. Four of these areas were sex-linked areas, and in each the area named was a male area, as hypothesized. In five classes, the same area was chosen by boys and girls, but it was not a sex-linked area; that is, it was not disproportionately used by either boys or girls. In only two classrooms, 12 and 14, were different areas named as class favorites by boys and girls. In each of these classes, girls named a female sex-linked area and boys named a male sex-linked area.

Favorite was operationalized as meaning the area chosen most frequently by girls and boys. Some children did not choose to answer the question and some chose other areas in the room. However in the cases in which girls and boys agreed on a favorite area, the total number of choices for the area ranged from 13 to 20. Since class size ranged from 27 to 31 children, the favorite area represented about 50% or more of the children.

The fact that in four of the eleven classrooms both boys and girls named male sex-linked areas as the favorite of the children in the room raises a number of questions. What kinds of areas are these? Are children aware that one group in the class has greater access to these priority spaces? How is the situation maintained?

Consideration of these three questions requires a closer look at the particular sex-linked areas considered favorites and children's comments about these areas, as well as their perception of who uses these areas.

Children's statements are cited when relevant to the relationship of boys and girls in the classroom. It is important to remember that no initial question directly called for a response in terms of gender. The intent was deliberately to avoid a cognitive set of boy/girl antagonism, attempting to understand the gender relationship of boys and girls, important as it is, in terms of children's perception of its influence.

In Classroom 1, the area named as favorite by 59.3% of the class, 42.9% of the girls and 76.9% of the boys, was the block corner. An additional 11.1% of the children chose blocks as the favorite activity, although naming an area other than the block area as favorite. The block corner was located in the back of the classroom, 81.8% of children observed in the area were boys and the teacher was never observed in the area. The floor area was covered with a tightly woven carpet and open cabinets along the window wall contained blocks. The carpet extended into a portion of area 2, an area not used sufficiently to be designated sex-linked, although 80.0% of the users were boys and the teacher was seen in this area only once. In effect, almost one-sixth of this room was functionally "the block corner." In response to the question, "Is there a place in the room

that most of the children in your class like to use?", one child (a boy) answered "of course, the block corner cause it's the biggest place we have."

In response to the question, "Who uses the favorite place (block corner)?" it was clear that children were aware the area was used by boys. All children named boys as the predominant users of the area. If 75% or more of the names given as users were of one sex, the area was considered to be perceived by the children as used by children of predominantly one sex. In fact children frequently just designated either 'boys' or 'girls' as users of a particular area, rather than naming individuals. In this class in response to the question of block corner users, one girl said, "the boys and Peggy." One boy said, "Boys mostly - John, Billy, me and Peggy."

In Classroom 1 some additional responses by children were interesting. One boy said, after stating that boys use the block area, "I don't know about girls, (they are) probably drawing flowers." Another boy said, "Only boys, girls wouldn't want to." Yet when an interviewer asked why only boys use the block corner, a five-year-old girl said, "Girls don't use blocks, because boys need to." The interviewer asked why that was so, but the girl could not clarify.

In Classroom 3 the favorite area was also a carpeted area, area 1, the carpet extending slightly into area 5. The major attractions in this area were two bean bag chairs, vinyl pillows stuffed with small pellets, usually

used by children alone, or occasionally in pairs.

When one May mapping was done in this room, area 1 not only contained the bean bag chairs, but also was the only carpeted area. Area 1 was a boys' sex-linked area; area 12 was a girls' sex-linked area. The male population in area 1 accounted for 76.3% of all users in that site, the female population in area 12 accounted for 94.6% of all users. Both of these areas were heavily used, although area 1 was more heavily used since it also was the class meeting area. Between the time the mapping was done and the time children were interviewed, three new rugs were bought for the classroom. It is unfortunate that the interviews did not occur before this change took place as children's comments were influenced by the arrival of the new rugs. Yet to make use of this naturally occurring change it seems as though an even stronger emphasis on area 1, the area containing a carpet and bean bag chairs, may have been tempered by the arrival of the new rugs. Children's comments indicate the importance of a variety of imageable or special areas within a classroom.

A majority of the children in this class (74.1%) named rugs or bean bag chairs as the favorite place or places in the room. It is possible that these choices would have referred only to area 1 two weeks earlier, but this remains speculative. At the time of the interview 46.4% of the children specifically referred to the black and white rug (which replaced the original rug in area 1) or the bean bag

chairs; 14.3% stated "the rugs," 7.1% named the new red and black rug; 17.9% felt there was no special place; and 14.3% gave other mixed responses. Of the children who named the black and white rug or the bean bag chairs, 83.3% stated the area was used by boys, 16.7% felt it was used by both boys and girls, and no child perceived the area predominantly used by girls.

The children's responses suggest that use of particular resources was commonly recognized by all the class, although the perceptions of how it came about differed. One boy, after stating that the black and white rug was the favorite, said it was used mostly by boys. When questioned about this he said, "The girls probably like other rugs." Girls agreed with the designation of favorite as well as the predominant users, but they were not as sanguine about how use was decided. One girl stated,"the boys barge in in the morning and get the bean bag chairs; another said, "the boys push the girls off." Yet one boy who was mentioned as "frequent" user of the bean bag chairs said "I don't care about them so much since we got our three new rugs."

In Classroom 5 the favorite area was area 9. This area was named as a favorite by 57.7% of the class, 46.2% of the girls and 69.2% of the boys. All of the children named boys only as users of the area. The area was a block area in one of the rear corners of the room. It had a sculptured (cut pile) rug on the floor, open cabinets containing blocks and was bounded on one side by a piano. In answer to the

question, "Do you use the block area," two girls replied, "once" and said they would like to use it more. One added, "...but I always have to put them away," the other said, "If the boys invited me to play." One girl said she would not like to use it more since she didn't like blocks very much. Another said, "We like to do other things and they (boys) like to do their stuff." Most boys named the block area as the favorite place, although it was clear that not all boys had an equal chance and/or desire to use that area. Some boys said they didn't want to use it more, some complained that others got there first. One boy felt it took a while to build something and then there wasn't enough time to play with it.

Interestingly, a work table area in the room that was used predominantly by girls, area 2, was not mentioned as a favorite by any girl. Yet one boy who was mentioned as a frequent user of the block area named the work table as a favorite area although he said he preferred using the blocks.

In Classroom 11, the favorite area was the two-story loft which provided an audio-visual area on floor level and an upper carpeted area. The loft was located in area 3 and named as favorite by 58.1% of the class, 56.3% of the girls and 60.0% of the boys. Half of the children named particular boys as those using the area most, one-third named both boys and girls. Three children mentioned a girl who, in a specific incident that had recently occurred, was allowed to sleep there when she felt ill. In this class,

although more boys used the area and more children recognized that the area was used most by boys, children readily agreed that both boys and girls could use the loft. Observations in the classroom after the loft was built indicated that arguments over the use of the loft were settled by teacher-made and enforced rules: sign-up for use, four users at a time, and so on.

Among those classrooms where the favorite area was a male area (four classrooms), the amount of cross-sex interaction varied (See Appendix D). The highest and lowest amounts of cross-sex interaction are included in this group. Although, four classes are too few to understand the impact of favorite areas, issues to be considered include what resources the area contained and how the decision was made as to who could use the area.

Hypothesis 9. Greater use of sex-linked areas within classrooms will be related to less cross-sex interaction in the total classroom.

The hypothesis that greater use of sex-linked areas would be related to less interaction between boys and girls, tested by the Pearson product moment correlation, was not upheld, (r = -.33, N.S.)

The proportions of children observed in areas associated with their gender ranged from 6.5% to 51.4% and the proportions of integrated pairs ranged from 5.2% to 32.8% of all dyads in the classroom. See classroom summary in Appendix D for complete listing.

Hypothesis 10. The amount of cross-sex choices children express will be related to the amount of cross-sex interaction that occurs in classrooms.

Children in 11 classrooms (n = 314) were asked their choice of companions for play, math work, reading and friendship. The hypothesis that the percentage of cross-sex choices would be related to the percentage of cross-sex interaction observed in classrooms was tested (Pearson product moment correlation). The percentages of cross-sex math choices were correlated with the percentages of observed integrated dyads (r = .68, p = .01). Percentages of choices for play, reading and friendship were not significantly related.

The interviewer was advised to write as many choices for each category as a child wished to make. In addition, for the first choice, the play choice, each child was encouraged to name at least three children. Although the dyad seemed to be the most usual class group size, we wanted children to have the option of naming as many others as they chose. In addition, we thought that play groups might be larger than the dyad. Although the number of children's choices varied, most children named three play choices and one choice for each of the other categories.

Each of the choices for play, math, reading and friendship was analyzed by tallying the percentage of first choices that were cross-sexed. Play choices were also analyzed by considering all (generally three) children's choices. A choice was tallied as a cross sex choice if any

child named was not of the same sex as the child making the selection (called playany choice). The percentage of choices for each of these categories is listed by class in the classroom summary sheet in Appendix D. All correlation results are listed in Table D in Appendix E.

The intercorrelations of children's preferences affirms that math choices were based on different criteria from other choices that children made. Friendship choices were related to both play choices (r = .53, p = .05) and reading choices (r = .54, p = .04), but not to math choices.

This finding suggests that at least two social networks existed in classrooms. One reflected a friendship or play orientation, the other was based on a more academic-functional mode. The finding that the percentage of cross-sex math choices correlated with the percentage of observed cross-sex dyads in classrooms, suggests that the classroom program supported these opportunities.

Additional Results

Areas Segregated by Time

Hypotheses were based on the conceptualization that room areas would either be mixed use or sex-linked. In the course of analysis the possibility that areas used by relatively equal numbers of boys and girls were in fact segregated by time was investigated. Every observation for each of the 12 areas in every classroom was reviewed to determine whether the population was comprised of mixed or

same sex groups. An area was considered to be segregated by time if at least 75% of the time it was occupied it was used by only same-sex peers. Classrooms were found to have at least one area and as many as seven that were segregated by time. Areas segregated by time are indicated on floor plans found in Figures 5 through 8 in Appendix C.

This suggests temporal constraints on the use of classroom areas as well as spatial ones. It also suggests that children's casual or incidental opportunities to interact with opposite-sex peers were limited to even fewer than had been expected, those that were neither spatially nor temporally segregated.

Developmental Effects

It is considered a truism that same sex affiliation, is an important description of social patterns in the middle years of childhood, intensifying from age six to adolescence. In view of the premise of this study that setting-specific variables influence cross-sex interaction, the developmental trend towards greater segregation bears consideration. However, two caveats are in order before presenting the results. The first is that only four classes contained children older than second grade; the second that some classes were inter-aged.

Table D (The Pearson Correlation Coefficients) in Appendix E illustrates an interesting pattern when age is correlated with other variables. Age is not correlated significantly with the cross-sex interaction of dyads, nor

with the percentage of math or reading cross-sex choices. There is, however, a significant positive correlation with the percentage of children using sex-linked areas, (r = .59, p = .01) and significant negative correlation with the percentage of play, friendship and playany cross-sex choices, (r = -.52, p = .05).

These findings suggest that within the classrooms greater segregation was associated with age when the context was social such as play or friendship choices. The correlation of age with the percentage of children using sex-linked areas might be another manifestation of social clustering. The finding that age does not correlate with the amount of observed boy/girl interaction nor with the percentage of math or reading choices suggests that segregation did not increase with age for all contexts, perhaps that with functional or academic pursuits in a classroom gender may not be as important a criterion for selecting peers.

Classrooms with Same Teachers

Of the eight teachers in the classrooms studied, five remained in structurally identical or very similar rooms both years of the study. Furniture arrangement and/or teacher's programs, however, changed from year to year affecting the way rooms were used. The importance of teachers in elementary classrooms as authority figures, leaders, or role models suggests the possibility that certain attitudes and behaviors, not necessarily those considered in this

study may have direct effect on the amount of cross-sex interaction that takes place in their classroom. To ascertain whether the amount of interaction between boys and girls was similar in classrooms with the same teacher a Pearson correlation coefficient based on the percentages of boy/girl pairs observed in each teacher's classes for the two years was computed. No relationship was found (r = 0.11, N.S.). This analysis was based on the following pairs of rooms, Classrooms 1 and 5, Classrooms 2 and 6, Classrooms 9 and 13, Classrooms 10 and 14 and Classrooms 11 and 15. The following classrooms were omitted, Classroom 3, because the teacher left, Classrooms 4 and 7 because room size changed and Classrooms 8 and 12 because of a teacher change during the first year.

This finding suggests that the teacher alone is not sufficient to predict the amount of cross-sex interaction from one year to another. That is, the extent to which teachers have an effect on interaction within their classes is mediated by other variables. The data on each of these rooms, their physical arrangement, teacher patterns and dyadic interaction have already been presented. A consideration of how room changes might have contributed to spatial and social patterns will be discussed in the next chapter.

Inequalities in Classrooms

A review of the findings indicate inequalities in the distribution of resources and in children's perceptions of

who was influential and who had (or took) more classroom opportunities to do as they wished. Boys were more likely to have access to favorite areas and boys were more likely than girls to be chosen by opposite sex peers as having both greater influence with peers and doing more of what they wanted to in classrooms.

Questions were included on the sociogram to explore children's perceptions of who held classroom power as well as how the power was attained. We were interested in whether toughness, a quality on which children of school age rank their classmates with considerable consensus (Omark et al., 1973; Omark & Edelman, in press), would play a part in the distribution of resources. Children's responses did indicate that toughness or forcefulness was influential in their classes.

Perceived Classroom Influence

The following question was asked to help assess the extent to which boys and girls were perceived as influential and why:

> Sometimes in a classroom children have different ideas about what they want to do. When this happens in your classroom which child is listened to most often by other children?

Children were asked for second and third choices, as well. After each choice the child was asked why that child was listened to. Girls named boys 34.6% of the time, boys named girls, 25.9% of the time as the persons listened to

most often by the children ($z = 2.18$, $p \leq .05$).

The reasons children gave for why peers were listened to ranged across a number of dimensions. Most frequently children chose others because they were likable, forceful or competent. Other reasons given were grouped under assessments of effort, teacher's pet and other (for unique responses). Some children said they did not know why others held influence.

Most responses tallied in the likable category were based directly or indirectly on personal attributes or affiliations I like him/her, S/he's nice, friendly, or S/he's friends with "_____". Included in the forceful category were comments such as s/he's a smart alec, big mouth, bossy, s/he pushes people around, is tough, or s/he acts crazy, screams. Competency responses included comments such as s/he's smart, has good ideas, or says interesting things. The effort category included responses such as s/he tries hard, works nicely, or is getting better.

Table 8

Children's Perceptions of Why Peers Have Influence

	% Social		% Compe-	%	%	%	%	
	Likable	Forceful	tent	Effort	Teacher's Pet	Other	Don't Know	n
Girls chosen by								
Girls	32.2	19.7	26.8	1.6	2.7	3.3	13.7	183
Boys	27.4	9.6	28.8		5.5	6.8	21.9	73
Boys chosen by								
Girls	18.6	35.1	27.8	7.2	2.1	6.2	3.1	97
Boys	29.2	26.8	31.1	1.0	1.4	1.0	9.6	209

[a]Percents based on row total. For example each category for which girls chose girls was compared to total number of girl/girl choices.

According to Table 8, girls name girls primarily because they are likable and competent and name boys primarily because they are forceful and competent. Boys name girls primarily because they are competent and likable and name boys for competency, likability and forcefulness. A toughness hierarchy (Omark, 1972) does seem to interact with class influence. Both boys and girls perceived a greater percentage of boys influencing by being forceful (tough) than girls. However, the data indicate that forcefulness is not exclusively male in the school population. Girls list forcefulness for girl's influence 19.7% of the time. In fact, one of the times that physical aggression was mentioned, a boy and a girl were described at the top of the hierarchy:

> "Brian...He could beat everyone up. And Janey, she could beat everyone up except Brian."

Yet Brian was selected as influential by six boys, Janey selected by one boy and one girl.

At times the children's responses to this question included comments about the relationship between boys and girls in the classroom. The repeated selection of a few individuals in each class, as well as children's comments suggest that the boys and girls had their own leaders.

> "He's the boss of the boys"
>
> or
>
> "Most boys listen to him, they like him the best."

At times, for girls, influence was described, in part, as being able to appeal to boys.

> "She's friends with the boys."
>
> "Most popular girl, boys like her good writing and drawing"

It is interesting to note the percentage of children who shrugged or said they did not know why the child they selected had influence. It is curious that so many (21.9%) of the boys naming girls could not or would not tell why they did so. One possibility is that the descriptor was not available to them. Another possibility is that the boys felt social constraints against describing influential girls. It would be interesting to investigate further how girls influence others in open classrooms.

Resource Use. Children were also asked what they would like to do more of in the classroom and why they don't and who in the class gets to do what they would like and why. These questions were included the second year and therefore asked of fewer children. Also, about 25% of the children chose not to answer some questions. Whether their reluctance had to do with the length of the interview or the nature of the questions, the findings should be interpreted as suggestive.

The equipment boys and girls stated they would like to use more reflected to some extent the sex-stereotyped use of materials previously reported. Of the 28 children naming blocks or woodworking, 67.9% were boys. Of the 27 children

naming drawing and crafts or doll house, 81.5% were girls.

The reasons children gave for not using the materials more indicated that the teacher's program, 59.7% (i.e. "too much work" or "not enough time") or the teacher, 16.3%, ("the teacher doesn't pick me") limited opportunities. An additional 16.3% said others using the materials prevented their use of them. These data suggest that the teachers' emphasis on the skills program limited the general use of materials. The few comments by boys and girls about not being chosen for painting or blocks also suggest that teachers contributed to the stereotyped use of equipment.

The results of the last question (Who gets to do what they want to do and how that comes about) indicate again that a higher proportion of girls chose boys (37.6%) than boys chose girls (14.5%) ($z = 7.2$, $p \leq .01$). Fifty percent of the reasons given for children's opportunity to do what they wanted related to being good, smart, working hard, and being allowed to, reaffirming the importance of the teacher's evaluation and permission in the use of resources. Another 26.8% of the responses mentioned children doing what they wanted to because they did not listen to the teacher (i.e. "they are bad," "they play instead of work"). Of the 29 children placed in this category 25 were boys. Only 12.5% of the responses related to toughness among peers (i.e. "pushing," "bossy").

The sociogram responses relating to perceived influence

and resource use reaffirm other findings about classroom organization. The importance of the teacher's role in controlling classroom activities and the use of resources is clear. Also reemphasized is the extent of gender segregation in the classroom. As children are more frequently observed with same-sex peers so do all sociogram responses reveal more same-sex than opposite sex choices. Yet, despite the programmed similarity of children's activities and the separateness of boys and girls in the classroom the data reveal that when there is a difference between boys and girls, boys have access to more open space and more favored room areas. Children's awareness of this difference is indicated by a greater percentage of girls selecting boys than boys selecting girls as having classroom influence and the opportunity to do more of what they want in class. The basis for these opportunities were mostly attributed by children to others' niceness, popularity and competence, but bossiness or toughness was also noted in a fair amount of responses, particularly for boys.

Summary of Results

The following hypotheses were confirmed:

1. In the open classrooms studied there was more same sex than mixed sex interaction.
2. There were areas in the classrooms studied that were predominantly used by boys or girls (sex-linked areas).
3. Sex-linked areas were located in segments of the room not usually frequented by the teacher.
8. When both boys and girls named a sex-linked area as a favorite of the children in their class, it was a male-linked area.

Hypothesis 9 was not confirmed.

9. Greater use of sex-linked areas within classrooms was not related to less cross-sex interaction in the total classroom.

Findings were mixed for the following hypotheses.

4. Areas predominantly used by girls were located in the front of classrooms as were teachers' areas, whereas areas predominantly used by boys were located in the back of classrooms. There was, however, no difference in physical distance between teachers' areas and male or female areas.
5. When areas of the classroom contained sex-stereotyped equipment, these areas were associated with gender as follows:

a. Nine of the ten areas containing blocks were predominantly used by boys.

b. The one playhouse area was predominantly used by girls.

c. Areas containing paints were not predominantly used by girls.

6. Across classrooms containing both open areas and desk areas boys' areas were equally likely to be open space or desk areas, girls' areas were more likely to be desk areas.

7. The most frequent classroom activities, writing, talking, and reading, occurred in sex-linked as well as mixed areas of the classroom. Some qualitative differences in activities were found between male and female areas. Activities in male areas involved more use of materials and play or play-type activities. Activities in female areas involved more drawing and crafts, and traffic.

10. Children's cross-sex play, friendship and reading choices were not related to the amount of cross-sex interaction observed in classrooms. However, children's cross-sex math choices were related to the amount of cross-sex interaction observed in classrooms.

Additional Findings

1. In addition to sex-linked areas in each classroom there were areas that were sex segregated by time.

2. Age was not related to the percentage of cross-sex

interaction in classrooms, nor to children's cross-sex math and reading choices.

3. Age was positively correlated with the percentage of predominant gender use of sex-linked areas, and negatively correlated with children's cross-sex play and friendship choices.
4. No relationship was found between the amount of cross-sex interaction observed in classrooms with the same teacher over two years.
5. Indications of male dominance were found in their use of varied and preferred areas and children's perceptions of their greater influence and use of opportunities in the classroom. In part these differences were attributed to boy's aggressiveness or toughness in the classroom.

IMPLICATIONS AND CONCLUSION

The aim of the present research was to consider how the socialization of boys and girls with respect to people and the environment would be reflected in the use of space in the open classroom. The hypotheses tested were derived from previous research on boys' and girls' environmental patterns. It was predicted that boys and girls would interact more with same sex than opposite sex peers, spend time in different areas, be differently located with respect to adults, and that teachers' spatial patterns and room arrangements would encourage these segregated patterns. Many of the predicted patterns did occur suggesting that even within classrooms in which the most frequent activities were similar for both boys and girls, choices of companions and locations were likely to entail a consideration of gender. In view of the open classroom philosophy that stresses the role of the active learner, interacting with others and the environment, the occurrence of configurations indicating gender patterns suggests that delimited classroom choices were available for the many children who conformed to these patterns.

As we know, the segregation of boys and girls is not unique to open classrooms. In fact, the power of segregated socialization practices is derived from the constancy of these patterns across both indoor and outdoor environments. Fitting the model of a non-conscious ideology as expressed

by Bem and Bem (1970), the sheer repetitiveness of these patterns precludes the contrast or dissonance necessary to lead to consciousness of their effect on boys and girls and their interactions within the environments they inhabit. But, there is dissonance in the system when we consider the meaning of segregated practices in the light of the goals of the open classroom as well as the goals of society for equality of opportunity for men and women.

This chapter will consider the meanings and effects of gender segregation, children's choices and the nature of classroom space. The final section will focus on future research and strategies for change.

The Meanings and Effects of Segregation by Gender

As we have seen gender was important in the social and spatial organizations in the open classroom. Same sex interactions were the most frequently observed type and same sex companion choices were most frequently expressed by children for academic, play and friendship choices. In addition there were areas in each classroom that were habitually and disproportionately used by boys or girls as well as areas that were alternately used by only boys or girls. Clearly gender influenced the social and spatial decisions children made. That is, children limited themselves, to some extent, to interactions with one half the children in the classroom and in addition, limited their use of classroom space to areas "appropriate" for their gender.

If such obvious segregation were based on race, religion or ethnicity it immediately would warrant our attention. However this pattern of gender separation in children's social networks is one that is generally familiar and taken for granted. Why should this be so? It is possible that grouping by sex is an ordering mechanism helpful to adults in the control and the maintenance of discipline. That is, the separation may facilitate the surveillance of some behaviors associated with the male stereotype such as aggression or fooling around as well as limit instances of heterosexual teasing or exploration. Also, the segregation may be seen as reassuring evidence that children are being properly socialized, learning to parallel adult behavior, which with the exception of heterosexual pairing, is often homosocial in significant work, friendship and leisure interactions. In this context the differing home ranges permitted boys and girls, the block corners and doll houses provided for them, may be understood as environmental labeling to foster the sex typing deemed culturally appropriate in our society.

Children enter the classroom aware of the gender appropriateness of the use of a wide range of materials and settings. Whether conformity to sex role stereotypes is based on a cognitive self definition and therefore intrinsically rewarding (Kohlberg, 1966) or based on learning as a result of social reinforcement by peers and adults (Mischel, 1966) the processes are mediated by the range and sex-stereotyped

quality of the environmental options. The segregation of boys and girls serves to facilitate the disparity of environmental options, fostering differing sets of competencies, interactions and aspirations by gender.

The segregation of boys and girls within a context of division of labor by gender, provided continuity with some aspects of adult life, specifically the traditional roles of women at home, men in the world. We are now aware that even within this context, conformity to rigid sex-role stereotypes limits the potential of people across situations (Bem & Lenney, 1976). Evidence also indicates that strong identification with sex-typed interests, although socially appropriate at some ages, may be dysfunctional during some parts of the life cycle. Highly masculine adolescents, for example, felt less positive about themselves as they matured (Mussen, 1962). Maas and Kuypers (1974) found that older women, who as young adults were highly family centered, were likely to express low satisfaction with their lives. However, the life styles of older men, whose earlier involvements spanned contexts in addition to the family, seemed likely to sustain continuing interests.

Today we must question socialization practices that postpone the opportunity and institutional support necessary to develop informal networks and ways of using resources that are based on shared goals rather than gender. Not only are we delaying the opportunity to support the communication and organizational skills across gender necessary

to equal opportunity, but the continued social segregation further reinforces same-sex affiliation making cross-sex interaction even less likely. As shown in the results, sex-linked area use and same sex play and friendship choices increase with age. The extent to which the environments planned for children exacerbate this developmental phenomenon needs greater consideration.

What are children learning along with the traditional skills when gender differences in interaction and location flourish in a context in which the explicit program is the same for all? In view of the differential status of males and females in society the segregation itself may indicate, as well as facilitate patterns of male dominance. Same-sex groups are not only more likely to elicit sex stereotyped responses from others, but may well constrain their own opportunities. The results indicate instances of inequalities favoring boys in the distribution of resources, both by kind of area and by favorite area. In addition, more girls attributed greater influence in the classroom and greater opportunity to participate in chosen activity to boys than boys attributed to girls.

The segregated patterns of boys and girls in classrooms was similar to patterns observed in other environments. Data from the 15 classrooms demonstrated predictability on many of the hypothesized patterns. Thus, it seems that classroom environments provided support for children's stereotyped sex-role socialization. This con-

sistency of segregated patterns across settings suggests that change will be difficult to attain.

However, there were differences across classrooms in the extent of cross-sex interactions observed, in children's choices and in spatial organization. A consideration of how classrooms varied may provide a reasonable beginning in planning for change.

Children's Preferences

Children's choices of companions are important to the conceptualization of this research. The integration of girls and boys in classrooms could lead to negative as well as positive consequences. If, for example, cross-sex pairings are arranged by the teacher for negative reasons, such as to punish or to humiliate, children would not value the experience nor choose to repeat it. Knowing the relationships among children's choices, the percentage of observed cross-sex interaction and the use of sex-linked areas sheds some light on children's evaluation of those classroom experiences.

The relationship of children's cross-sex choices with the percentages of cross-sex interactions observed across classrooms is particularly interesting. The findings that the percentages of cross-sex interaction in groups of two varied from 5.2% to 32.8% suggest that social opportunities across classrooms were phenomenologically different for children. Sharing an interest with other than a same sex peer may have been unremarkable in one class, yet deviant

in another. Within this context the finding that only children's math choices, not play, friendship, nor reading choices, are positively and significantly related to the observed cross-sex interaction is instructive. The relationship suggests that to varying degrees across classrooms it was appropriate for boys and girls to both do math work together and to express the desire to continue to do so.

Although no sociogram choices show a relationship with sex-linked area use, the relationships of these variables to age are interesting. As children develop there is a significant positive relationship with the proportion of use of sex-linked areas and a significant negative relationship with the percentage of cross-sex choices. These relationships suggest an increase in both same sex social choices and spatial grouping with age. However, skill areas of both math and reading choices do not relate to age.

It might be helpful to view the classroom organization as essentially two systems, one the result of prior socialization, the way girls and boys respond to each other and the environment that reflects their past experience. The second is the response to the academic or functional school program, its goals and how they are supported. An interpretation of the intercorrelations reported is that when supported by the classroom program or the teacher, cross-sex interactions based on the academic dimension did occur and were reflected in the percentage of cross-sex math choices. Whether cross-sex play choices would occur if

sanctioned is a moot point. Play activities, according to children's comments, were limited by too much work and too little time. The observations of limited play activities also suggest these activities were not encouraged by the teacher.

Before leaving this topic it is worthwhile to consider why math work seemed to provide children with the opportunity for joint endeavors. It may be that since boys' superiority in quantitative achievement does not appear in the early elementary years (Maccoby & Jacklin, 1974), class ability groupings reflected a relatively even distribution of small numbers of boys and girls. This may be a potent area to explore as this type of shared math experience could help to diffuse the differences in math interest and in ability that appear between boys and girls during adolescence. Further research on the efficacy of varied content areas and processes to provide children with realistic opportunities for working equality would be constructive.

Nature of the Space

Although classrooms looked different from one another, varying in both arrangement and elements, there were also many similarities. Teachers planned their rooms considering the same functional needs, such as writing surfaces, a class meeting area, book and supply storage, block corners and some particular subject areas. These functional needs, along with delimited space, similar room structure, equipment and furniture contributed to the resemblances.

The conceptualization of sex-linked areas was helpful in revealing relationships between room structure and elements, teachers' space patterns and boys' and girls' locations in the classroom. However, sex-linked area use was not related to either the percentage of cross-sex interaction as hypothesized, nor to the percentage of cross-sex sociogram choices. The most direct explanation is that cross-sex interaction was primarily based on the academic mode, had its own organization and its occurrence was not prevented by boys' and girls' usual locations. In addition, the majority of children's interactions were based on same sex affiliation whether or not children were located in sex-linked areas. Yet, a consideration of a methodological problem seems warranted before discarding the possibility of a relationship between spaces habitually used by boys and girls and social organization. This will be considered in the section on future research.

We have looked at classroom space from a number of perspectives, noting boys' and girls' locations with regard to the front and back of classrooms, relationship to teacher, open space and desk areas, equipment use and storage and time-segregated areas. It is clear that even within the confined limits of classroom space, the limits on classroom activity levels and the program directive, there are spatial differences that are related to gender. Whether the actual difference in the opportunities provided by these spaces or the symbolic statement of a difference

these segregated areas impart is more important, some speculation on the evolution of spatial patterns may be useful.

Most classroom areas were open space areas or desk areas. In addition there were a few special use areas, such as the loft or science areas. Children's favorite spaces were likely to be open spaces or special spaces rather than the more usual desk spaces. Carpeted open space areas, particularly those containing pillows or bean bag chairs, were an important contrast to the hard surfaced desks and chairs. They provided an opportunity to move around, lounge on the soft fabric, and to be near and work with friends in a more informal setting. Some of these areas were used approximately equally by boys and girls and some were sex-linked.

Open space areas often contained blocks and when they did, they were likely to be used by boys. There are some puzzling, if not paradoxical facts, related to these findings. Children were seldom allowed to use the blocks, even though blocks are seen to provide opportunities to learn mathematical and spatial relationships. Teachers frequently placed blocks in areas in the back of the classrooms, while using the front themselves to teach, check work and talk with children. In addition, some blocks were used on rough or sculptured rugs (which did provide a sound buffer for collapsing structures) although the surface was clearly not optimal for the task.

One can only speculate about the rationale for these room arrangements, yet the outcome is clear; boys consistently gravitated towards the block areas, however not to use the blocks (perhaps by choice, probably by teacher constraint). The result is that boys had socially conditioned access to some open space areas that were apart from teachers and girls. It would seem that the most important use of blocks in the classroom was as a signifier for boys and girls as to the appropriateness of the area for their use or avoidance.

Although this speculation only applies to some areas it suggests that casual use and placement of equipment may nonconsciously or unwittingly support a sexist ideology. The other point to be made is that sex-linked areas, particularly when open space areas are compared to desk areas, are quite different in the opportunities they present and the ways they evolve.

Teachers Influence on Classroom Patterns

It is clear that whether we are discussing academic programs or the nature of classroom space, the influence of the teacher is involved. Through diverse teaching abilities and styles, organizational skills, attitudes, expectations and room arrangements, teachers have an impact on many aspects of children's lives. The impact on children's social and spatial organizations is likely to be the result of intentional planning, the implementation of unquestioned cultural norms, as well as the inadvertant side effects of

actions taken for other purposes, each mediated by children's attitudes, proclivities and values.

The relationship of sex-linked areas to teachers' spatial patterns has been shown. We can only speculate that sex-linked areas would be less likely in classrooms with a highly mobile teacher or one who expected children to use a variety of areas in the completion of tasks. In fact, in the classrooms studied, teacher's spatial patterns were quite similar with only a few exceptions. We know the percentages of cross-sex interaction observed in classrooms with the same teachers over two years were not correlated. We also know that teachers made changes in their classrooms, eliminating or changing block corners, relocating their meeting areas and allowing children to spread out, use more of the classroom. The small number of classes and the variation in the alterations preclude definitive assessments, but provide possibilities for future research and interventions to be considered in the next section.

Future Research

The ecological perspective demonstrates the redundancy in classroom patterns. Where children are, whom they are with and what they are doing, as well as how they are perceived by themselves and others, all reinforce existing patterns. Without a consideration of the systemic nature of the setting, these patterns reinforcing the social category of gender are likely to inhibit attempts at changing parts of the system. For example if the environment that children

apparently read so well remains constant, changes in children's behavior may be interpreted as deviant. The powerful reinforcement of sex-roles also means that to be effective, non-sexist education cannot be taught during a part of the day, but requires incorporation into the general goals and purposes of the school program. Social changes imposed without careful consideration may be perceived as punitive, or misperceived.

This discussion of future research is oriented toward an assessment of variables to support viable classroom alternatives. In providing a graphic view of the social and spatial environment of classrooms the present study may be useful to teachers of young children. What seems to be particularly needed now is a joint effort of teachers and researchers evaluating the effects of their strategies for change. To this end, this section on future research includes possible interventions that can be evaluated for their efficacy in supporting a non-sexist classroom organization.

Spatial Organization-Proximity

Sex-linked areas were conceived of as being inversely related to the proximal relationship of boys and girls in the classroom. That is, when children were not in sex-linked areas they were assumed to be in areas of more mixed population. However, this assumption turns out to be incorrect. The occurrence of areas segregated by time and the range in the population of predominant users in sex-

linked areas suggest that a more direct measure of proximity is required to test its effects.

The classroom summary sheet in Appendix D provides data that appears to support a relationship between the proximity of boys and girls and their interaction. In the first four classes, where cross-sex interaction was greater than 22% in this hierarchical list, boys and girls experienced a more proximal relationship than in other classes. In the first class (Classroom 11) the use of the front of the room (a reading area and one very large table) by all class members was greater than specific areas in any other class. In the next three classes, children were in contact with the same children daily around tables. In these classes children chose and retained their seats (see column G on table D). At the other extreme was the largest single classroom (Classroom 3), the last classroom in the list with the highest percentage of sex-linked area use (51.4%), and the lowest percentage of cross-sex interaction (5.2%). In addition, in the second year of the study two of the teachers made changes that involved a decrease in spatial density. One teacher (classrooms 11 and 15) intentionally encouraged the children to use the back as well as the front of the room. The second year there were three female sex-linked areas (all around the large table) in the front of the room and three male sex-linked areas in the back of the room. (This contrasted with one male sex-linked area in the first year.) The other classrooms (4 and 7) occupied a double

room that afforded children the opportunity not only to hold personal seats, as in the first year, but to use an additional room. The cross-sex interaction in these teachers' rooms decreased 20% and 10%, respectively, the second year.

One may speculate, based on the discussion of the data, that when girls and boys repeatedly share the same limited areas of classrooms cross-sex interaction is likely to occur. On the contrary, when space tends to buffer initial same sex groupings of children, interactions between boys and girls are least likely to occur. However, the spatial factor alone may not be sufficient. Another possibility to investigate is that proximity is only relevant when the program provides the opportunity for and sanctions boys and girls working together.

Although these alternatives may be assessed in naturally occurring classrooms as in this research, an intervention that would provide areas of the classroom that boys and girls would share in carrying out their assigned tasks seems particularly useful. Essentially, in all the classrooms studied, there was a social orientation to the arrangement of space. That is, similar activities took place in all areas, but different children used them. The intervention would provide for the environment to take on a more active role in the curriculum, so that areas would reflect aspects of the program valued by the teacher. To illustrate, areas could contain an aquarium for water pressure

experiments, an art area with collage material, a writing corner with pens, pencils, paper, story ideas, a poetry board, a microscope with ideas for use and so forth. These areas, usable by small groups, would provide opportunities for children to explore different areas, meeting others involved with similar tasks or having similar interests. Other parts of the classroom could provide a variety of furnishings that would be suitable for different activities and different sized groups, i.e. study carrels could provide spaces for individual desk work and easy chairs for individual reading. The coordination of space use with classroom program may well encourage more active use of the classroom and, as a result more chances for incidental interaction with peers in addition to their friends.

Social Interaction - Small Groups

We generally expect that when children enter a new class they would gravitate towards children of the same sex. This ordering is based on a combination of social attributes, prior affiliative experiences and, in addition, the social taboo against cross-sex interaction. If the classroom then offers spatial support for these social groupings, cross-sex social interaction may become infrequent. The significant correlation between the percentages of cross-sex math choices and observed interactions, suggests that interactions based on "legitimate" class purposes can more easily be achieved than strictly social ones.

Although teachers' instructional methods were not systematically investigated in this study, we do know that some teachers grouped children by ability levels for the teaching of skills such as reading or math. It seems possible that these small groups provided the opportunity for children to get to know and select working companions based on skill or compatibility. The assumption that the children's sociogram choices were related to their classroom experiences, could be tested more directly if more data on ongoing processes were collected in future research.

Interventions to be evaluated could be based on size of group, basis for grouping (e.g. ability or interest) and kind of activity (e.g. skill drill, putting on a play). Although sociogram choice could be one dependent measure, another interesting measure would assess whether children's interactions extend beyond the tasks with which they were initially involved.

Distribution of Resources

Classroom patterns were influenced by what was placed in the room, where it was placed and the part it played in the classroom program. In addition, there are suggestions in the results, particularly in the discussion of favorite areas, that the system of resource distribution may have been related to different patterns of use by boys and girls.

Use of the four favorite areas that were also male sex-linked areas seemed to be decided upon differently. In two of the favorite areas, each called "the block corner,"

use of the area was relatively uncontested, seemingly the result of prior socialization. These areas were used by boys over 82% of the observations and all class members who named the areas as favorite acknowledged that the area was used by boys. In another class in which the favorite area was the loft, overuse of the area was resolved by teacher intervention by means of rules and mandate. In this class some of the children naming the area as favorite recognized that it was used mostly by boys (as it was 65% of the observations), some felt it was used by girls, others felt use was by both girls and boys. In the last class, in which the favorite area was a carpeted meeting area containing bean bag chairs and pillows, the data suggest that some of the influence that resulted in the unequal use of the resources by boys was based on force. There was no indication that the teacher entered the discussion.

It seems, based on children's accounts of who used the area named as favorite, that control of classroom resources was decided on in at least three different ways, by cultural consensus, use of authority and by physical power or threat. Clearly both the means and outcomes provide important learning opportunities for children. If decisions continually favor a particular group the probabilities of these outcomes may well become social expectations. Observations of classroom areas early in the school year could contribute to an understanding of the relationship between the means of distribution and use of resources.

In addition to the possibilities listed above an intervention could be evaluated. Environmental education based on classroom resources and opportunities could provide a most direct means of helping children to understand and plan for their own needs, others' needs and group needs in a situation in which resources are limited. One effect of this intervention could be the message that resource use is not peripheral to the program, but a sanctioned part of the organization. Clearly this outcome depends on careful initial planning by all of resources to be included. Another important aspect is that boys and girls would be provided with the opportunity to organize, negotiate and enforce group decisions.

Individual Differences

Assessing the social and spatial organizations of open classrooms based on data quantified by gender answered some questions, left others unresolved and posed additional ones. Observations of the same boys and girls over time is necessary to understand the contribution of individuals to group norms. A number of issues could be clarified by longitudinal observations.

At times children mentioned one girl amid many boys as users of particular areas. Longitudinal observations could ascertain the extent to which the use of an area is attributable to a few habitual users or many different ones. Similarly, the number of children who become involved in cross-sex interaction would be helpful to an understanding

of classroom organization. In addition, individual variation in activities and the way spaces are used could be clarified.

Questions need to be raised concerning the meaning of cross-sex interaction. That is, it is important to understand whether the interaction reinforces stereotypical patterns or allows for individual expression. Observations of the initiation, content, and resolution of interactions can clarify the kinds of situations that reinforce stereotypical abilities and expectations.

This research was based on the belief that the experiences children have in classrooms can exacerbate sex-role stereotypes. A long term study that would evaluate the influence of school interventions on the degree of sex-stereotyping of children's behavior, attitudes and aspirations would be a valuable contribution.

Potential for Change

Changing the criteria on which sex roles are based is a most difficult task. Part of the problem stems from the fact that one way children learn culturally appropriate sex roles is through observation of others, both directly, and indirectly through the various media. Although as more overlap occurs between male and female roles, sex typing will encompass a broader range of options, the cultural models of today still present children with a view of highly dichotomous sex roles.

Another way children learn about themselves and their place in the world is through their day to day experiences. It is clear from this research that one of the things children are learning is that gender is a powerful social attribute influencing where they may go and with whom they may work or play. Although there are differences between individuals and among classrooms, the data suggest well understood social contingencies.

Classrooms provide a potential for change worth further investigation. Although sex-role socialization practices do not originate in the schools, the school program and environment can temper their effects, or elicit and sustain and thereby exacerbate them.

Appendix A

SOCIOGRAM - Name:_____

OPEN SCHOOL CLASSROOMS Class:_____ School:_____

Interviewer:_____

Introduction Date:_____

Hello, I'm_____. I'm going to ask you some questions about children in your classroom. First, let's read this list together of all the children in your classroom. Read. Think about everyone in your classroom. You may choose the same person as often as you wish or you may choose others.

1. If you had some free time to play with anyone in your class, who would you choose to play with?

_____

_____

_____

2. If you were going to work with another child in the room, who would you most like to do math with?

_____ allow # of choices child wishes to make

3. And who would you most like to do reading with?

_____

4. Thinking about all the children in your class, who would you most like to have for a friend?

_____

5. Sometimes in a classroom children have different ideas about what they want to do. When this happens in your classroom, which child is listened to most often by other children?

Any others? _____ Why? _____

_____ Why? _____

_____ Why? _____

6. Is there a place in the room that most of the children in your class like to use?

_____

Who do you think uses it most?_____

Do you use that space?_____

Would you like to use it more often?

Why or why not?

7. What activity in the room is the favorite of most of the children?

Who gets to use that most of the time?

How come?

8. What things in your class would you like to do that you don't do? or things you would like to do more of?

Why don't you do them?

What could help you to do them more?

9. Who in your class gets to do what they want to do the most in this class?

How does that happen?

Appendix B

Figures 1 to 4
Classroom furniture arrangements

Furniture symbols


Animals


Boxes

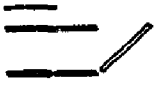

Cabinets


Chairs


Chart / Blackboard


Loft, area 3, rms 11, 15


Painting Easel


Partitions


Pillows / Beanbags


Plants

Radiators


Rugs


Shelves


Tables / Desks


Teacher's Desk


Trashcan

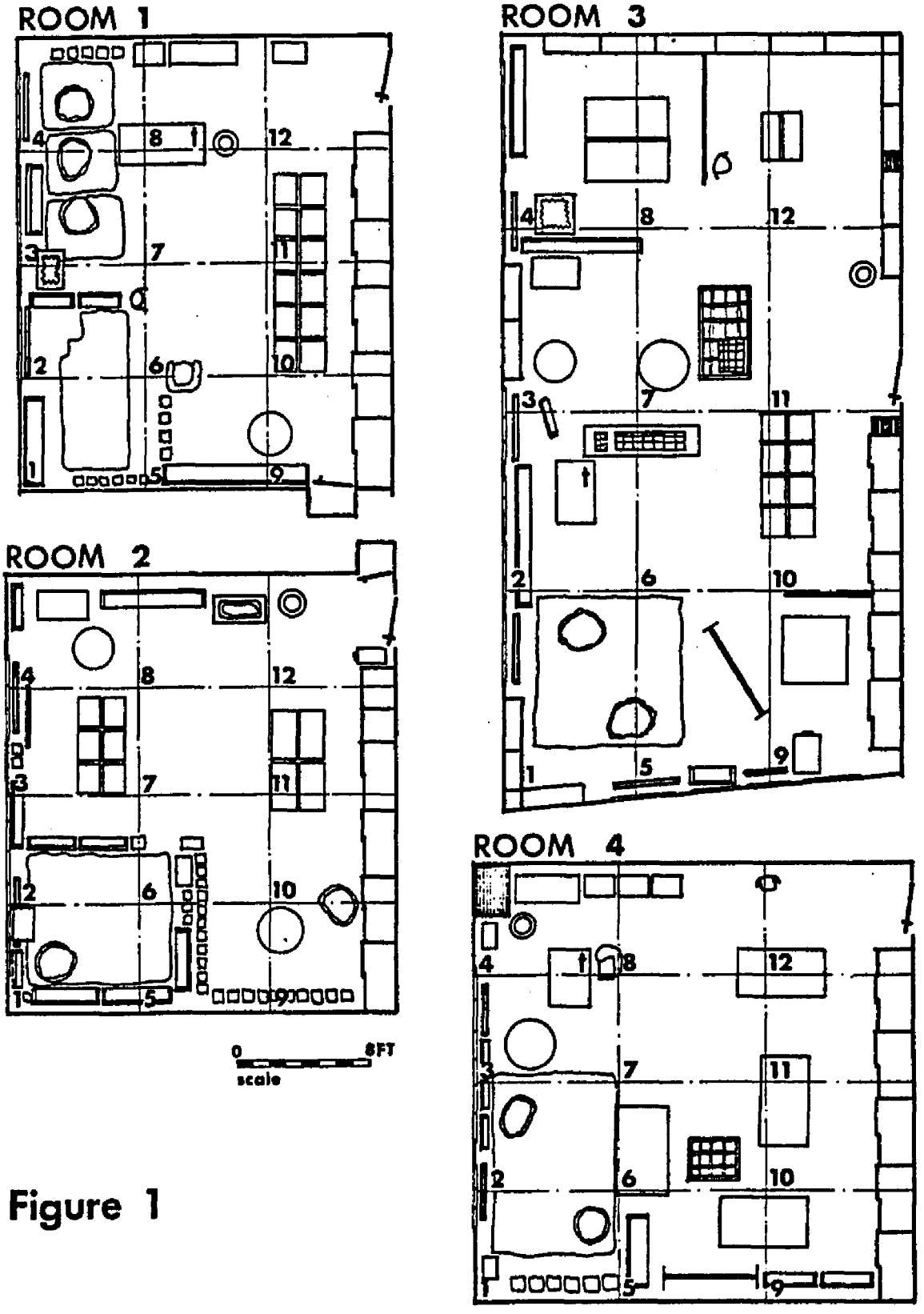


Figure 1

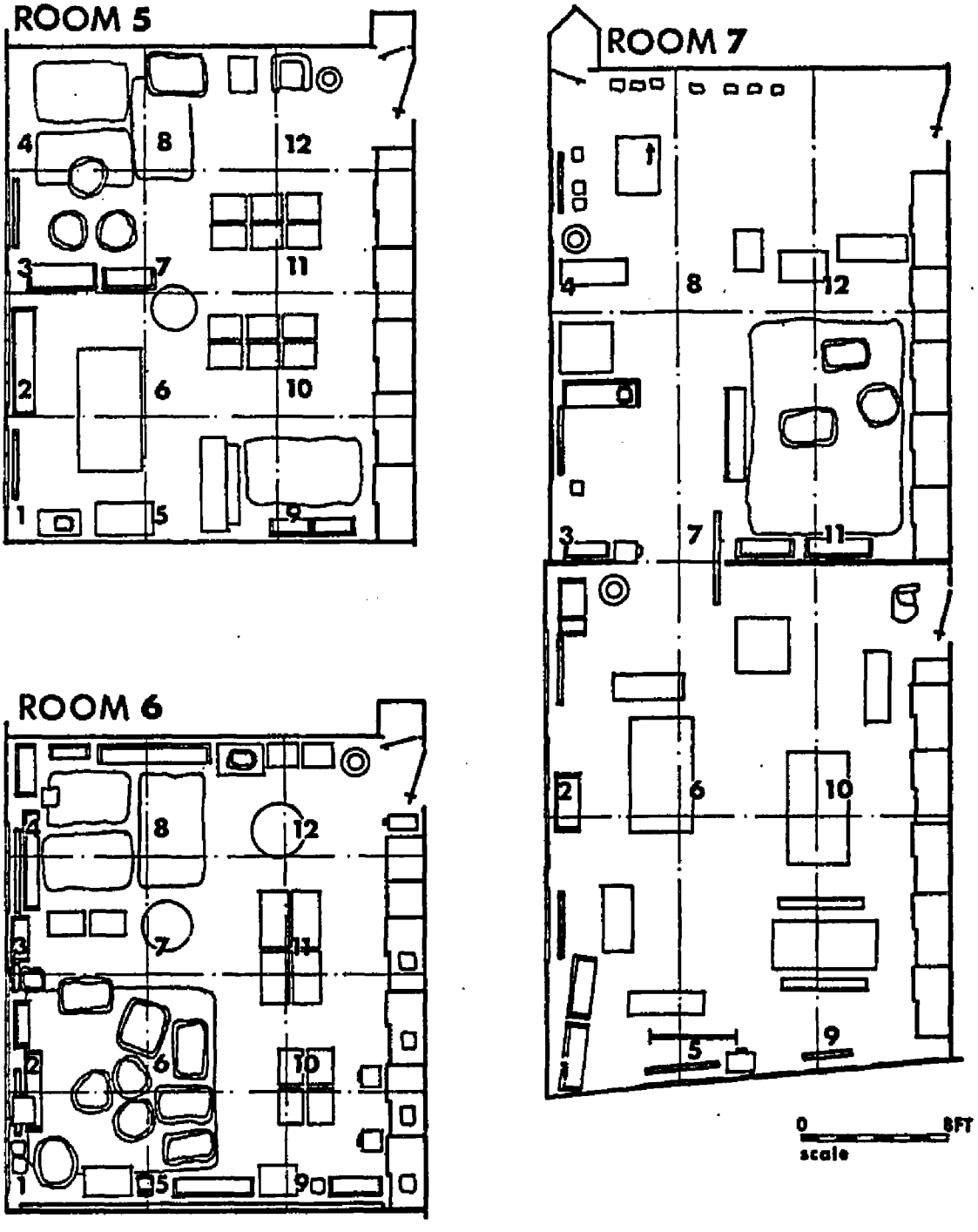


Figure 2

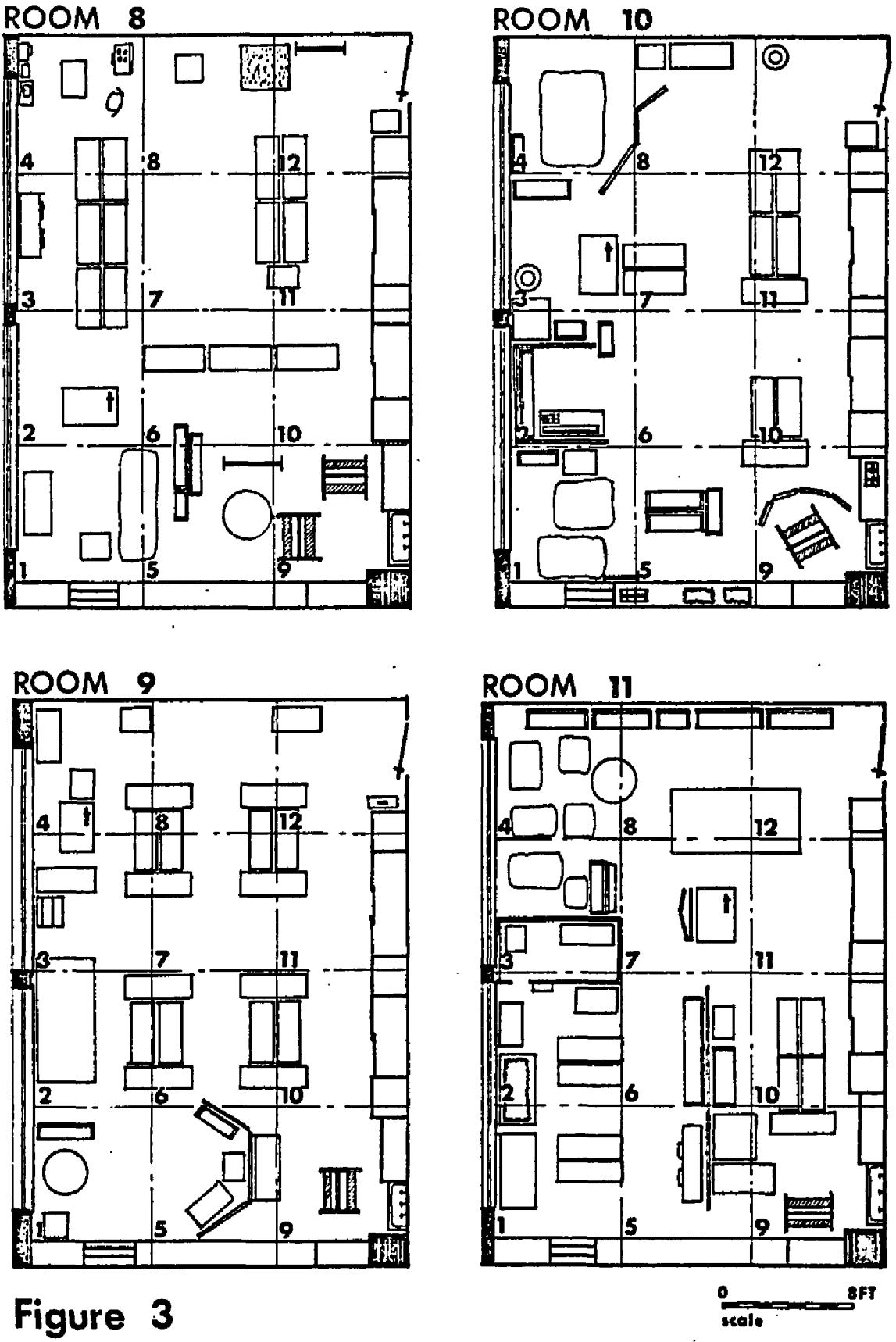
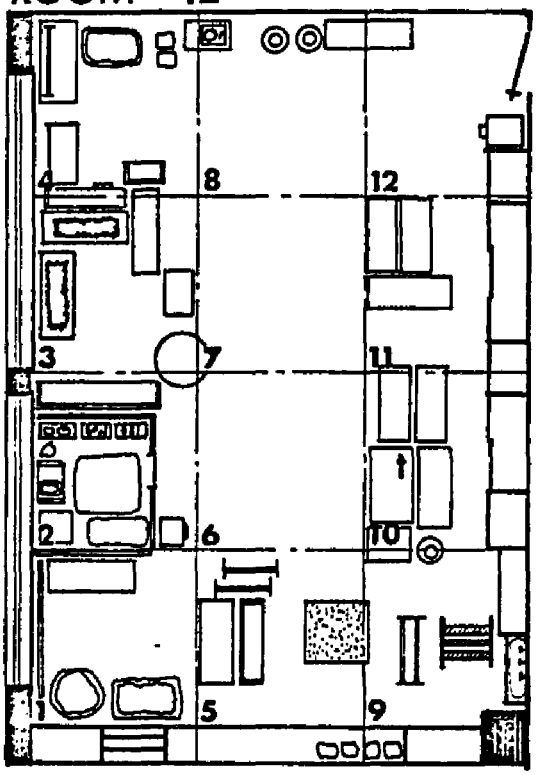
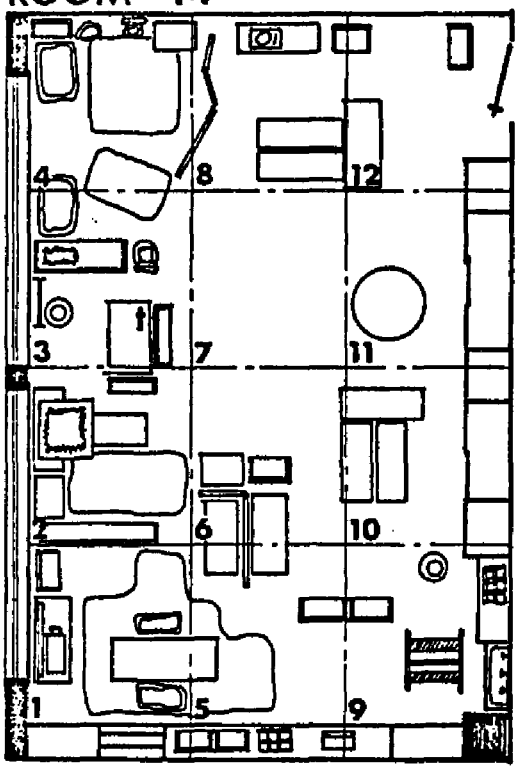


Figure 3

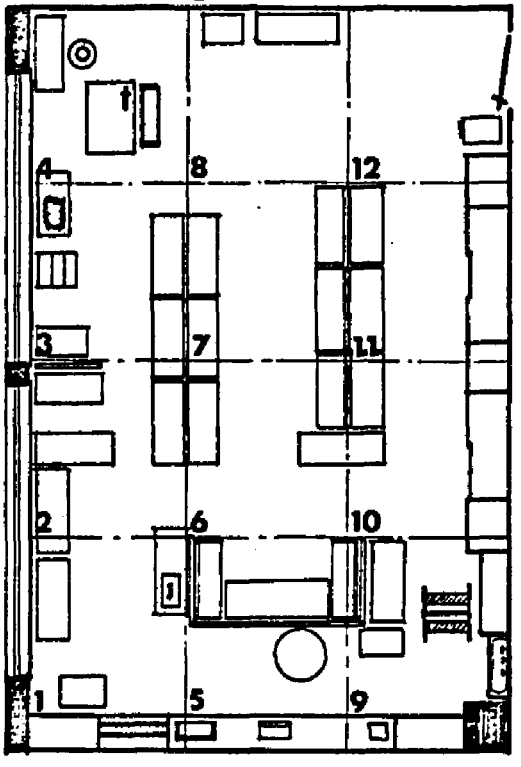
ROOM 12



ROOM 14



ROOM 13



ROOM 15

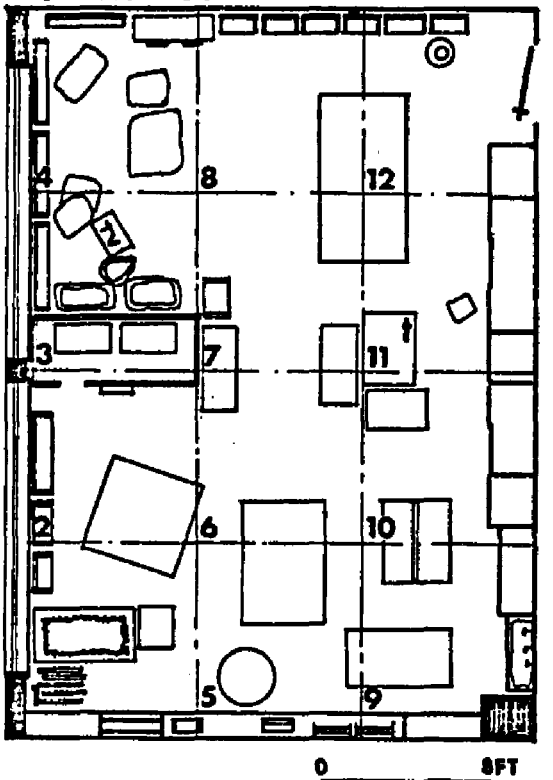


Figure 4

Appendix C

Figures 5 to 8
Classroom grids, showing locations of sex-linked areas and an index of use by each gender

B = boys / **G** = girls	Predominant users
b = boys / **g** = girls	Non-predominant users
1.11	Index of numbers of children based on expected population
x	Segregated by time

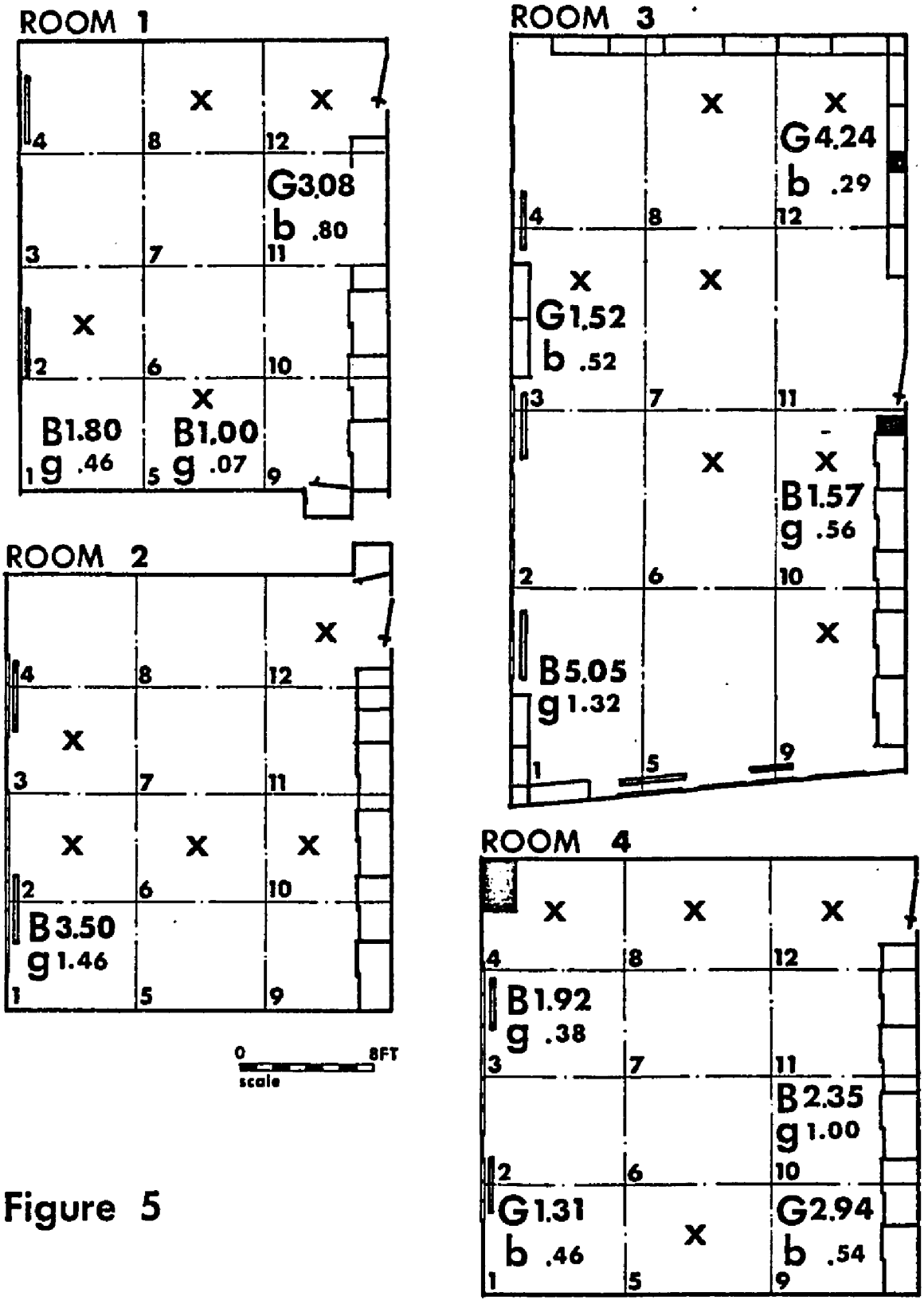

ROOM 1
G3.08
b .80
B1.80
g .46
B1.00
g .07
ROOM 2
B3.50
g 1.46
0
8FT
scale
ROOM 3
G4.24
b .29
G1.52
b .52
B1.57
g .56
B5.05
g 1.32
ROOM 4
B1.92
g .38
B2.35
g 1.00
G1.31
b .46
G2.94
b .54

Figure 5

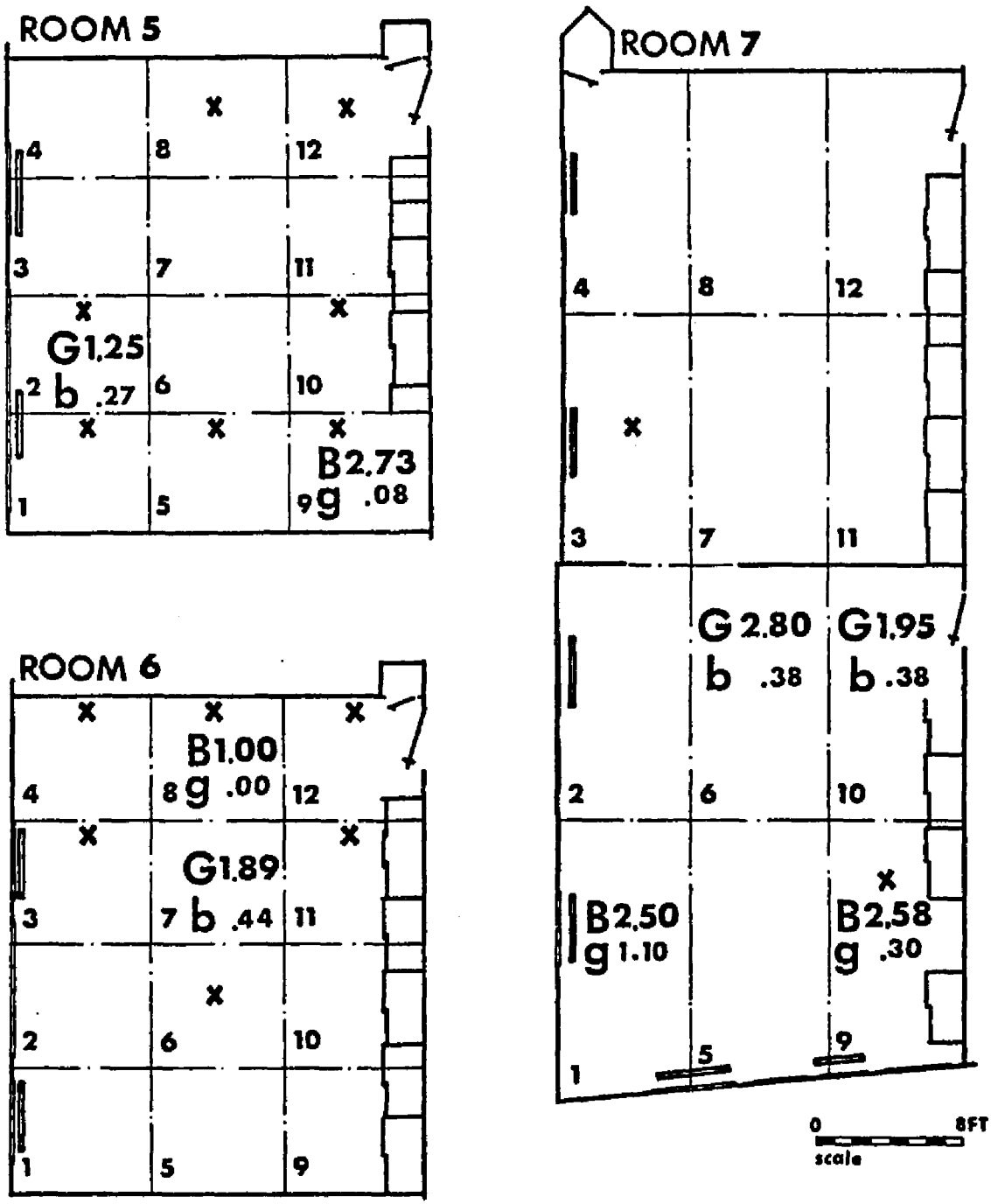

ROOM 5
4
8
12
3
7
11
G1.25
2 b .27
6
10
B2.73
g .08
1
5
9
ROOM 6
B1.00
8 g .00
4
12
G1.89
3
7 b .44
11
2
6
10
1
5
9
ROOM 7
4
8
12
3
7
11
G 2.80
b .38
G1.95
b .38
2
6
10
B2.50
g 1.10
B2.58
g .30
1
5
9
0
8FT
scale

Figure 6

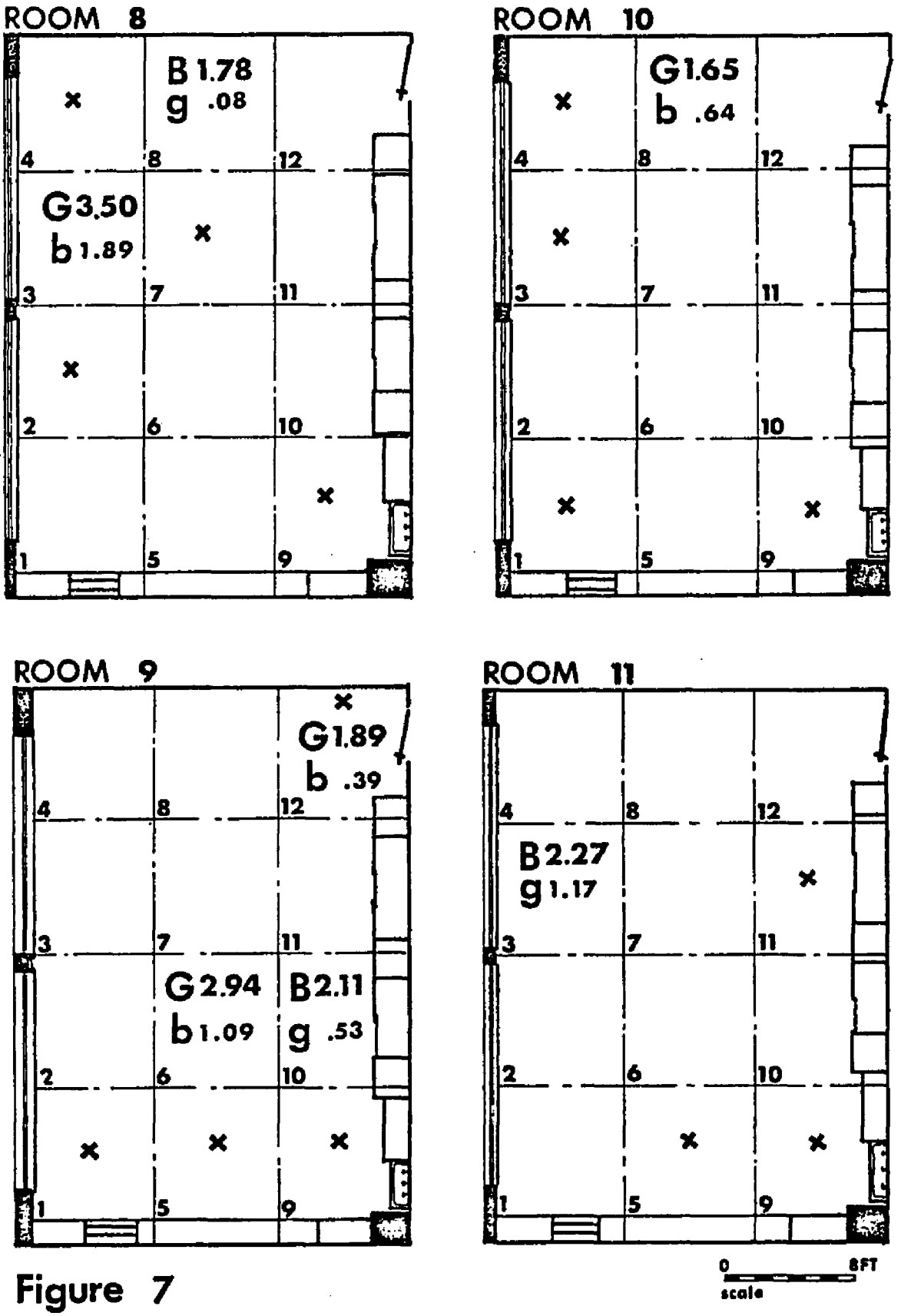

ROOM 8
B 1.78
g .08
G3.50
b 1.89
4
8
12
3
7
11
2
6
10
1
5
9
ROOM 10
G1.65
b .64
ROOM 9
G1.89
b .39
G2.94
b1.09
B2.11
g .53
ROOM 11
B2.27
g1.17
0
8FT
scale

Figure 7

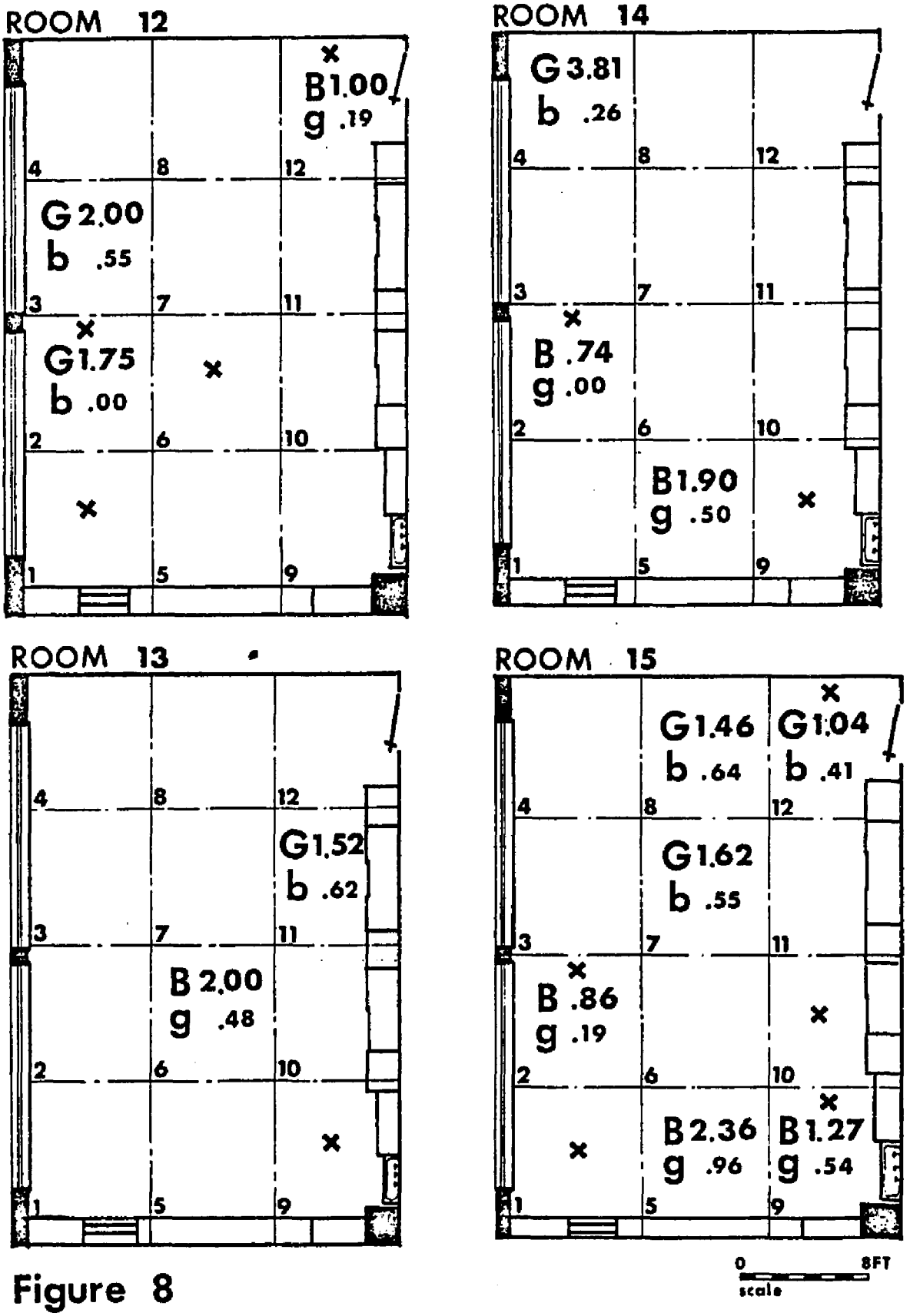

ROOM 12
B1.00
g .19
G2.00
b .55
G1.75
b .00
ROOM 14
G3.81
b .26
B .74
g .00
B1.90
g .50
ROOM 13
G1.52
b .62
B 2.00
g .48
ROOM 15
G1.46
b .64
G1.04
b .41
G1.62
b .55
B .86
g .19
B2.36
g .96
B1.27
g .54
0
8FT
scale

Figure 8

Appendix D

Definitions of Variables for Classroom Summary Sheet

A. Dyad — The percentage of integrated pairs based on all pairs observed in each room.

B. Areause — The percentage of predominant users in sex-linked areas compared to the total number of children observed in each classroom.

C. Sociogram Choices — For each category (except playany) the percentage of cross-sex first choices compared to the total number of first choices.

Playany — The percentage of children selecting at least one child of the opposite gender compared to total number of choosers.

D. Age in Years — Age in years represents average age of children according to grade level.

E. Classroom Areas

Sex-linked - Areas predominantly used by either boys or girls.

Mixed - Areas equally used by boys and girls.

Time Segregated - Areas in which 75% of the observations revealed use by same sex groups.

F. Distance — Average distance (measured in feet) from male areas and female areas to teachers' focal areas.

G. Personal Seating — Classrooms in which children generally retained the same desks and chairs after the initial selection.

H. Sex-linked Favorite Area Classrooms in which both boys and girls selected the same sex-linked area as the favorite of all children.

Table A

Classroom Summary Sheet[a]

Classroom[b]	A Dyad %	B Area Use %	C-Sociogram Choices: Play %	Friend %	Math %	Reading %	Play any %	D Age in Years	E-Classroom Areas by Type (Number of Areas)[d]: Sex-linked Male	Sex-linked Female	Mixed	Time Segregated	F-Distance Areas: Male	Female	G-Personal Seating	H-Sex-Linked Favorite Area
11	32.8	9.3	9.4	9.4	28.1	12.5	25.0	7.5	1	0	8	3	16.25	-		Male
4	22.8	34.3	-c	-c	-c	-c	-c	9.5	2	2	4	4	18.42	29.17	X	
9	22.8	28.2	-c	-c	-c	-c	-c	7.5	1	2	6	4	28.75	20.50	X	
13	22.5	14.9	3.7	3.7	18.5	11.1	25.9	7.5	1	1	9	1	25.00	24.50	X	
8	18.8	18.0	-c	-c	-c	-c	-c	6.5	1	1	6	4	12.50	12.50		
6	15.2	12.1	10.0	10.0	6.7	10.0	16.7	7.0	1	1	5	6	10.92	10.92		
5	14.5	16.1	18.5	7.4	3.7	7.4	33.3	6.0	1	1	5	7	17.33	18.25		Male
14	14.3	26.2	11.1	11.1	22.2	25.9	37.0	7.5	2	1	8	2	16.50	20.72		
12	12.9	17.9	13.3	10.0	0.0	16.7	40.0	6.5	1	2	7	4	16.50	12.25		
15	12.8	35.3	3.7	7.4	18.5	22.2	14.8	7.5	3	3	4	5	26.42	9.58		
7	12.0	41.4	7.1	7.1	7.1	0.0	14.3	9.5	2	2	7	2	49.33	39.00	X	
10	10.2	6.5	3.2	6.5	0.0	16.1	9.7	7.5	0	1	7	4	-	12.50		
2	8.8	14.0	-c	-c	-c	-c	-c	7.5	1	0	6	5	24.50	-		
1	7.9	24.4	7.4	14.8	14.8	14.8	18.5	6.0	2	1	6	4	17.33	15.33		Male
3	5.2	51.4	0.0	0.0	0.0	0.0	0.0	8.5	2	2	4	7	13.75	31.00		Male

[a]Definition of variables on pp. 134-135.

[b]Classrooms listed in order of most to least cross-sex interaction.

[c]No sociogram data for these classrooms.

[d]When total of room areas exceed 12 an overlap between sex-linked and time-segregated areas is included.

Appendix E

Table B

Percentage of Activities Containing Both Boys and Girls by Group Size

Year	Classroom	Group Size			
		Dyads	3-8	8-15	15+
		School 1			
1974	1	7.9	44.1	100.0	100.0
	2	8.8	37.5	100.0	100.0
	3	5.2	14.5	50.0	100.0
	4	22.8	41.5	100.0	100.0
1975	5	14.5	31.0	---[a]	100.0
	6	15.2	28.6	100.0	100.0
	7	12.0	32.5	---[a]	100.0
		School 2			
1974	8	18.8	42.9	---[a]	100.0
	9	22.8	44.8	---[a]	100.0
	10	10.2	35.7	100.0	100.0
	11	32.8	53.3	100.0	100.0
1975	12	12.9	31.4	100.0	100.0
	13	22.5	52.3	100.0	100.0
	14	14.3	59.3	66.7	100.0
	15	12.8	46.2	100.0	100.0

[a]No group of this size observed.

Table C

Ten Highest Ranked Activities Observed in Sex-linked and Mixed Areas

School 1

Boys' Areas		Girls' Areas		Mixed Areas	
Talking	24.3	Reading	21.1	Talking	18.4
Writing	19.3	Arts/Crafts	15.2	Writing	12.9
Reading	10.8	Talking	15.2	Arts/Crafts	10.6
Building	5.6	Writing	13.8	Reading	8.9
Watching Others	4.7	Watching Action	6.9	Working with Materials	6.4
Working with Materials	4.7	Traffic	5.2	Traffic	5.0
Game-sit	4.4	Game-sit	3.8	Teaching	4.4
Playing	4.1	Care of Materials	2.4	Watching Action	4.0
Looking at Objects	2.9	Sitting	2.1	Looking at Objects	2.7
Sitting	2.9	Teaching	2.1		
		Working with Materials	2.1		

School 2

Boys' Areas		Girls' Areas		Mixed Areas	
Writing	34.0	Writing	36.6	Writing	32.9
Reading	17.0	Talking	10.9	Talking	10.8
Talking	12.8	Reading	10.6	Arts/Crafts	9.0
Arts/Crafts	5.7	Arts/Crafts	9.7	Reading	8.9
Working with Materials	4.8	Traffic	4.7	Traffic	6.7
Building	2.7	Care of Materials	2.8	Working with Materials	4.1
Teaching	2.1	Teaching	2.4	Teaching	3.4
Looking at Objects	1.8	Game-sit	2.1	Playing	3.2
Playing	1.8	Sitting	2.1	Care of Materials	2.6
Traffic	1.8	Working with Materials	2.1	Waiting	2.5

Table D

Observed Dyadic Interaction, Sex-linked Area Use and Sociogram Choices: Pearson Correlation Coefficients

	Dyad 1	Areause	Play	Friend	Math	Reading	Playany	Age
Dyad 1	1.0000 p=0.001	-0.3276 p=0.117	0.2331 p=0.245	0.0963 p=0.389	0.6795 p=0.011	0.1288 p=0.353	0.3986 p=0.112	0.0903 p=0.375
Areause	-0.3276 p=0.117	1.0000 p=0.001	-0.4174 p=0.101	-0.3946 p=0.115	-0.1484 p=0.332	-0.3698 p=0.131	-0.4569 p=0.079	0.5894 p=0.010
Play	0.2331 p=0.245	-0.4174 p=0.101	1.0000 p=0.001	0.5284 p=0.047	-0.0141 p=0.484	0.1451 p=0.335	0.7958 p=0.002	-0.5720 p=0.033
Friend	0.0936 p=0.389	-0.3946 p=0.115	0.5284 p=0.047	1.0000 p=0.001	0.3329 p=0.159	0.5371 p=0.044	0.4929 p=0.062	-0.5539 p=0.039
Math	0.6795 p=0.011	-0.1484 p=0.332	-0.0141 p=0.484	0.3329 p=0.159	1.0000 p=0.001	0.4572 p=0.079	0.2717 p=0.209	-0.0058 p=0.493
Reading	0.1288 p=0.353	-0.3698 p=0.131	0.1451 p=0.335	0.5371 p=0.044	0.4572 p=0.079	1.0000 p=0.001	0.4818 p=0.067	-0.4371 p=0.089
Playany	0.3986 p=0.112	-0.4569 p=0.079	0.7958 p=0.002	0.4929 p=0.062	0.2714 p=0.209	0.4818 p=0.067	1.0000 p=0.001	-0.5227 p=0.050
Age	0.0903 p=0.375	0.5894 p=0.010	-0.5720 p=0.033	-0.5539 p=0.039	-0.0058 p=0.493	-0.4371 p=0.089	-0.5227 p=0.050	1.0000 p=0.001

Note: For all intercorrelations with sociogram choices, n = 11. For all other intercorrelations, n =15.

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