DOCUMENT RESUME

ED 449 659 EF 005 938

AUTHOR	Cramer, Robert Joseph
TITLE	Some Effects of School Building Renovation on Pupil Attitudes and Behavior in Selected Junior High Schools.
PUB DATE	1976-00-00
NOTE	138p.; Doctor of Education Dissertation, University of Georgia.
PUB TYPE	Dissertations/Theses - Doctoral Dissertations (041) -- Tests/Questionnaires (160)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Educational Environment; *Educational Facilities Improvement; Junior High School Students; Junior High Schools; Public Schools; *Student Attitudes; *Student Behavior; Student School Relationship; Student Surveys

ABSTRACT

A study of 2,300 junior high school students from three schools determined the effect of a newly renovated school, a new school environment, and an old dilapidated school environment on their attitudes and behavior. Points were assigned to their answers; high scores indicated a positive attitude. Results show attitudes were lowest in the old dilapidated school; highest in the newly renovated school. Dilapidated schools also generated higher disruptive behavior incident scores. Neither space density or grade level had significant effect on pupil attitudes and behavior. Black students had more positive attitudes toward their school than White students. Sex differences in attitudes toward the school building were not significant, but subsets within each school had significant interactions. Finally, students without free-lunch scored higher on the attitude scores than students receiving free lunches. Appendices provide the Our School Building Attitude Inventory, population group separation statistics from each school, a comparison of physical characteristics of the three schools, and buildings floor diagrams. (Contains 47 references.) (GR)

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SOME EFFECTS OF SCHOOL BUILDING RENOVATION ON PUPIL ATTITUDES AND BEHAVIOR IN SELECTED JUNIOR HIGH SCHOOLS

Robert Joseph Cramer

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ROBERT J. CRAMER
Some Effects of School Building Renovation on Pupil Attitudes and Behavior in Selected Junior High Schools
(Under the direction of DR. CARROLL W. MCGUFFEY)

Introduction: The present cost of school building renovation staggers the imagination. If educational planners can justify costly physical environmental changes by indicating to Boards of Education and the public that facility renovation will pay dividends, then perhaps badly needed building funds may be obtained. Additional evidence of the means to obtain improved attitudes and behavior in schools will extend existing knowledge about the effects of the physical environment on pupils and provide school personnel practical support in improving school facilities.

Problem: The problem of this study was to determine the effect of school building renovation on the attitude and behavior of a selected number of eighth and ninth grade pupils.

Conceptual Framework: Environmental behavior modification provided the basis for the conceptual framework of this study. Included in this theoretical base was much of Skinner's (1953) research on the importance of environment as a behavior modifier. Also Lewin's (1938) "Field Theory" indicated that environment was an integral part of the learning process. (p. 215) The later work of Estes (1954), Robert Sommer (1969), and Calhoun (1971) all emphasized the importance of environment as an effector on the residing organism. Recent related studies by McGuffey (1972),

Lovin (1973), and Bothwell (1974) were presented to support the assumption that environment does effect the attitudes and behavior of school children.

Procedures and Methodology: Twenty-three hundred pupils in three junior high schools were tested to measure attitudes toward their school building. When the pupil responded correctly to the test question, he was awarded one point. A high score indicated a positive attitude.

The number of the disruptive incidents occurring in the three school buildings over a one-year period (1974-75) was also recorded. This information allowed a comparison of each school and subsets within each school.

The three junior high schools represented three typical categories of school buildings:

1. Ballard B - Newly renovated school
2. Ballard A - New school
3. Miller B - Old dilapidated school

Pertinent data from the subsets in each school were gathered and analyzed using the Analysis of Variance Technique and Duncan's Multiple Range Test for individual differences.

Findings and Conclusions:

1. Pupils housed in the renovated school scored significantly higher on the attitude inventory than pupils in the new facility and pupils in the old dilapidated facility.

2. Pupils housed in the old dilapidated school scored significantly lower on the attitude inventory than any other

group of pupils involved in the study.

3. Pupils in the old dilapidated school had a higher major disruptive incident ratio per pupil.

4. The "no-free lunch" versus the "free lunch" pupils in the two schools--Ballard A (new) and Miller B (old)--were compared. The pupils without free lunches scored higher on the attitude test than pupils receiving free lunches. Test scores from all pupils receiving lunches indicated that the pupils in Ballard A (new) School had a more positive attitude toward their school building than pupils in Miller B (old) school.

5. Space density in the three schools had no effect on pupil attitudes and behavior.

6. Grade level differences in pupils' attitudes toward their school buildings were not significant.

7. Black pupils had a significantly more positive attitude toward their school building than white pupils.

8. Sex differences in attitudes toward the building were not significant, but subsets within each school had significant interactions.

The most consistent differences present in all pupil subsets studied were the significant differences among pupils housed in the three schools. The findings clearly support the hypothesis that pupils' attitudes were significantly more positive in the newly renovated school than in the other two schools.

SOME EFFECTS OF SCHOOL BUILDING RENOVATION ON PUPIL ATTITUDES AND BEHAVIOR IN SELECTED JUNIOR HIGH SCHOOLS

by

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B.S., University of Georgia, 1949

M.Ed., Mercer University, 1958

A Dissertation submitted to the Graduate Faculty
of the University of Georgia in Partial Fulfillment
of the
Requirements for the Degree

DOCTOR OF EDUCATION

ATHENS, GEORGIA

1976

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Date July 16, 1976

ACKNOWLEDGEMENTS

The author wishes to express his gratitude to Dr. Carroll W. McGuffey, major professor, for his encouragement, scholarly assistance, and continued direction during the course of this study. Without his professional concern and understanding, the writing of this paper would have been extremely difficult. I will always be most appreciative for his yeoman effort in reviewing the study even while experiencing serious personal health problems. Appreciation is also expressed to members of the Preliminary Examination Committee: Dr. Morrill Hall, Dr. Edith Grimsley, Dr. Michael LaMorte, and Dr. Joseph Bledsoe. Their constructive comments and advice assisted in the completion of this dissertation.

A special appreciation is extended to the members of the Reading Committee and Final Oral Examination Committee: Dr. Morrill Hall, Dr. Edith Grimsley, Dr. Joseph Bledsoe, and Dr. Ken Matthews; their friendship and support was a source of strength.

The writer also wishes to express deep appreciation to the Bibb County Board of Education for allowing the use of test scores and data from three of their junior high schools and also for allowing the author to devote time to

this study over the past two years.

The author is deeply grateful to Emmie and the two Karens for their clerical assistance in the completion of this paper.

For her support, encouragement, and love during the period of this study, the author wishes to express special appreciation to Juanita; her faith and devotion provided motivation for completion.

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CHAPTER I

Introduction

The continued existence and progress of the United States of America is a salient tribute to the success of its public schools. The preparation of our society's young in the arts and skills of good citizenship is still one of the most important of our educational goals; however, modern society's permissiveness makes the accomplishment of this goal a difficult task. The process of education is subject to disruptive societal influences, some of which are television, breakdown of the family unit, a relaxation of morality, rise of the ghetto with its inherent poverty, and loss of tax support.

Poor discipline, student disruptive behavior, violence, increased vandalism, and negative student attitudes are all factors that must be taken into consideration by facilities planners and designers as they respond to the educational change of the seventies. New school design and the planning for the modernization of existing schools require a responsible approach to security and a built-in response to potential vandalism and abuse of public property.

Any research that will provide information about the relationship of a pupil to his environment is important to

those who must justify new and renovated facilities in the face of a reduced tax base, increased building costs, and strong taxpayer resistance.

Problem Statement

The problem of this study was to determine the effect of school building renovation on the attitude and behavior of a selected number of eighth and ninth grade pupils.

This study examined pupil attitudes as measured by "Our School Building Attitude Inventory" and behavior as indicated by the major disruptive incidents for a one-year period. Pupils involved were housed in:

1. old dilapidated facilities
2. newly renovated facilities
3. new facilities

The following questions were examined:

1. Is there a difference in the attitudes of pupils housed in a newly renovated school building and those in older, run-down, and dilapidated ones?

2. Is there a difference between the attitudes of male and female pupils toward renovated versus older, run-down, and dilapidated school buildings?

3. What differences, if any, are there in the attitudes of black versus white pupils toward the renovated and older, run-down school buildings?

4. Do pupils at various grade levels reflect different attitudes toward the renovated and older, run-down school buildings?

5. Does the socio-economic level of pupils have different effects on their attitudes toward the renovated building as compared to the older, run-down buildings?

6. Will the incident rate of pupil disruptive behavior be greater in the older, run-down, and dilapidated school buildings than in the newly renovated one?

7. Will differences in the space density of a school have an effect on the attitudes of pupils housed in the school?

Hypotheses

In order to analyze the questions raised in this study, five hypotheses were developed for testing by inferential statistical means. Questions six and seven were analyzed through the use of descriptive statistics and are not stated in hypothesis form.

The five hypotheses were stated as follows:

1. Significantly more positive attitudes will be expressed by pupils who were housed in the newly renovated building than by pupils in the older, run-down, and dilapidated buildings.

2. The attitudes of male pupils will be significantly more negative toward their school buildings than the attitudes of female pupils.

3. The attitudes of black pupils will differ significantly from the attitudes of white pupils when both are exposed to the same environmental conditions.

4. Pupil attitudes toward their school buildings will differ significantly among pupils at different grade levels.

5. Pupil attitudes toward their school buildings will differ significantly among pupils from different socio-economic backgrounds, as measured by the "Free Lunch" and "No Free Lunch" participants' scores on the "Our School Building Attitude Inventory".

Theoretical Background

The theoretical basis for this study was developed from the research findings of numerous researchers, including Skinner, Lewin, Calhoun, Sommer, Hall and others. The theory was best expressed by Churchill when he stated, "Man shapes his buildings and thereafter his buildings shape man."

In examining the available research, a principle of significance stands out: The learner is significantly affected by his physical environment. The physical environment shapes his attitudes, affects his self-concept, has impact on his achievement and has an effect on his behavior.

General

Several researchers made contributions to the theory concerning the impact of the environment on the individual. Lewin (1938), in the development of his well-known "field theory," recognized "that environment was an integral part of the learning process." (p. 215) Skinner (1953)

discussed the changing role of environment and its interaction with the individual as follows:

> Before the Nineteenth Century, the environment was thought of simply as a passive setting in which many different kinds of organisms were born, reproduced themselves and died. No one saw that the environment was responsible for the fact that there were many different kinds . . .
>
> The trouble was that the environment acts in an inconspicuous way: it does not push or pull, it selects. (p. 16)

Skinner (1971) further noted that "it is now clear that we must take into account what the environment does to an organism not only before but after it responds. Behavior is shaped and maintained by its consequences." (p. 18)

Attitudes

Some researchers have studied the effects of school buildings on pupil attitudes. Lovin (1972) reported that there was a significant difference in the attitudes of pupils in grades 4 - 7 who were placed in new, modern, flexible space facilities after previously being housed in older facilities. (p. 65) The question of whether or not the school's physical environment affects pupils' attitudes toward their school building appears to have been answered in the affirmative as inferred from the results of his study.

In still another study, McGuffey (1972) investigated pupil attitudes at the elementary level (grades 2-3). (p. 9) A comparison was made of pupil attitudes towards new, fully carpeted, air conditioned, school buildings and older

existing ones. The results of the McGuffey study showed significant differences in favor of the new, air conditioned fully carpeted schools.

Behavior

Researchers have likewise examined the effects of the school's physical environment on human behavior. In the Spring of 1970, the United States Commissioner of Education made the following statement:

> . . . deportment in an increasing number of urban high schools had deteriorated to a point where the educative capacity of the high school was seriously if not mortally threatened (Bailey, 1969, p. 4).

Bailey included among his in-school causes of school disruption the type of school facilities. David (1975) stated "that the built environment does have an effect on our behavior, an effect which we are only beginning to understand." (p. 178)

Space

There have been numerous research studies analyzing the impact of space on both animals and man. In several classic animal studies including the study of the Sika Deer by Christian, Flyger, and Davis (1960), it was shown that overcrowding causes hyperactivity of the adrenal glands and that this overactivity results in a high mortality rate. (p. 19)

Myers (1971) studied crowding of wild rabbits and reported that "there are large losses of body weight and in

the weights of organs concerned with the metabolic function, an impairment in reproductive conditions and significant changes in adrenal morphology which points to increased rates of secretion of corticoids." (p. 179)

There are few comparable studies of man in relation to environmental overcrowding. Furthermore, as Davis (1971) suggested, "the translation of animal studies to man is fraught with danger." (p. 29)

The Zimbardo (1970) study was one which appeared to deal with the relationship of overcrowded neighborhoods and aggressive behavior. (p. 44) In the study, a car was abandoned in two neighborhoods of varying population density. The passing pedestrians from the densely populated New York City area were the most aggressive toward the automobile. In fact, they reduced it to rubble within 64 hours.

It appears reasonably clear that major environmental scientists and other authorities have documented certain facts that suggest postulates that are pertinent to this study. These postulates are presented as the basis of the problem presented in this study. These postulates are as follows:

1. Man is a creature of his environment and to a larger or smaller degree is affected by it.

2. Pupil attitudes toward the school's physical environment are affected by the condition and quality of the school building in which he is housed.

3. Man is affected by his physical environment particularly where extreme physical characteristics such as crowding prevail.

4. Disruptive behavior in schools may be influenced to some extent by the type and condition of school buildings.

Significance of the Study

School building design has undergone great change during the last half of the twentieth century. The "Little Red School House" disappeared at the turn of the century to be replaced by the standard brick and block, double-loaded corridor building and more recently with "open space buildings." Little attention has been given to the impact of changes in facility designs on the behavior and attitudes of pupils in our schools. Many questions are left unanswered as to the impact of the new types of facilities as well as the growing obsolescence of older facilities.

Bailey (1970) indicated that poor school facilities was considered a major cause of behavioral disruptions in the public schools. (p. 20)

The relationship of worn-out, overcrowded buildings to pupil violence and vandalism was recognized in a 1974 survey by George Gallup. This survey, published in most of the nation's newspapers, listed the lack of proper facilities as one of the leading problems faced by local school administrators as they combat increased violence and

vandalism in the public schools.

The influence on pupil behavior and attitudes due to a changed educational environment has been studied primarily in relation to traditional closed-space and open-space schools. No studies were found that considered attitudinal and behavior changes due to the renovation of existing facilities. Because behavior and discipline have become of prime concern to educators within the past decade, research that will help educators understand pupil behavior as related to disruptive incidences and attitudes toward the school building will be of importance.

A careful review of the pertinent literature indicated that few studies have been published or documented that were concerned with the effect of renovation of buildings on the attitudes of pupils housed in those buildings. Therefore, this study should both contribute to the knowledge in the field and also assist practicing administrators in their educational tasks.

Limitations of the Study

The following are limitations of the study:

1. A school principal and faculty from one school may be more effective in preventive disciplinary measures than a school principal and faculty in another school.

2. Because of teacher assignment practices, all teachers have been assumed to have similar basic characteristics; however, an outstanding teacher at any one of the

project schools could influence pupil attitudes and behavior in a positive way.

3. A principal could over-react in the treatment and classification of minor infractions as major incidents; however, a standard classification scheme was developed and used as a basis for reporting behavioral incidents.

4. The presence of an outstanding curriculum in any one of the schools could have influenced attitudes and behavior; however, county curriculum guides were available in all subject areas.

5. Experimental and control groups could not be randomized; therefore, the population samples studied were intact school populations.

6. The inability to randomize the selection of the population and to use a larger sample of schools makes generalization to other school populations impossible.

Definitions

Attitudes: Pupil feelings toward his school building as measured by scores on the "Our School Building Attitude Inventory".

Behavior: Social conduct of the pupils in the three schools.

Disruptive Behavior: School conduct so abnormal that it causes a disruption of the normal school routine. In this study the following are listed as disruptive offenses:

1. Fighting among pupils
2. Possession of illegal objects

3. Failure to serve assigned detention
4. Smoking or possession of tobacco
5. Possession of or under the influence of drink or drugs.
6. General misconduct - used to describe disruptive conduct that could not be classified in 1 - 5.

Density: Defined for this study as the number of square feet of floor space available for each assigned pupil in average daily attendance.

Renovation: The improvement and partial rebuilding of an old school building to include installing adequate lighting and air conditioning, expanding media center, painting interior, carpeting interior in selected areas, and providing new school furniture.

Environment: The pupil's immediate physical surroundings.

Environmental Matrix: The pupil's surrounding conditions which include visual, thermal, sonic, safety, and sanitary environments.

Socio-Economic Level: In this study, the socio-economic levels are indicated by the "Free Lunch" and "No Free Lunch" pupils.

Sociopetal Reflex: The tendency for groups to be cohesive or be attracted to one another.

Sociofugal Reflex: The tendency for persons or groups to avoid one another.

Summary of Procedures

The location and identification of the population to be studied was the first major step in the sequence of activities. The major renovation of a large junior high school for grades eight and nine provided a unique opportunity to study the effect of school building renovation on a group of pupils who were housed in the inadequate dilapidated building for one year before renovation and who remained there for one year following the renovation.

Two other junior high school buildings and their pupils were selected as controls to allow a comparison. The two control groups selected for the study reflected two distinct types of school physical environments. One school plant was new, opened in 1966; the other was an old converted girls' high school built in 1932. These school plants provided the environmental settings for comparing pupil attitudes.

Instrumentation for the two-year study was organized as follows: An "Our School Building Attitude Inventory" was selected to provide a measure of pupil attitudes toward their school building. This inventory was validated in Georgia utilizing a study of elementary children's attitudes toward their school building. The grade levels of pupils involved in the validation study included 4 through 8.

A record of all the major disruptive incidents was kept over a one-year period (school year 1974-75). The numbers of major disruptive incidents were compared among

the three schools. Race, sex and grade subsets were also compared by schools and by total population. Total means and subset means were recorded for each school population.

Organization of the Study

This study was organized into five chapters. Chapter I included the introduction, statement of the problem, hypotheses, theoretical background, significance of the study, limitations of the study, definitions, a summary of procedures, and finally, organization of the remainder of the study.

Chapter II includes the review of related literature organized into four major areas of environmental consideration:

1. Physical environment and learning;
2. Disruptions in the public schools;
3. Attitudes toward the school building;
4. Effects of spacing or density on animals and man.

Chapter III provides an outline of the procedures used in the study as follows: Introduction, hypotheses stated in the null form, population, data collection procedures, instrumentation and measures used, and the statistical treatment.

Chapter IV contains the presentation and discussion of data, tables, and the analysis of the findings.

Chapter V contains the summary, conclusions, and recommendations resulting from the study.

CHAPTER II

Review of Selected Related Literature

The review of related literature presents the findings from research and provides the conceptual base of this study. One of the major difficulties involved in an environmental study is the question of what should be included in the environmental matrix. Since this research was concerned with the impact of the physical environment on the school child, the question is resolved for this study. The environment defined in this research is concerned with and limited to the physical space surrounding the pupil.

General Background

In reviewing the effect of environmental factors on the learning process and on the socializing function of the school, the researcher was faced with the difficult problem of how to separate areas of the student's environmental matrix. Some basic research on the effect of environment on behavior does not treat physical space and the animal or human interaction within that space in a separate manner, and perhaps it cannot be so treated. The dichotomy of environment and person poses problems difficult to resolve.

Because a part of this study was concerned with pupil

disruptions in the public schools, the review of related literature included documentation of the severity and number of pupil disruptions afflicting the public schools in recent years. A study of the effect of the physical environment on the learning process was a part of the review of literature. Sommer's (1969) "designed for learning" school building is a part of this review along with Hall's (1969) warning that cultural differences must be taken into account as one attempts to determine how a pupil will respond to varied environmental conditions. Other later research projects involving changes in modern school environment and their effect on the housed pupils were included in the literature review.

Pupil attitude toward school building is also a segment of this study. The review of literature has included current research projects to examine elementary children's attitudes toward their new facilities. The review also touched on the Coleman Study (1966), and on the views of Robert Sommer (1969) and Hilgard (1956). All agreed that environment does affect children in many ways. After reviewing the literature, it became apparent that additional study was desirable to measure pupil attitudes toward school buildings.

As this study progressed it appeared that space in general, and space density per se, would be an extraneous variable whose effect would have to be measured as it could not be manipulated or controlled in this study. Accordingly, density and space studies were previewed in selected studies.

The works of Calhoun, (1971), Hall (1966), K. Myers (1971), D. E. Davis (1971), and R. Sommer (1969) were reviewed and documented.

Physical Environment and Learning

A traditional concept of education was that the teacher was the source of all learning. Modern educators now believe that environment also has an effect on the learning process and that pupils themselves must be the source of some of their own developmental learning.

Sommer (1969) discussed a school building area "designed for learning" as follows:

> If the recitation and reproduction of lessons is considered the chief aim of teaching, the traditional equipment of the classroom is perhaps sufficient but if teaching is guiding children to do their own thinking, purposing, planning, executing, and appraising, as recent educational philosophy maintains, then the classroom becomes a workshop, a library, a museum, in short, a learning laboratory. (p. 102)

The "schools without walls" concept was included in Sommer's review of modern and successful areas designed for learning. Sommer (1969) stated "that temporal, spatial, and administrative freedom go hand in hand," indicating that teachers must be allowed the luxury of support and encouragement from superiors in regard to developing a program suited to the spatial needs of pupils. (p. 120) With such support, a superior teacher could accomodate an unsuitable space-time-environment.

Behavioral scientists have made a strong case for the

integration of facilities environment into the total learning and emotional growth of pupils. Man through advancements in technology can now control his environment; so the hour is late for learning the true meaning of environmental influence on the learning process.

The U. S. Office of Education sponsored a study to determine the effect on learning that would occur when pupils were housed in an underground school structure for a period of time. The study involved approximately 500 fourth, fifth and sixth grade pupils in selected schools in New Mexico. Results indicated that the environmental shift to the underground school shelter had no adverse effect on the learning process of the 500 students (Lutz, 1964, p. 18).

Larson (1965) conducted a study to determine the effect of windowless classrooms on school children and concluded that no consistent pattern of performance was detected which could be attributed to the presence or absence of windows. A number of studies involving the effect of carpeting on pupil behavior and learning have been documented. Conrad and Gibbons (1963) concluded that pupils in grades 1, 2, 3, and 5 showed greater mean yearly growth in achievement but that taken together, these grade groups did not show statistically significant growth. (p. 18)

Caffarella (1973) recently reported "that the educational facility can effect learning generally and can effect interpersonal communication specifically." (p. 4) This same

study, however, also pointed out that no conclusive implications can be drawn because of the lack of data and research studies dealing with the specific subject of educational facilities and their effect on social and emotional learning. (p. 12)

In the Coleman Study (1966), a new environmental concept was discussed; that is, a sense of control by pupils over environmental conditions. (p. 16) In his study of disadvantaged groups, Coleman found that a sense of control over environment was strongly related to achievement. If the ghetto child felt that his environment was unresponsive to reasonable efforts by him to change or improve it, then his academic achievement was also low. This lack of a sense of control over the environment was a major characteristic of the ghetto child. Coleman (1966) concluded that school facilities were not among the relevant variables that explained the inequalities of ghetto children's school achievement. (p. 20) However, other studies have shown that school facilities were a significant factor in the child's total environment; therefore, the ghetto child's sense of control over his environment would logically include his physical environment.

Hilgard (1956) discussed learning theories and environment and how they mesh:

> The organism seeks a perceptually stable environment in a fashion somewhat parallel to that in which it seeks an internally stable environment. There is a kind of environmental homeostasis parallel to physiological homeostasis. The

> equilibrium is a dynamic one and the external environment like the internal one is ever changing. The organism tolerates perceptual differences between night and day as it does not accept an environment that distorts too rapidly. If a man's perceived environment distorts too rapidly he gets upset or seasick. (p. 466)

Perhaps the search is for a point in environmental change that is similar to the rapid distortion described above. It may be that at this point the environmental press on behavior and learning is at its peak.

Bruner (1966) in listing his benchmarks about the nature of intellectual growth made the following comments about the importance of environment in regard to the growing, learning child:

> Growth depends upon internalizing events into a "storage system" that corresponds to the environment. It is this system that makes possible the child's increasing ability to go beyond the information encountered on a single occasion. He does this by making predictions and extrapolations from his stored model of the world. (pp. 4-5)

This storage system discussed by Bruner as the child's model of the world must have its beginning in the environment that surrounds the growing child.

"Incidental learning" is described as learning that takes place unconsciously outside of the formal setting of the classroom. Shaffer (1956) stated that "the concept of unconscious learning represents a very great discovery of modern psychology for which we are mainly indebted to Sigmund Freud." (p. 139) Under certain circumstances incidental learning can become a significant supplement to formal

learning. Old buildings with broken windows, faded, peeling paint, dingy dark halls, wooden dusty floors, desks with knife-scarred tops and expanded metal covered windows are poor stimulators of incidental learning.

Sommer (1969) discussed the state of knowledge about classroom design and environmental learning:

> If we know little about what goes on inside classrooms we know even less about what happens between classes, after classes, in school clubs and to the student who does his homework as the radio on his dresser blares away. To understand the institutionalized learning process requires us to deal with a complex ecosystem that includes the community, the school building, as well as the classroom. (pp. 118-119)

In examining closely the physical environmental influences on the pupil, one does well to heed the ideas expressed by Sommer (1969). The pupil's reaction and adjustment to his close physical environment may be colored and changed by factors in his greater and all-encompassing total environment that may well include a segment of the "violent society" of contemporary America. This means then that when the pupil's adjustment to his school's physical environment is explored, it should be done on an individual basis, fully expecting a variety of reactions and adjustments that will run the gauntlet from total awareness to complete indifference. Cultural differences are of extreme importance in the realm of environmental reaction, yet there is a tendency to overlook or minimize cultural differences. Hall (1966) discussed the cultural dimension:

> More important we have consistently failed to accept the reality of different cultures within our national boundaries. (p. 183)

The complexity of the basic environmental matrix and man's response to it becomes all to apparent when pupil's individual reactions to environment are perceived. At least one of the basic problems is to gain an understanding of each pupil's unique cultural background. Hall (1966) pleaded for this very understanding at the close of his book:

> The ethnic crisis, the urban crisis, and the education crisis are interrelated. If viewed comprehensively all three can be seen as different facets of a larger crisis, a national outgrowth of man's having developed a new dimension -- the cultural dimension -- most of which is hidden from view. The question is how long can man afford to consciously ignore his own dimension. (pp. 188-189)

Educators and architects must understand and appreciate the cultural background of pupils who will be housed in the educational facility that is being built or renovated. Pupils originate from many types of cultural backgrounds and each pupil brings his unique response to the physical environment. This environment should reinforce the learning situation and support a positive emotional climate.

Disruptions in the Public Schools

Pupil disruptive behavior in our nation's schools has become a serious educational problem. A number of studies have provided statistics that detail the magnitude of the problem. A former Supreme Court Justice Arthur J. Goldberg believed that societal causes contributed to violence in our schools. His statement, "When we justifiably decry violence

on our campuses and schools, we should remind ourselves as adults that - students have been brought up in a violent society" (Disruptions . . ., 1971, p. 13).

While Justice Goldberg indicated a belief in a casual relationship between society and school violence, some of the research reviewed treated man's closer relationship to his physical environment.

Altman and Haythorn (1965) discussed man's relationship to his physical environment as follows:

> We see our research as demonstrating the two way relationship between man and his environment . . It acts upon him and he acts upon it. Neither is more important, but, until recently, social psychologists concerned with interpersonal relationships seemed to focus more upon the environment as determinant. Our isolation work and that of many others in other areas, clearly indicates the role of the physical environment as an important press on interpersonal behavior. (p. 411)

Research of this type would seem to support the broad hypothesis of this study that school children are affected in a way, positive or negative, by their environment.

In a study of disruptive behavior in urban public secondary schools, Dr. Allen F. Westin, Director of the Center for Research and Education in American Liberties at Columbia University, reported that 348 high schools in 38 states had undergone some form of disruption between November 1968 and February 1969, and that an additional 239 schools had suffered serious episodes (Bailey, 1970).

In 1969, the House Subcommittee on General Education sent a questionnaire to all the nation's 29,000 public,

private, and parochial high schools. The number of responses exceeded 50 percent which included more than one-half of the nation's public high schools. Of those responding, 18 percent had experienced protests and pupil violence (Bailey, 1970). A survey by George Gallup (1974) showed the trend in pupil violence to be increasing. (p. 8)

In each of the major studies of pupil disruption completed within the past ten years, one of the prime factors cited as leading to student protest and violence was a lack of proper physical facilities. A direct quote taken from one of these studies follows, "We merely note that overcrowding together with its attendant noise and fatigue provide a ripe climate for disruption" (Bailey, 1970, p. 28).

Bailey (1970) stated the major causes of disruptions are divided into two main areas as follows:

Societal Causes of Disruption

1. Violence in America;
2. The success of Civil Rights protests in the 1960's;
3. Visibility and apparent success of college protests;
4. The expression of ethnic/racial pride;
5. Participatory democracy;
6. Slum life styles;
7. Black revenge;
8. Racism: Black and white;
9. Situation ethics and the "new permissiveness";
10. The television generation.

In-School Causes of Disruption

1. Student involvement in policy;
2. Poor school facilities;
3. Restrictions on behavior;
4. Cross-culture classes;
5. Classification of students and career counseling;
6. Increasing politicalization of school. (p. 20)

From the above list of probable causes of disruptions, it appears that the school receives as many problems from society as are generated within the school.

Most writers agree that the causes of disruption in schools are complex and that strategies for response must be developed regardless of whether the problems are "in-house" or "in society".

Disruptions in Southern schools during the past ten years have been related to the efforts to desegregate the public schools. The desegregation of the public schools in the South has made significant progress. Many of the junior high schools, senior high schools, and a large number of elementary schools have been desegregated. Although the problems of integration have subsided, violence and disruptions have not decreased in the public schools; they have increased (Gallup, 1974). Some see this present problem of violence as a problem of contemporary society.

Some of the researchers envisioned a society in which physical environment reflected the values and aspirations of a modern society. Craig (1966) at an environmental

conference stated:

> The rapidly developing new fields of environmental behavioral science, e.g., environmental psychology, behavioral geography, environmental sociology, through seeking to advance knowledge of interplay between human behavior and the everyday physical environment, will inevitably contribute to a realization of the humanistic goal of a better physical environment, by clarifying implicit behavioral assumptions embedded within professional practice, overcoming social and administrative distances between professionals and user clients, and conducting follow-up evaluation of the behavioral consequences of planning and design decisions. Surely the vision of an everyday physical environment which truly reflects the values, activity patterns and aspirations of its society through the constant, sensible effective monitoring of its past performance and behavioral impact would appear to be a modest goal, even in light of steadily increasing social and technological complexity. (pp. 320-322)

Other behavioral scientists explored the aesthetic effects of the environment through imaginative and varied techniques.

Mason and Mintz (1956) studied the aesthetic effects of the environment on people within different types of environment. Their finding showed that people housed in the "beautiful" room tended to rate photographs of people more positive than people who were housed in the rooms labeled "average" or "ugly." (p. 248)

A study in which serendipity was important was conducted at Western Electric Company by Roethlisberger and Dickson (1939). It is noted primarily for the discovery of the "Hawthorne Effect." The study showed that production rose as working conditions improved; inversely, as working conditions were made worse, production still continued to go up.

This has been interpreted to mean that environment does not make any difference -- that it was all a placebo effect. Sommer (1969), however, takes exception to the preceding interpretation and suggests that the Western Electric Study showed conclusively that environment did make a difference and that almost every change in environmental condition had its effect on the workers and their production. What the study did demonstrate was that there is no simple relationship between single environmental elements and complex human behavior. The effects of environmental changes are mediated by individual needs and group processes.

Attitudes Toward the School Building

Pupil attitudes toward the school building is an important part of this study. The review of literature has included current research projects which examine elementary children's attitudes toward their facilities. The review also touched on the Coleman Study (1966), and on the views of Robert Sommer (1969) and Hilgard (1956). All agreed that environment does affect children in many ways. In reviewing the literature, it became apparent that additional study was desirable to measure pupil attitudes toward school buildings.

How much human aggression and violence can be directly attributed to environmental press is a matter of conjecture. However, man is affected by his physical surroundings. A study completed by Lovin (1972) in Middle Georgia explored the attitudes of elementary children who had moved from a

traditional school to an open space school. In this study of school children reacting to their school environment, it was shown that they were keenly aware of their school building and responded positively to bright and comfortable surroundings. (p. 58)

Lovin (1972) recorded direct comments made by fourth through seventh grade children who were moved into a new open space school

Fourth Grade Remarks

"I like this building a whole lot."

"It is prettier and brighter."

"I think it is a good building."

Fifth Grade Remarks

"I feel good; it's bright and cheerful."

"The carpet and lights help me learn better."

"I like the moving walls."

Sixth Grade Remarks

"I like everything."

"It's not junky and dark."

"I would put in some windows."

Seventh Grade Remarks

"I like it very much; I love it here."

"I like the spaciousness and the carpet."

"It's not crowded, we have more room." (p. 59)

Lovin (1972) explored the effect of the school's physical environment on the attitudes of elementary children. "The question of whether or not the school's physical

environment affects the attitudes of pupils toward that environment appears to have been answered in the affirmative," stated Lovin. (p. 65) Lovin based this conclusion on the fact that the experimental group scored significantly higher than the control group on tests of attitudes given after the experimental group had moved into a modern school facility.

Sommer (1969) looking at school environment and the effect that types of school environment have on pupils, made this observation about corridors, cafeterias, and study halls: "large homogeneous areas lacking lines of demarcation barriers or obstructions make it difficult to mark out and defend individual territories." (p. 51) This observation implied a loss of a sense of control over school environment.

The Coleman Report (1966) indicated a high positive correlation between a sense of control over environment and pupil achievement. (p. 320)

The McGuffey Study (1972) was the only one that was found to concentrate solely on pupil attitudes toward the school building. His study of pupil attitudes showed a significant preference for the new building over the old building.

Effects of Spacing or Density on Animals and Man

Students of behavior and environment believe that man's sense of space is closely related to his sense of self and to his self-concept. Educators in recent years have

assigned a number of definitions to the term "self-concept." Bledsoe and Garrison (1962) indicated that it was an individual's perception of himself. Purkey (1970) said that "self-concept" is a complex and dynamic system of beliefs which an individual holds true about himself. Combs (1962) indicated that the individual expresses himself with his behavior.

Hall (1966) continued the discussion of the relationship of man's self with his environment indicating how urban man relates to his surroundings:

> Man's relationship to his environment is a function of his sensory apparatus plus how this apparatus is conditioned to respond. Today one's unconscious picture of one's self - the life one leads, the minute-to-minute process of existence is conducted from bits and pieces of sensory feedback in a largely manufactured environment. Americans who live urban and suburban lives have less and less opportunity for active experiences of either their bodies or the spaces they occupy. Our urban spaces provide little excitement or visual variation and virtually no opportunity to build a kinesthetic repertoire of spatial experiences. (p. 63)

Hall's (1966) studies linked aggression with crowding and the proper use of space by man and animals. He discussed aggression as follows:

> Aggression is an essential component in the make-up of vertebrates but to insure survival of the species, aggression must be regulated. This can be done in two ways: by development of hierarchies and by spacing. (p. 14)

In discussing spacing, Hall (1966) makes use of the term "personal distance" as defined by Hediger: "Normal spacing that contact animals maintain between themselves and their

fellows." (p. 13) Spacing in the school environment would refer to the physical separation of pupils in the classroom. This setting should provide the "personal distance" needed.

Calhoun (1971) stated that:

> Space has value to life as a continuum which contains resources and provides experiences. Effective utilization of resources has culminated in the evolution of both aggressive defense of area and the formation of groups which share the same range. The presence of others within his extended ego boundary may generate anxiety and produce defensive antagonism. (p. 334)

The preceding statements by Calhoun are a plea to recognize the importance of spatial environment as it relates to the emotional well-being of animals and of men. Most pupils, it should be noted, spend at least six hours of their time in the spatial environment of the school building.

A direct result of overcrowding in personal space among lower animals is the creation of the "behavioral sink" (Calhoun, 1971). Calhoun (1971) developed this concept in his study with rodents. (p. 336) The sink develops when group size is above the optimum in a four-cell universe. In this overcrowded universe a strange pattern of eating develops. After a few weeks most of the rodents use the same feeder while two of the four feeders are not used at all. Calhoun (1971) explained:

> When the universe is overcrowded the chance that one animal feeding will be joined by another is very probable, after a number of such coincidences of joint eating in close proximity, each individual comes to associate the presence of another with the reward of eating. This association becomes so strong in time that the eating

> situation is redefined by the mice as requiring the presence of an associate. This need for proximity to others becomes pathological. This condition caused gross distortions of behavior among the universe. (p. 336)

Calhoun indicated that experiments with rodents and the "behavioral sink" should tell us how not to design an environment, and it also points to the detrimental consequences of a static environment.

Myers (1971) studied wild rabbits and reported:

> Adult rabbits of both sexes respond to crowding in ways similar to those measured in other mammalian species. There are large losses in body weight and in the weights of organs concerned with metabolic function, an impairment in reproductive conditions and significant changes in adrenal morphology which point to increased rates of secretion of corticoids. (p. 179)

Man is similar to lower animals in his adaptations to his environment. However, man in his evolution shifted from reliance on the nose to reliance on the eye. This simple change completely redefined the human situation. It allowed man to plan and to code vastly more complex data and thus encouraged thinking in the abstract. For this reason man's adaptation to his environment is vastly more complicated than that of his fellow creatures. Man's sense of space is closely related to his sense of self engaged in an intimate transaction with his environment. Man can be viewed as having visual, kinesthetic, tactile, and thermal aspects of his self which may be either inhibited or encouraged to develop by his environment. (Hall, 1966, p. 63)

In several classic animal studies including the study

of the island population of Sika Deer by Christian, Flyger, and Davis (1960, p. 19), and the Woodchuck Study by Christian (1964), it was shown that overcrowding causes hyperactivity of the adrenal glands and that this overactivity causes a high mortality rate. There are no comparable human reactional studies to environmental overcrowding except the Rolfe and Zimbardo Studies. Zimbardo (1970) used an abandoned car with hood up and plates removed to measure the effects of overcrowding on humans from two neighborhoods of varying population density in New York City and Stanford, California. The most aggressive behavior toward the car was shown by the passers-by from the denser population area. In fact the passers-by from the more dense New York City area reduced the car to rubble in 64 hours.

Numerous environmental animal studies point to the fact that crowding per se is neither good nor bad, but rather that overstimulation and disruptions of social relationships as a consequence of overlapping personal distances lead to population collapse. Hall (1966) introduced a term called "proper screening." He indicated that proper screening can reduce both the disruption and the overstimulation, and permit much higher concentration of populations. Hall contended that rooms, apartments and buildings provide screening in our cities. This screening works until several individuals are crowded into one room, then a complete reversal tends to take place. The walls no longer screen, they tend to press inward on the inhabitants. (p. 160)

Rolfe (1961) studied the use of school space and found that teachers were quick to react to changes in the size of classroom space and all expressed enthusiasm about more classroom space:

> Their classroom made them feel there was no limit to what they could do if they desired. They said there was space for large and small group work, for dancing and for project work. Pupil's desks were easy to move to clear space for activities and for group work. They were quick to emphasize, however, that the large classroom had not changed their teaching methods. (p. 279)

Man's reaction to his environment is much more complicated than other mammals, and some researchers have provided warnings. D. E. Davis (1971) stated, "the translation of studies of other mammals to man is fraught with danger." (p. 29)

Summary

The review of literature has examined pupil attitudes and self concepts, man's relation to his physical environment, and the impact of crowding or space density. The effect of environment on man and animals was reviewed and carefully compared. Conclusions of major environmental scientists and other authorities document certain facts and unanswered questions under consideration in this study. While the evidence is not conclusive, the following postulates appear to be supported:

1. Man to a larger or smaller degree is a creature of his environment -- he creates it and it in turn affects him.

2. Man is affected by his physical environment

particularly where extreme physical characteristics such as crowding prevail.

3. Studies support the positive effects of an improved physical environment on pupil achievement.

4. Studies also support the hypothesis that new school facilities improve the attitudes of pupils.

5. Authorities agree and support the concept that disruptive behavior in many schools may be influenced by the poor condition of old school facilities.

Chapter III

Methodology

Introduction

The purpose of this study was to determine some of the effects of the renovation of an old school building on the attitudes and behavior of selected junior high school pupils. The school building in which the experimental pupil group was housed was renovated during part of the first school year and completed during the summer. The two control groups were housed in an old, rundown school and in a new school. These two groups were used for comparison.

The research data were carefully analyzed in an effort to arrive at a satisfactory and meaningful research design and procedure. Some factors which determined procedures used in this study were:

1. The type and kind of data collected
2. The selection of testing instruments
3. The most appropriate statistical analysis
4. The population used in the study
5. The minimum time period required for the study

Null Hypotheses

Five major hypotheses were developed for this study and all are restated below in the null form. The accepted level of significance for rejecting or retaining a null hypothesis was established at the .05 level. When the findings showed a significance greater than the .05 level, it was included for the reader's interest.

Hypothesis one. The attitudes of pupils housed in the newly renovated school building do not differ significantly from the attitudes of pupils housed in older, rundown school buildings.

Hypothesis two. The attitudes of male pupils and the attitudes of female pupils toward the three school buildings do not differ significantly.

Hypothesis three. Black and white pupils' attitudes do not differ significantly when exposed to the environmental settings of the different buildings included in the study.

Hypothesis four. Grade level differences in attitudes do not differ significantly among the pupils tested in their individual environmental settings -- the old school, the new school and the renovated school.

Hypothesis five. Pupils' attitudes toward the two schools, the old school and the new school, do not differ significantly among pupils from different socio-economic levels as measured by the "free" and "no-free lunch" participants' scores on the "Our School Building Attitude Inventory".

The Independent Variable

In this study one independent variable was the physical facilities of the junior high schools located at: 1) Ballard B; 2) Ballard A; and 3) Miller B. Other independent variables were grade level, sex of pupils, race of pupils, and pupils receiving "free" or "no-free lunches."

The Dependent Variable

In this study the measures of the dependent variables were the scores on the "Our School Building Attitude Inventory" and the number of disruptive incidents caused by pupils in the three schools.

Treatment of the independent variable to create an effect on the dependent variable took place only in the Group I (Experimental) pupil group housed in the newly renovated school.

Population

Table 1 provides a general description of the pupil population in the Experimental Group - Ballard B, Control Group 1 - Ballard A, and Control Group 2 - Miller B.

The experimental group population selected for this investigation consisted of 1,306 pupils in grades eight and nine. This was the total enrollment of an integrated junior high school in a city school system in Middle Georgia. Further analysis of the experimental population indicated a racial ratio of 48% black and 52% white. The enrollment showed 712 eighth graders and 594 ninth graders.

Table 1

Experimental and Control Group Population by Sex, Race, Grade and School

		Experimental Gp. (Ballard B) Renovated	Control Gp. 1 (Ballard A) New	Control Gp. 2 (Miller B) Old
EIGHTH	Black	320	217	197
	White	392	380	148
	Total 8th	712	597	345
NINTH	Black	303	189	187
	White	291	323	136
	Total 9th	594	512	323
SUB-TOTAL	Black	623	406	384
	White	683	703	284
GRAND TOTAL ENROLLMENT		1306	1109	668
TOTAL INVENTORIED		998 (76%)*	878 (79%)*	410 (61%)*
	Females	526	454	194
	Males	472	424	216

* Percent of enrollment that completed inventory

Grade nine pupils in the renovated school had been in the facility for two (2) years at the end of May, 1975. Eighth grade pupils were housed in the renovated facility for one year; so they had no experience in the facility before it was renovated.

Control Group 1 was selected from a junior high school in the same section of town as the experimental group with approximately the same age, grade, and race distribution within the school population. Control Group 1 population was shown in Table 1, Column 2.

Control Group 1 was the pupil group that had a two-year experience in the new school facility. This group consisted of the ninth grade shown in Table 1, Column 2 with the 512 pupil total. This control group was used to provide a comparison of the major disruptive incidents among the pupil population groups over the two-year period.

Control Group 2 consisted of the total pupil population of a junior high school housed in an old, three-story high school building constructed in 1932. This building has needed renovation for some time. The pupil population of this school had approximately the same age, grade and race distribution within its school population as the other two schools. The Control Group 2 population was shown in Table 1, Column 3.

The group which had a two-year experience in the Control Group 2 facility was the ninth grade (school year 1974-75) represented in Table 1, Column 3 by the ninth grade line totaling 323 pupils. This group was used as Control Group 2 housed in an old, non-renovated facility.

School Characteristics

During the period September 1973 through June 1974, three quarters of a million dollars was spent on the renovation and modernization of the school facility which housed the experimental group. This renovation and modernization consisted of the following:

1. Addition of complete central air conditioning.
2. Addition of new fluorescent lighting in the building.
3. Carpeting in eighteen (18) classrooms.
4. Epoxy painting throughout the building.
5. New automated heating system.
6. New vinyl asbestos tile in forty (40) classrooms.
7. Lay-in ceiling in sixty (60) classrooms and in the corridors.
8. Total library renovation including 2,500 square feet of carpet in the library, new furniture, shelving, and library equipment.
9. Newly renovated guidance area.
10. Removal of all but one exterior window in each classroom.
11. Doors cut between groups of three classrooms to allow interaction and team-teaching procedures to be utilized in 20 classrooms.

The school facility that housed the Control Group 1 population was a junior high school facility which was first opened in 1967. It was a modern, climate-controlled, split level school building, constructed in the traditional style.

The school facility housing the Control Group 2 population was a three-story, brick school building constructed in 1932 as an all girls' high school. It contained classrooms with high ceilings, incandescent lights and wooden floors. As in most old school buildings, it had wide corridors and a large auditorium with a stage. The lunchroom was located in the basement under the auditorium. When the school was converted to a coeducational junior high school (grades 8 and 9) in 1970, restrooms for boys were added in the basement.

Table 2 compares the three schools as to their physical characteristics and other extraneous variables considered important to the study. The researcher was aware that the teaching faculty provided for each school could, by their quality and dedication, change or modify the total education environment found in each school building. However, the teachers who comprised the total faculties of the three schools were similar in racial composition, age level and education level; teaching assignments came from the Central Office. In summary, the teaching faculties were as similar as any intact, non-manipulated city school faculty.

Table 2

A Listing of Selected Characteristics Along with Faculty Similarities and Differences in the Three Junior High Schools

	Ballard B Renovated	Ballard A New	Miller B Old
Year Constructed	1949	1966	1932
Size in Squ. Feet	109,100	80,482	56,860
Building Design	Closed Space	Closed Space	Closed Space
Shape	Finger Plan	Compact Rectangular	Compact Rectangular
Number of Stories	One	One	Three
Average Family Income	$8,000.00	$9,200.00	$8,800.00
Faculty Certification Level	43% Masters	24% Masters	30% Masters
Percent of Free Lunch	48%	34%	46%
Administrator's Cert. Level	Ed. D.	Specialist-6-year	Masters
Average Achievement Scores Eighth Grade	6.8 Grade Equivalent	6.8 Grade Equivalent	6.9 Grade Equivalent
Percent White Respondents	50%	64%	40%
External Environment*	City	City	City

* Some pupils bused in from the rural areas of the county in the three schools.

Data Collection Procedures

The design selected for this study involved three school populations in three junior high schools which were studied over a period of two years. Major disruptive incidents in the three schools were recorded and classified according to types of major incidents. The types of major incidents classified as disruptive were defined in Chapter I.

Along with a comparison of major disruptive incidents in the three schools, the project also considered results of the administration of the "Our School Building Attitude Inventory" developed by McGuffey at the University of Georgia. This inventory was administered to the total school population in all three schools. The administration of the inventory involved a total 2284 pupils. The pupils were scored on fifty-five (55) "yes" and "no" statements regarding the school building in which they were housed. The higher the numerical score on the test, the more positive the pupil is toward his school building. The three junior high schools involved in the study represented the following three common types of school facilities:

1. Renovated School - Experimental Group One
2. New School - Control Group One
3. Old Dilapidated School - Control Group Two

Variables

Two variables that were present during the period of the experiment was first the effect of the differences among

the three teaching faculties at the three junior high schools, and second, the ability of the pupils to discriminate between the "school building" and the "school"--"school" encompassing the total school environment including classmates, teachers and any facet of school life. However, the "Our School Building Attitude Inventory" emphasized that the statements in the inventory were about the building and not the school.

The "Our School Building Attitude Inventory" was administered by homeroom teachers to all pupils who were present in the three schools on May 21, 1975. All answers were marked on standard I.B.M. answer sheets. A program was written to allow the use of an optical scanner to score all answer sheets and accumulate a total numerical score for each pupil.

The inventory was divided into 28 positive and 27 negative statements arranged through the use of a table of random numbers. Responses of yes to positive statements about the building were weighted "1." Similarly, responses of no to negative statements about the building were weighted "1." Responses of no to positive statements about the building which carried a positive evaluation intent and yes to negative statements of positive intent were weighted "0." In this manner, the higher the numerical score, the more positive the pupils felt toward their school building.

The maximum score on the original inventory was 66 and the minimum score was 0. Responses of approximately 500 subjects to the "Our School Building Attitude Inventory" were factor-analyzed and yielded five distinguishable factors, although analysis revealed essentially one major factor which related to the pupil's emotional needs. The instrument was, therefore, treated as measuring a single homogeneous factor.

Reliability

The original reliability coefficient was .92. In the final form, the inventory was reduced to 55 items by deleting 11 that had either negative or extremely low factor loading. These deletions slightly reduced the reliability coefficient.

To obtain an inventory reliability coefficient for this study, The Kuder-Richardson Formula 21 of the Kuder-Richardson procedure was used. A reliability coefficient of .85 was found using a subset of 61 Miller B subjects. This reliability is regarded as an understatement of the true reliability (because of formula construction) and while it was not so high as the .92 found in the earlier analysis, it did indicate that the reliability of the "Our School Building Attitude Inventory" was satisfactory for this study.

Validity

The American Education Research Association, the National Council on Measurements and the American Psychological

Association define three types of test validity:

1. Content validity
2. Face validity
3. Construct validity

The "Our School Building Attitude Inventory" was evaluated using this triad.

Content Validity -- refers to the degree to which a test samples the content area which is to be measured.

In this study, the researcher expected to learn how pupils felt about their school building. The inventory covered most of the major areas concerned with the school building, such as (1) furniture (Questions 2, 3, 11, 16, 41, 43); (2) thermal comfort (Questions 19, 24, 29, 35, 36, 52, 54); (3) lighting (Questions 5, 11, 14, 21, 38, 50); (4) noise factors (Questions 15, 19); (5) colors (Questions 14, 20, 28, 42); and (6) general feelings (Questions 1, 4, 6, 7, 8, 9, 12, 21, 22, 30, 31, 39, 44); also (7) playground was included (Questions 10, 17, 23). The items in the inventory were thus judged to meet the criterion of covering the universe of items that might be asked on this subject.

Face Validity -- defined as a subjective evaluation by judges as to what a measuring device appears to measure.

The face validity concept was employed when this inventory was written. All questions within the inventory appeared to ask questions about the school building. There were no questions that did not deal with the subject of school buildings.

Construct Validity -- refers to the extent to which a test reflects constructs presumed to underlie the test performance and also the extent to which it is based on theories regarding these constructs. Factor analysis is a statistical technique used to determine types of construct validity.

The constructs underlying a building attitude inventory were analyzed in the following manner. If a pupil answered questions in a certain way--for example, yes to positive questions about the building and no to certain other questions that reflect a positive attitude even though answered in the negative--the evaluator would assume that the pupil would have a positive daily attitude toward the school building. The items listed in the test, if answered correctly, would all add up to a pupil's having a "good" or "positive" attitude toward his school building. The items listed in the inventory were simple and were not subject to being misconstrued by the average pupil. The individual items in the "Our School Building Attitude Inventory" concerned such factors as color, lighting, temperature, size and furniture in the classroom. Therefore, it was concluded that if a pupil answered individual items correctly, the sum total of answers would yield a measure of positive feeling about the total school building.

Measures Used

The four areas or measures used to determine the behavior and attitudes of the students involved in the study were the following:

1. Disruptive behavior -- This was measured by the count of major incidents over a one-year period in the three school buildings. These incidents were listed and defined in Chapter 1.

2. Attitudes of pupils -- This was obtained from pupils' feelings toward the physical facility housing them, as measured by a posttest, "Our School Building Attitude Inventory."

3. Density -- This was measured by the square feet per pupil in Average Daily Attendance.

4. Incident Population Ratio -- This was obtained by dividing the enrollment into the total number of major disruptive incidents. This procedure yields a ratio of the number of incidents per pupil. This ratio is used as a descriptive statistical item only.

Statistical Treatment

The experimental design was considered a non-equivalent control group design of a quasi-experimental nature. Full experimental control was not possible because of the inability to randomize subjects and because no pretest was given.

The non-equivalent control group design has been used extensively in education research. Usually it has involved an experimental group and a control group with each given a

pretest and a posttest. In this study, two control groups were used with one experimental group. No pretest was administered; however, a one-year count of disruptive incidents was recorded as they occurred. The control group and the experimental group did not have pre-experimental sampling equivalence. The naturally assembled, randomly assigned, school groups were as similar as availability permitted; however, experimental control would have been more effective with a pretest confirmation of similarity. In an effort to reduce the lack of experimental control, the total target population was included in the study.

Some threats to external validity such as interactions of the treatment with testing, selection and reaction by pupils were reduced by the testing procedures. Also the use of natural groups, use of the total target population and the absence of freedom to volunteer among pupils reduced further the threat to external validity.

Each of the five hypotheses was tested through an analysis of variance of the pupil scores on the "Our School Building Attitude Inventory." Comparisons were made between pupils housed within the building and among the three subsets in the three buildings.

The LAVA (Least Squares Analysis of Variance) was the program selected for computer data analysis. This program permitted analysis of groups with unequal subsets. The means for the subsets were adjusted by an unweighted means analysis as described by Harvey (1960).

Hypothesis one was concerned with the attitudes of pupils housed in the newly renovated school versus pupils housed in the non-renovated schools. This hypothesis was tested for significance by an analysis of variance of the pupils' scores on the "Our School Building Attitude Inventory."

Hypothesis two was concerned with interactions among groups in the study. In this case sex differences were measured by an analysis of variance of the male and female pupils' scores on the "Our School Building Attitude Inventory."

Hypothesis three was developed to determine if significant differences existed between the black and white pupils' attitudes as found by the "Our School Building Attitude Inventory." Analysis of variance was used to determine if significant differences existed. Duncan's Multiple Range Test was used to determine the source of the difference.

Hypothesis four assumed that grade level scores of pupils (eighth and ninth) would reflect a significant difference on the "Our School Building Attitude Inventory." An analysis of variance technique was used and scores were compared among the two grades at the three schools. F-Ratios were obtained for grade level versus all pupils. Duncan's Multiple Range Test was used to obtain grade averages on the "Our School Building Attitude Inventory."

Hypothesis five stated that a difference in pupil attitudes toward their school building would be found by

comparing the scores of pupils receiving free lunches and those not receiving them. An analysis of variance of pupils' scores on the "Our School Building Attitude Inventory" was made to determine if the differences were significant. The Duncan's Multiple Range Test of Differences was used to determine the source of the variance.

Because of the omission of the Ballard B (renovated) pupils' names from the "Our School Building Attitude Inventory" score sheets, data from the renovated school were not available for hypothesis five. Therefore, only the two non-renovated schools were compared.

The statistical procedures used were available on existing computer programs at the University of Georgia.

Question Six

Will the incident rate of pupil disruptive behavior be greater in the older rundown and dilapidated school building than in the newly renovated one?

Because this question posed difficulties for meaningful inferential statistical analysis, it was treated as a descriptive statistic.

Justifications:

1. Differences in enrollment among the three schools dictated that an incident population ratio be developed; however, experienced educators know that incidents are not spread evenly over the pupil population as a ratio implies.

2. The record of major disruptive incidents was recorded only as an incident without pupil identification; so

it was impossible to locate incident repeaters.

3. Due to different methods of incident reporting to the central office, it was possible to record incidents for a one-year period only.

The descriptive statistical information obtained in the study of this question was gathered for the purpose of comparing the disruptive incidents rate in the three schools involved in the study.

Question Seven

Will differences in space density, as measured by the square foot per pupil in Average Daily Attendance, have an effect on the attitudes of the pupils occupying that space?

The research question also proved to be a difficult question to answer through inferential statistics. Because of this fact, it was treated as a descriptive type of statistical question.

Some factors that prevented inferential statistical analysis were:

1. One tool available to measure space in a school building is square footage per pupil in Average Daily Attendance. However, this method treats all school space as equal, including corridors, lunchroom space, gym space, shop space, media center space, and office space. Educators and planners believe that school space has different value to different pupils.

2. Two of the three project schools were almost identical in square foot per pupil in Average Daily Attendance

value. The third school had thirteen square feet per pupil less than the other two school buildings. Any treatment of attitude difference versus space in the two identical schools would not have been statistically valuable.

3. The school with the most space per pupil in Average Daily Attendance also had the most negative pupil attitudes and the larger number of major disruptive incidents. Descriptive statistical information obtained in studying this question indicated a need for extensive research in the area of space and space density and how it affects pupil attitudes.

CHAPTER IV

Findings and Interpretations

The results of this study are presented and discussed in relation to the five (5) major hypotheses and the two questions not covered by hypotheses. Data obtained from the "Our School Building Attitude Inventory" scores and from the tabulation of major disruptive incidents have been recorded, analyzed, and explained. Statistical analysis was used to determine if the null hypotheses should be retained or rejected and descriptive data have been used to answer the additional questions raised in the study.

The research population consisted of the total pupil enrollment in three selected junior high schools. A total of 2284 pupils were tested for attitude toward the school building and a record of each school's total disruptive incidents for school year 1974-75 was made. The total population tested within each of the three schools was Ballard B-998; Ballard A-876; and Miller B-410.

The First Null Hypothesis

The first null hypothesis stated that the attitudes of pupils toward the renovated school building do not differ significantly from the attitudes of pupils housed in an old

run-down school building.

This hypothesis provided the major thrust of this research study. Questions still unanswered, yet of major importance to educational administrators, were considered in part by this hypothesis. Are facilities important in the educational process? Do facilities affect more positive attitudes toward the school building and consequently toward school itself? If important, how important? Do new or renovated education facilities contribute more toward positive attitudes? Is space in an old building as important to pupils as space in a new or renovated building?

The first null hypothesis was rejected at the .01 level of significance (see Table 3). The overall significance test was followed by Duncan's Multiple Range Test. Statistical analysis of the subsets within the tested population indicated enormous race differences and a number of other interactions.

Table 3

Analysis of Variance Summary Table
of the "Our School Building Attitude Inventory"

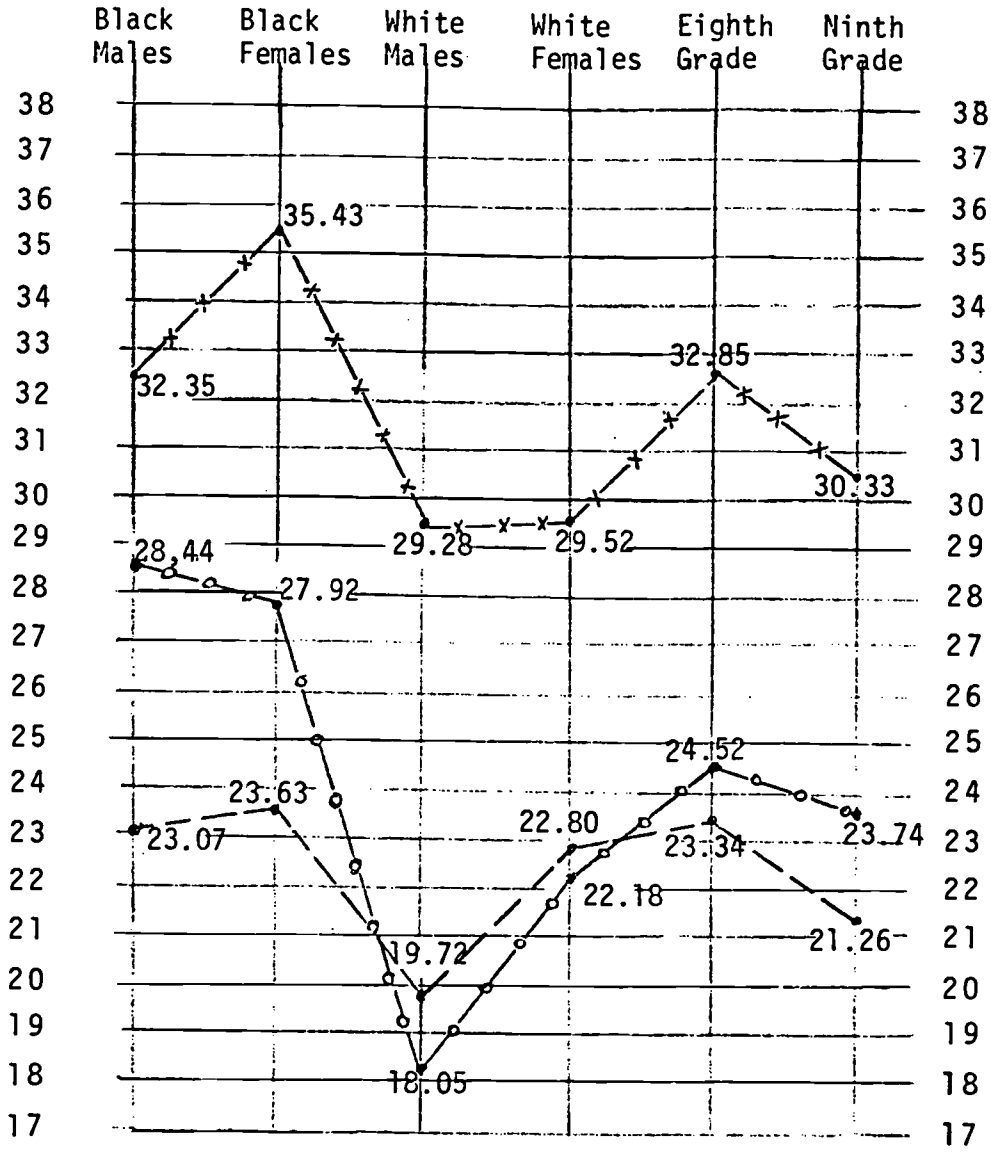
Source of Variance	df	Sum of Squares	Mean Square	F-Value
Main Effects				
Grade	1	688.45	688.45	7.41*
Race	1	10772.10	10772.10	116.06*
Sex	1	36.66	36.66	0.40
School	2	35292.22	17646.11	190.12*
First Order Interactions				
Grade X Race	1	277.94	277.94	2.99
Grade X Sex	1	104.88	104.88	1.13
Grade X School	2	510.89	255.45	2.75
Race X Sex	1	1051.50	1051.50	11.33*
Race X School	2	2727.17	1363.58	14.69*
Sex X School	2	17.71	8.85	0.10
Second Order Interactions				
Grade X Race X Sex	1	0.66	0.66	0.01
Grade X Race X School	2	50.45	25.23	0.27
Grade X Sex X School	2	162.92	81.46	0.88
Race X Sex X School	2	1834.65	917.32	9.88*
Third Order Interactions				
Grade X Race X Sex X School	2	67.98	33.99	0.37
Error	2262	209950.87	92.82	

*Significant at the .01 level

Further analysis of the differences using Duncan's Multiple Range Test indicated that Ballard B, the renovated school, had an overall mean of 35.60 as compared with Ballard A's (the new school) overall mean of 24.14 and finally Miller B, the old school, with a low overall mean of 22.30. The three means were significantly different at the .01 level. See Figure 1, page 58, for a visual graphic depiction of the significant differences between the subset means for Ballard B (renovated) and the other two schools.

The Second Null Hypothesis

This hypothesis stated that pupils' attitudes toward the school building would not differ significantly between male and female pupils involved in the study. This hypothesis was not rejected. There was no significant difference between male pupils and female pupils scores on the "Our School Building Attitude Inventory." The average inventory score mean for all females in all three schools was 26.15 and for all males the average inventory score was 25.87. The females outscored the males by only .27. This difference is not significant. However, as Figure 1 shows, sex differences appear when schools are taken into account.



Ballard B -x-x-x-x-

Ballard A -o-o-o-o-

Miller B - - - - -

Figure 1

Polygraph Projection of Adjusted Test Means on the "Our School Building Attitude Inventory" Selected Subsets

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The Third Null Hypothesis

This hypothesis stated that black and white pupil attitudes do not differ significantly when exposed to the environmental settings described in this study.

The schools involved in the study were integrated in approximately a 50 percent black and a 50 percent white ratio since the fall of 1970. It was assumed that prior differences in environmental conditions between the races would not disproportionately affect either group.

In the process of rejecting or accepting the third null hypothesis, a close look at differences within each racial group was considered important. Table 3, page 56, illustrates the large F-Ratio for the interaction of race. This F-Ratio is exceeded only by the main effect of school. The table also shows a number of significant interactions involving race with other effects. The mean average for all blacks (without regard to grade, sex, or school) is 28.44 (see Table 7). The mean average for all whites is 23.58. Tables 4 and 5 provide information about racial interactions with grade, sex, and school.

Differences within both the black and white races have been tabulated, analyzed, and reviewed by the use of an analysis of variance technique. In an effort to examine the differences between the races and the responses of pupils to the condition of the school environment, Duncan's Multiple Range Test was used. Table 7 depicts this information.

Table 4

Summary Table of "Our School Building Attitude Inventory" Means of the Significant Subsets

Source of Variation		Adjusted Mean
Black Males	Ballard A	28.44
	Ballard B	32.35*
	Miller B	23.07
Black Females	Ballard A	27.92
	Ballard B	35.43*
	Miller B	23.63
White Males	Ballard A	18.05 *
	Ballard B	29.28
	Miller B	19.72 *
White Females	Ballard A	22.13 *
	Ballard B	29.52
	Miller B	22.80 *
Eighth Grade	All Males	26.72
	All Females	26.52
Ninth Grade	All Males	25.30
	All Females	25.50
Eighth Grade	Ballard A	24.52
	Ballard B	32.85 *
	Miller B	23.34 *
Ninth Grade	Ballard A	23.74
	Ballard B	30.33 *
	Miller B	21.26 *

*Significant at the .05 level

The third null hypothesis was rejected at the .01 level with black pupils scoring significantly higher in attitude in all three schools.

Table 5

Analysis of Variance Summary Table of "Our School Building Attitude Inventory" Means by Black Pupils Versus Miscellaneous Effects

Source of Variance	df	Sum of Squares	Mean Squares	F-Value
Grade	1	47.21	47.21	0.57
Sex	1	763.92	763.92	9.22*
School	2	18305.34	9125.67	110.41*
Grade X Sex	1	63.01	63.01	0.76
Grade X School	2	489.36	244.68	2.95
Sex X School	2	647.34	323.67	3.90*
Grade X Sex X School	2	77.41	38.70	0.47
Error	1044	86545.85	82.90	

*Significant at the .01 level

Table 6

Analysis of Variance Summary Table of "Our School Building Attitude Inventory" Means by White Pupils Versus Miscellaneous Effects

Source of Variance	df	Sum of Squares	Mean Squares	F-Value
Grade	1	893.14	893.14	8.82*
Sex	1	337.36	337.36	3.33
School	2	23976.15	11988.08	118.32*
Grade X Sex	1	43.14	43.14	0.426
Grade X School	2	111.19	55.49	0.55
Sex X School	2	1316.74	658.37	6.50*
Grade X Sex X School	2	142.88	71.44	0.71
Error	1218	123405.02	101.32	

*Significant at the .01 level

Table 7

Duncan's Multiple Range Test of Differences on "Our School Building Attitude Inventory" by Racial Groups

Schools	Black	White
Ballard B (Renovated)	33.79*	29.40*
Ballard A (New A/C)	28.18*	20.09*
Miller B (Old)	23.35	21.26
Combined Mean	28.44*	23.58*

*Significant at the .01 level

The Fourth Null Hypothesis

The fourth null hypothesis stated that there was no significant difference between the scores of pupils in the two grades (eighth and ninth) involved in the study. Comparison was further restricted to the old facility (Miller B) and the renovated facility (Ballard B).

Grade level differences in attitudes were significant among the pupils tested in a comparison of the old facility versus newly renovated facility.

This null hypothesis was rejected at the .01 level with the eighth grade showing a more positive attitude toward their school building. The eighth graders who took the "Our School Building Attitude Inventory" in the spring of 1975 had only been in the school for a period of one year. However, the eighth graders from Ballard B had been in a renovated facility only one year, while Ballard B ninth

graders had spent a year in old Ballard B and a year in renovated Ballard B.

The conditions in the other two schools had not changed; therefore, eighth grade attitudes were measured with one year in the facility and ninth grade attitudes were measured with two years in the facility. As no attitude pretest was given, it is difficult to predict or measure what effect the different periods of time spent in the facilities had on the pupil's attitude toward the building.

Data in Table 8 indicated that there was a significant difference between attitudes of pupils in the two grades.

Table 8

Analysis of Variance Summary Table of "Our School Building Attitude Inventory" Means by All Pupils Versus Grade Level

Source of Variance	df	Sum of Squares	Mean Squares	F-Value
Grade	1	688.45	688.45	7.42*
Error	2262	209950.87	92.82	

*Significant at the .01 level

Further analysis of the differences by Duncan's Multiple Range Test presented in Table 9 indicated that the attitudes of eighth grade pupils toward the school building were significantly more positive than those of the ninth grade pupils.

Table 9

Duncan's Multiple Range Test of Differences on the "Our School Building Attitude Inventory" by Grades

Schools	Eighth Grade	Ninth Grade
All Schools	26.62	25.40*

*Significant at the .01 level

The Ballard B (Renovated) School pupils had an eighth and ninth grade combined mean score of 31.59. The Miller B (Old) School pupils had an eighth and ninth grade combined mean score of 22.30. The large difference in attitude inventory means between the pupil attitudes in the two schools indicated that the major interaction was not occurring between grades but between the pupil attitudes toward the building.

The Fifth Null Hypothesis

This final hypothesis stated that attitudes were not significantly different among pupils who received free lunch and those who did not in the two non-renovated schools as measured by the scores on the "Our School Building Attitude Inventory". The fifth null hypothesis was rejected at the .01 level of significance. The data shown in Table 10 depicting the results of the analysis of variance technique indicated that within the population of the two schools, there was a significant difference between "free lunch" pupils' attitudes and "no free lunch" pupils' attitudes.

The data were first analyzed through an analysis of variance procedure. Finally, the sources of the variance were found by using the Duncan Multiple Range Test of differences.

In an attempt to analyze the major sources of variation, Duncan's Multiple Range Test was used as depicted in Tables 10 and 11. Table 11 also depicts the adjusted means for the two schools.

Table 10

Analysis of Variance Summary Table of "Our School Building Attitude Inventory" Means by Pupils in Two of the Three Schools Studied Versus Those on "Free Lunch" and Those with "No Free Lunch"

Source of Variance	df	Sum of Squares	Mean Square	F-Value
Lunch	1	1998.22	1998.22	21.57*
School	1	636.80	636.80	6.88*
Lunch X School	1	1575.28	1575.28	17.01*
Error	1284	118929.85	92.62	

*Significant at the .01 level

Table 11

Duncan's Multiple Range Test of Differences on the "Our School Building Attitude Inventory" by "Free Lunch" and "No Free Lunch" Groups and Combined

Schools	Combined Means	Free Lunch (adjusted) Means	No Free Lunch (adjusted) Means
Ballard A	24.02*	22.44	24.77
Miller B	22.47	21.30	24.47
Both Schools		21.87	24.62*

*Significant at the .05 level

Null hypothesis five was rejected because there was a significant difference between pupils' attitude test means between the "free lunch" and "no free lunch" pupils. The no free lunch group scored higher or more positive in attitude toward the school building than the pupils who were receiving a free lunch. There was also a significant difference for schools with Ballard A pupils scoring higher. The significant ordinal interaction as shown in Figure 2 indicates that the difference between the "free lunch" and "no free lunch" pupils' attitudes for Ballard A (2.33) was less than the difference for Miller B pupils (3.17). (See Figure 2.)

Questions from the Problem Statement

Questions 1 - 5 were analyzed through the five major

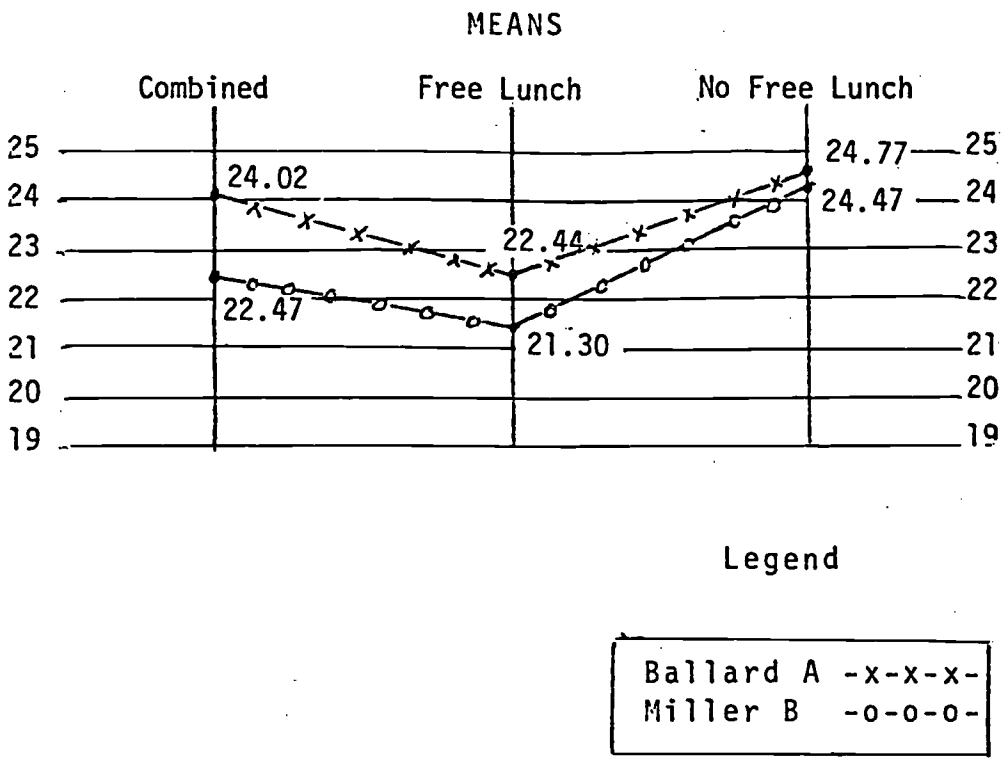

Figure 2

Polygraph Projection of Adjusted Test Means on the "Our School Building Attitude Inventory" "Free Lunch"-"No Free Lunch"

hypotheses. Questions six and seven were treated through the use of descriptive statistics and are not stated in hypothesis form.

Question Six

Will the incident rate of pupil disruptive behavior be greater in the older, run-down, and dilapidated school building than in the newly renovated one? This question was treated by descriptive analysis.

Because of large enrollment differences, it was necessary to develop an incident population ratio. This ratio was used as an index of the number of incidents distributed evenly over the pupil population. Table 12 depicts the number of disruptive incidents and enrollment equalization. This table shows that the ratio of major disruptive incidents on a per-pupil basis was less in Ballard A (new) School (.2556 per pupil) than it was in either of the other two schools. Miller B had the highest number of incidents per pupil (.3410 per pupil). Ballard B (renovated) School had a (.2672 per pupil) incident population ratio. A review of the incident population ratio indicated that each pupil at Ballard A (new) and Ballard B (renovated) Schools accounted for one-fourth of a major disruptive incident while each pupil at Miller B (old) School accounted for one-third of an incident. This question was not treated by inferential statistics. It is provided as descriptive information only. It is noted, however, that the index at both

the renovated and the new school was lower than at the old school (see Table 12).

Table 12

Number of Disruptive Incidents and Incident Population Ratio in the Three Junior High Schools (Descriptive Only)

	Ballard B Exp. I	Ballard A Control I	Miller B Control II
Enrollment	1306	1107	688
Number of Disruptive Incidents	349	283	228
Incident/Population Ratio*	.2672	.2556	.3410

*Incident Population Ratio: The ratio of major disruptive incidents on a per-pupil basis.

Question Seven

Will differences in space density, as measured by the square feet per pupil in average daily attendance, have an effect on the attitudes of the pupils occupying that space? This question was treated descriptively also.

A comparison of square footage per pupil in A.D.A. indicated the following:

Ballard A (new) 83.2 square feet per pupil

Ballard B (renovated) 96.4 square feet per pupil

Miller B (old) 97.8 square feet per pupil

In a comparison of pupil attitudes with the amount of

space available per pupil, it was found that the pupils at Miller B (old) School had the most negative attitude toward their school and also had the most square footage per pupil.

Ballard B (renovated) School had a generous amount of space per pupil in A.D.A. (96.4) and scored highest of the three schools on the attitude inventory. Ballard A (new) School was the most crowded of the three schools having 83.2 square feet per pupil, and the pupil attitude score means fell between that of the other two schools.

CHAPTER V

Summary of Findings, Conclusions, and Recommendations

This study has concerned itself with the basic physical environmental matrix of school pupils and how they respond to it. More specifically, pupil's attitudinal responses toward the renovation of school space and a comparison of major disruptive incidents in three junior high schools have been tabulated and analyzed in this study.

The problem of this study was to determine the effect of school building renovation on the attitude and behavior of a population of eighth and ninth grade pupils from three junior high schools. Directional questions from which hypotheses and descriptive questions were developed are listed below.

1. Is there a difference in the attitudes of pupils housed in a newly renovated school building and those in older, run-down, and dilapidated ones?

2. Is there a difference between the attitudes of male and female pupils toward renovated versus older, run-down, and dilapidated school buildings?

3. What differences, if any, are there in the attitudes of black versus white pupils toward the renovated and older, run-down school buildings?

4. Do pupils at various grade levels reflect different attitudes toward the renovated and older, run-down school buildings?

5. Does the socio-economic level of pupils affect their attitudes toward their school building?

6. Will the incident rate of pupil disruptive behavior be greater in the older, run-down, and dilapidated school buildings than in the newly renovated one?

7. Will differences in the space density of a school have an effect on the attitudes of pupils housed in the school?

Answers to these and other questions concerning the relationship of environment and the pupil will contribute to the body of knowledge in this field.

Theoretical Background

Environmental behavior modification was the conceptual framework around which this study was developed. As a theoretical base, the researcher reviewed extensively the early works of Skinner (1953), concerned with the importance of environment as a behavior modifier. Winston Churchill (1930) did not have the benefit of Skinner's research when he made the statement, "We shape our buildings then our buildings shape us." Lewin (1938) in the development of the "field theory" made a strong statement that environment was an integral part of the learning process. Calhoun (1971) in his work with rodents developed his now

famous "behavioral sink" in which he recorded the response of rats when their environment became overcrowded. This type of animal research depicted the bizarre behavior patterns that emerge when an environment becomes overcrowded. Pupil behavior modification due to environment may be less sensational but may be just as pathologically destructive as the "behavioral sink."

Later research done by Estes (1954), Robert Sommer (1959), and Calhoun (1971) emphasized the extreme importance of the environment on the organism residing within that environment.

The researcher also drew on some recent studies by McGuffey (1972), Lovin (1973), and Bothwell (1974), that involved school pupils and their reaction to their school's physical environment.

All environmental research supports to some degree the postulate, "Environment affects behavior." The critical questions within this broad statement are: To what degree? What type of environment causes the most effect? At what ages is environment most critical? How can educators modify environment for optimum effects on learning and behavior.

Most of these questions will go without completely supported answers. This study provides some insight into this problem and further supports the postulate stated in the above paragraph.

Methods and Procedure

Twenty-three hundred junior high school pupils (grades 8 and 9) located in three junior high schools were used as a population for this study. An inventory designed to measure attitudes toward their school building was administered to all 2300 pupils as a posttest after a period of one to two years in the three school buildings. The three junior high school buildings represented three very different types of school environments:

1. Ballard B - Newly renovated school
2. Ballard A - New school
3. Miller B - Old dilapidated school

Records of behavioral incidents were kept and attitude inventory scores were determined. A record was kept for each school population to allow the researcher to compare the schools in relation to attitudes and major disruptive incidents.

Letter and subscript groupings were used to breakdown the various groups within each school. Pertinent data from the lettered groups in the schools were gathered and analyzed using the analysis of variance technique and Duncan's Multiple Range Test to isolate individual group scores.

Hypothesis 1

Hypothesis one stated that the attitudes of pupils housed in a newly renovated school building will differ significantly from the attitudes of those housed in an old

run-down building. This hypothesis constituted the central core of the study.

This first null hypothesis was rejected at the .01 level with the pupils in the renovated facility scoring more positively by ten points over the pupils in the old run-down facility. The fact that the renovation occurred during the research period might indicate a temporary Hawthorne effect with the building that would diminish over time. Perhaps this question could be considered by a study of longer duration. The analysis of variance technique applied to the attitude inventory scores in all three schools indicated that the renovated school scored significantly higher than the other two schools in all cases and in all subsets (see Figure 1).

Hypothesis 2

Hypothesis two stated that the pupils' attitudes toward the school building will differ significantly between the male and female pupils involved in the study.

The null hypothesis was not rejected. Analysis of the data showed little difference, .27 or less than one response difference on the attitude test, between males and females. However, an indepth look at the mean scores of various subsets within the total male and female population indicated a wide range of pupil attitude scores and a number of significant differences.

Hypothesis 3

Hypothesis three stated that black and white pupil attitudes toward the school building will not differ significantly when exposed to the environment setting used in this study.

Analysis of the data on this hypothesis indicated that the null hypothesis was rejected at the .01 level of significance. Black pupils had a significantly more positive attitude than their white counterparts in all three school buildings.

An analysis of data for this hypothesis using Duncan's Multiple Range Test showed that both black and white pupils in the renovated school (Ballard B) scored significantly higher than the black and white pupils from the new school (Ballard A) and the old school (Miller B). The analysis of adjusted subset means indicated that race was involved in a large number of subset interactions that were significant. This finding continued to support the major hypothesis that the renovation of an old school building does improve pupil attitudes.

Hypothesis 4

Hypothesis four stated that the grade level differences in pupil attitudes will not differ significantly among pupils tested in the environmental settings - old facilities versus newly renovated facilities.

The two grades involved in the study were the eighth

and ninth grades housed in three junior high schools.

All pupils were tested at the end of the 1975 school year. However, the length of time spent in the building varied with eighth graders spending one year and ninth graders spending two years. In effect, the ninth graders were exposed to the treatment (the environment of the three schools) for twice as long. The ninth graders at the renovated school (Ballard B) had the experience of schooling in the Ballard B building for one year before it was renovated and one year in the school after renovation. Ballard B eighth graders had the experience of the renovated school for only one year.

Table 13 indicates that the difference between the two grades was significant at the .05 level. Eighth grade pupils were slightly more positive toward their school building than pupils in the ninth grade. One possible explanation is that the newness of attendance at the junior high level may have dissipated. Maturity is also a possible explanation for the difference. The null hypothesis was rejected.

Hypothesis 5

Hypothesis five stated that pupil attitudes will not differ significantly among pupils from different socio-economic levels, as measured by "free" and "no-free lunch", compared to pupil scores on the "Our School Building Attitude Inventory."

Because of the omission of the Ballard B pupil names from the "Our School Building Attitude Inventory" score sheets, data from the renovated school (Ballard B) were not available for this hypothesis. Therefore, only the pupil scores from the two non-renovated schools who had received "free lunch" and those who had "no-free lunch" were compared in an effort to determine whether there was a significant difference.

The null hypothesis was rejected at the .01 level. The "no-free lunch" respondents scored significantly more positive on the attitude inventory than the "free lunch" respondents. Tables 11 and 12 provide this information in statistical form. Figure 2 provides visual information about the "free lunch" and "no-free lunch" means in the two schools. Duncan's Multiple Range Test of Differences indicated that the pupils not receiving a free lunch had a significantly more positive attitude toward the school building than the pupils who did receive free lunch. This appeared to indicate that the fact that a pupil received a free lunch had no effect on his attitude toward the school building.

Question Six

The number of incidents of pupil disruptive behavior was analyzed by computing an incident population ratio and relating the ratio to type of school. The findings indicated that the ratio of disruptive incidents on a per pupil

basis was less in Ballard A (new) with .2556 per pupil than at the other two schools. The renovated school had a ratio of .2672 per pupil while the old school had a ratio of .3410 per pupil. Both the new school and the renovated school had smaller ratios than the old school building, a fact which would suggest that old school buildings may encourage disruptive incidents. This question needs further study.

Question Seven

Space density was analyzed by computing a square foot per pupil index and examining the differences in relation to pupil attitude scores of pupils in the three schools included in the study. The findings showed that the old school had the largest amount of space per pupil, but pupil attitude scores were significantly lower than those of the pupils in the renovated and new schools. In conclusion, it appears that quality of space may be more important than amount of space. However, it is suggested that this question be given additional study.

Findings and Conclusions

This study was designed to examine the effect of school building renovation on the attitudes and behavior of pupils housed within a renovated facility. Two other junior high schools were included in the study to use for comparison and provide two control groups. A total population of 2285 pupils were tested for attitudes toward their school building. Also the number of disruptive incidents was compared

in the three schools for the 1975 school year.

The basic research problem was to determine the effect of school building renovation on the attitude and behavior of a selected number of eighth and ninth grade pupils. Five research hypotheses were developed to provide statistical treatment and analysis about the effect of renovation on the attitudes and behavior of a pupil population in three selected junior high schools.

Statistical analysis indicated that the most significant difference was found in the comparison of the attitudes of pupils in the three schools. The pupils in the renovated school (Ballard B) scored significantly more positive on the "Our School Building Attitude Inventory" than those in the old school (Miller B) and the new school (Ballard A). An adjustment of the subset means indicated interaction variation but the renovated school's subset means were all superior to the other two schools (see Figure 1). Pupils in the renovated school scored a full ten points more positive toward their school building than the pupils in the old school building. Also the pupils in the old school (Miller B) had a higher number of major disruptive incidents per pupil than the other two schools in the study, indicating that a renovated school building or a new facility may help to reduce disruptive behavior among pupils.

The complete renovation of Ballard B totally changed the school environment for 1200 junior high pupils, and the results of this research appeared to support the theory that

pupil attitudes were affected significantly in a positive direction when housed in the newly renovated school facility.

Recommendations for Further Study

1. Additional research is needed in the area of the learning process and how it is modified and/or facilitated by the physical environment.

2. Changes caused by maturation should be studied and documented to account properly for them as attempts are made to measure educational change.

3. A study of facilities change, pupil attitudes, and learning efficiency of pupils at all grade levels is desirable.

4. The learning process and the pupil's total environment, their relationship, and how one is affected by the other should be the topics of continued research and development.

5. Question Seven concerning space density raised a number of unanswered questions. First, what is the effect of more or less school space on pupil attitudes? Second, is the type of space or quality of space important? Finally, at what point does a lack of or a surplus of space become a major factor affecting the organism within the space?

6. The search for the truly effective school facility must continue. Designers should utilize all of the

information now available from existing environmental research, and as new information is uncovered, it should be analyzed and disseminated.

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APPENDICES

ERIC

APPENDIX A

BUREAU OF EDUCATIONAL STUDIES AND FIELD SERVICES

University of Georgia

Procedure for the Analysis of the Our School Building Attitude Inventory

The Our School Building Attitude Inventory is composed of 55 statements which are designed to elicit simple yes or no responses from students regarding their thoughts and feelings about their school's physical environment.

The inventory is divided into 28 positive and 27 negative statements arranged through the use of a table of random numbers. Responses of yes to positive statements are weighted "1". Similarly, responses of no to negative statements are weighted "1". Responses of no to positive statements and yes to negative statements are weighted "0".

The numbers of positive and negative statements are listed below.

Positive	Negative
1, 4, 5, 6, 7, 8,	2, 3, 9, 10, 12, 13,
11, 14, 16, 17, 18,	15, 21, 22, 24, 25,
19, 20, 23, 26, 27,	25, 26, 31, 37, 38,
28, 29, 30, 32, 33,	41, 42, 43, 44, 45,
34, 39, 40, 49, 52,	46, 47, 48, 50, 51,
54, 55	53

Maximum Score: 55 Minimum Score: 0

Appreciation is extended to Dr. C. W. McGuffey and the Bureau of Educational Studies and Field Services, University of Georgia, for permission to use the Our School Building Attitude Inventory and its directions for scoring and analysis in this experimental study.

BIBB COUNTY PUBLIC SCHOOLS

Instructions for "Our School Building Attitude Inventory"

I. Use the multipurpose answer form for all your responses. Do not put answers on inventory.

II. Fill in the following on the multipurpose form (at the top in the blank area).

1. Name
2. School (Building)
3. Grade
4. Race and Sex
5. Date
6. Supervision Number

III. Read instructions on inventory, record answers on answer sheet, use space A for Yes answer, use space B for No answer (do not mark in space C, D, E, or F).

IV. Please be careful with the answer sheets - do not fold - no extra marks.

V. Your responses are part of a research project on school buildings. Thank you.

Our School Building Attitude Inventory

School_____ Teacher_____

Grade_____ Sex_____ Race_____ Date_____

INSTRUCTIONS: Please circle Yes or No in response to each of the items. As you answer each statement, think of the building and express your opinion as it applies to the building only.

Yes No 1. My room is just the right size.

Yes No 2. My chair is comfortable.

Yes No 3. I need a better place to keep my books and things at school.

Yes No 4. This building is really a good place to be.

Yes No 5. The lighting helps me to see better.

Yes No 6. This building makes it easier for me to study.

Yes No 7. This building makes my friends happy.

Yes No 8. I like going to school in this building.

Yes No 9. The building makes me feel restless.

Yes No 10. This building could cause me to get hurt easily.

Yes No 11. I can see to read my book and other materials easily.

Yes No 12. I'd like to tear this building down.

Yes No 13. The building is unpleasant most of the time.

Yes No 14. My classroom is bright and cheery.

Yes No 15. There is an awful lot of noise in this building.

Yes No 16. I have a good place to put my books and things at school.

Yes No 17. I like to play on the school grounds.

Yes No 18. I go to school in a nice room.

Yes No 19. This school is quiet.

Yes No 20. The colors of the walls are bright and pretty.

Yes No 21. This building is too dark and ugly.

Yes No 22. I feel lost in this building.

Yes No 23. I like to play at this school.

Yes No 24. This school building is too hot.

Yes No 25. This whole building is pretty bad.

Yes No 26. This is the best school building I have ever seen.

Yes No 27. I like to come into this building.

Yes No 28. This building is beautiful.

Yes No 29. My classroom is a cozy place to be.

Yes No 30. The building gives me a good feeling.

Yes No 31. This building makes me feel sick at times.

Yes No 32. The building is very comfortable.

Yes No 33. My classroom is a clean place.

Yes No 34. This building is friendly and inviting.

Yes No 35. I get tired and sleepy in this building.

Yes No 36. The floor is too cold.

Yes No 37. This building is really no good.

Yes No 38. Writing on the board is hard to see.

Yes No 39. This building is great in every way.

Yes No 40. The school building makes me feel at home.

Yes No 41. All the desks are uncomfortable.

Yes No 42. I could learn better if the school was prettier.

Yes No 43. I'd like to have more comfortable desks.

Yes No 44. I dislike this building.

Yes No 45. I feel too crowded in my classroom.

Yes No 46. This building is scary sometimes.

Yes No 47. The bathroom is too far away.

Yes No 48. This building makes me feel scared sometimes.

Yes No 49. I like this building.

Yes No 50. The lighting gives me a headache.

Yes No 51. This building is like a jail.

Yes No 52. This school building is a comfortable place to be.

Yes No 53. This building makes it hard for me to learn anything.

Yes No 54. This school building is the most comfortable place to be.

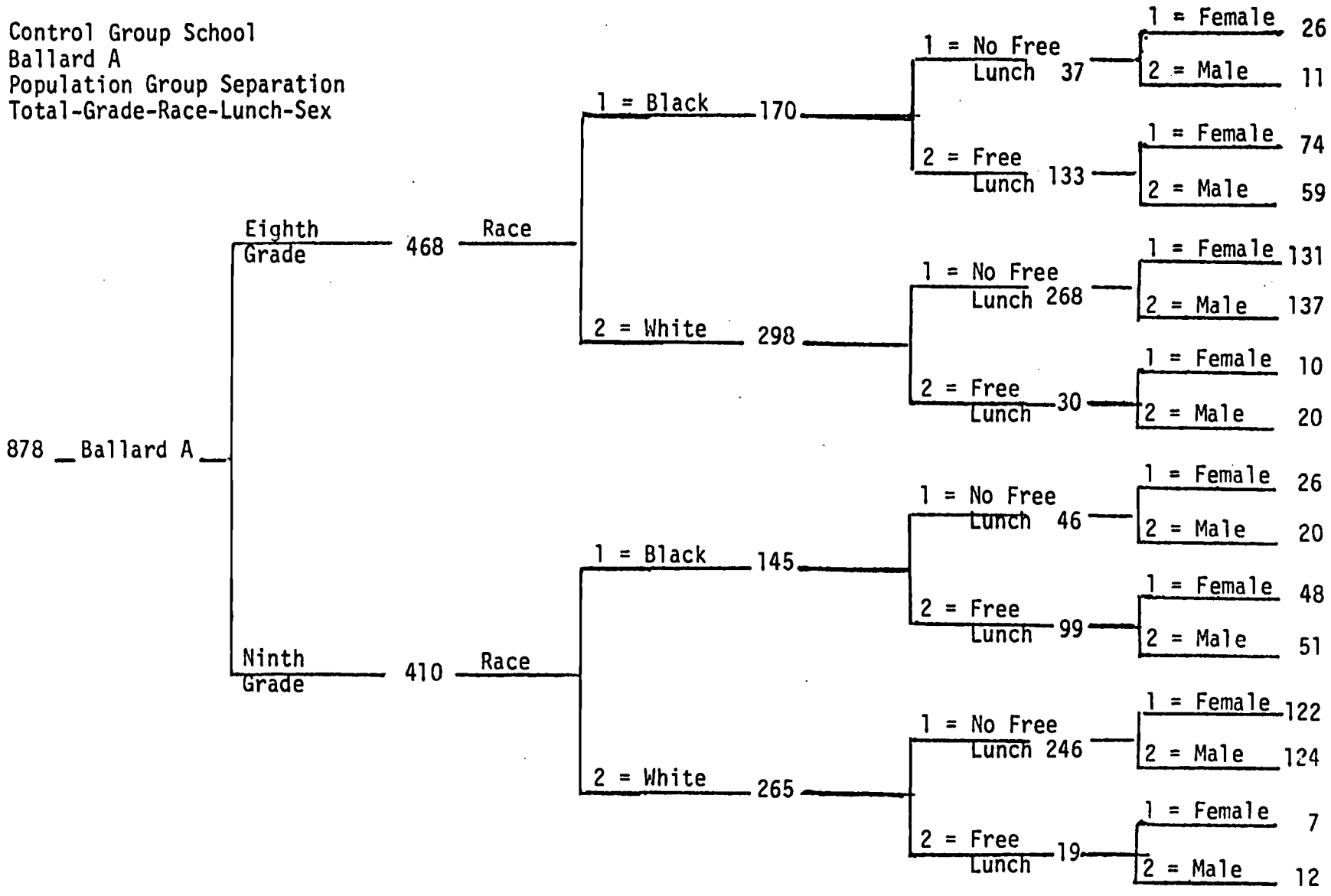
Yes No 55. I feel this building has more good points than bad points.

April 29, 1971
Revised, May 18, 1971
C. W. McGuffey

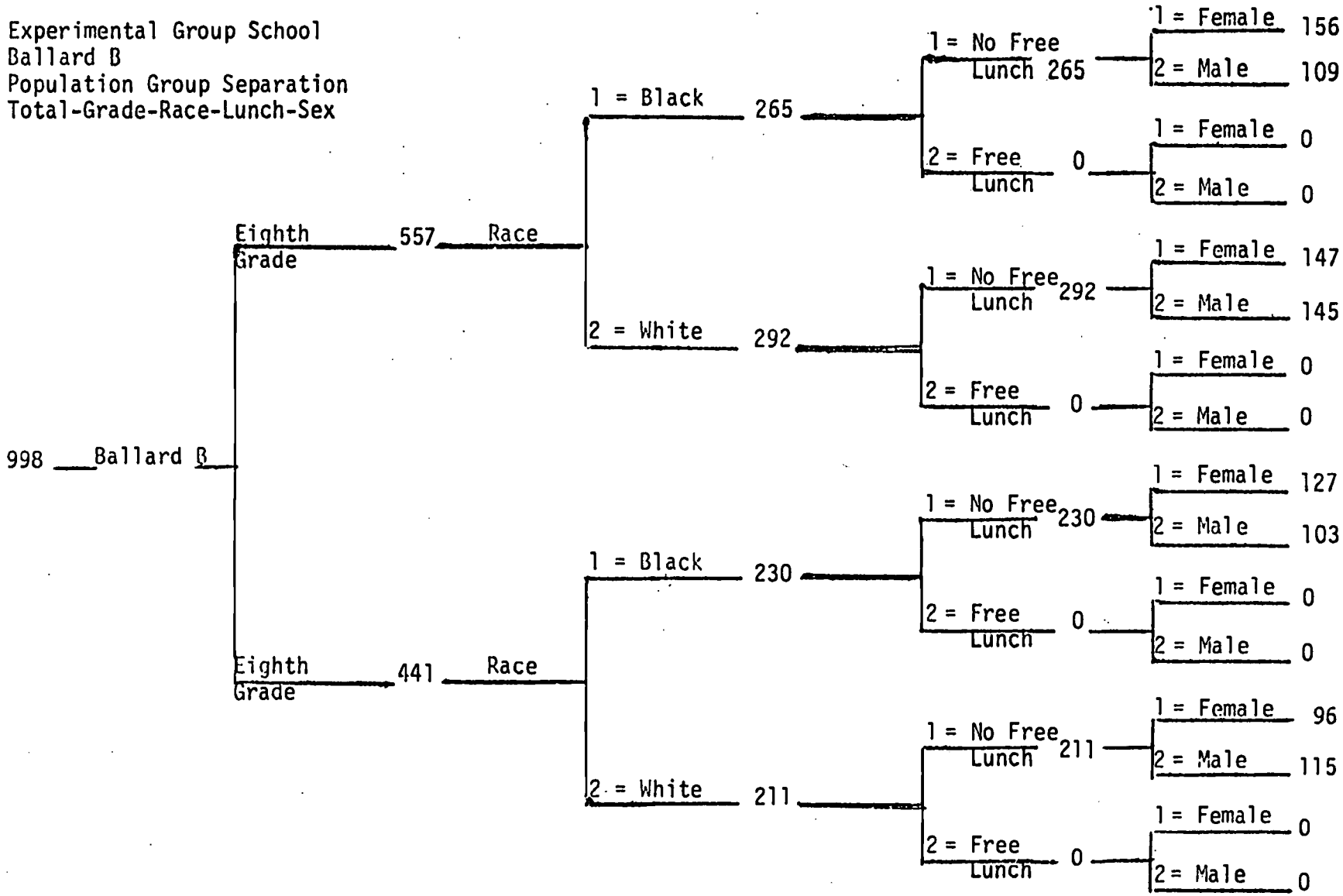
APPENDIX B

ERIC

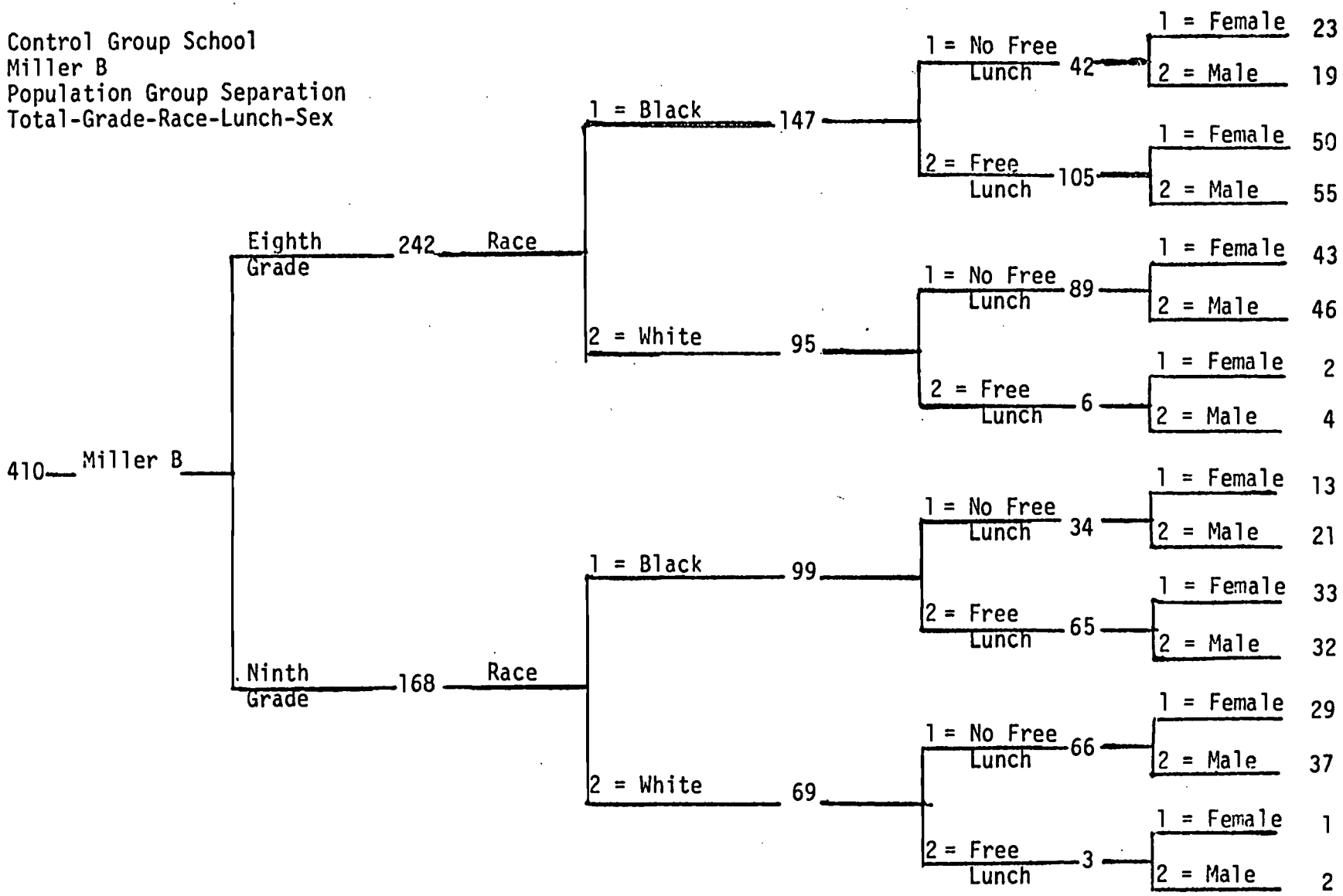
Control Group School
Ballard A
Population Group Separation
Total-Grade-Race-Lunch-Sex



Experimental Group School
Ballard B
Population Group Separation
Total-Grade-Race-Lunch-Sex



Control Group School
Miller B
Population Group Separation
Total-Grade-Race-Lunch-Sex



Factoral Design - 3 X 2 X 2 X 2 X 2 = 48

Legend

A = School
B = Grade
C = Race
D = Lunch
E = Sex

School

A_1 = Ballard A
A_2 = Ballard B
A_3 = Miller B

Grade

B_1 = Eighth
B_2 = Ninth

Race

C_1 = Black
C_2 = White

Lunch

D_1 = Free lunch
D_2 = No-free lunch

Sex

E_1 = Male
E_2 = Female

GROUPS BY SCHOOLS

A_1	B_1	C_1	D_1	E_1	59	A_2	B_1	C_1	D_1	E_1	Ø	A_3	B_1	C_1	D_1	E_1	55
A_1	B_1	C_1	D_1	E_2	74	A_2	B_1	C_1	D_1	E_2	Ø	A_3	B_1	C_1	D_1	E_2	50
A_1	B_1	C_1	D_2	E_1	11	A_2	B_1	C_1	D_2	E_1	109	A_3	B_1	C_1	D_2	E_1	19
A_1	B_1	C_1	D_2	E_2	26	A_2	B_1	C_1	D_2	E_2	156	A_3	B_1	C_1	D_2	E_2	23
A_1	B_1	C_2	D_1	E_1	20	A_2	B_1	C_2	D_1	E_1	Ø	A_3	B_1	C_2	D_1	E_1	4
A_1	B_1	C_2	D_1	E_2	10	A_2	B_1	C_2	E_1	E_2	Ø	A_3	B_1	C_2	D_1	E_2	2
A_1	B_1	C_2	D_2	E_1	137	A_2	B_1	C_2	D_2	E_1	145	A_3	B_1	C_2	D_2	E_1	46
A_1	B_1	C_2	D_2	E_2	131	A_2	B_1	C_2	D_2	E_2	147	A_3	B_1	C_2	D_2	E_2	43
A_1	B_2	C_1	D_1	E_1	51	A_2	B_2	C_1	D_1	E_1	Ø	A_3	B_2	C_1	D_1	E_1	32
A_1	B_2	C_1	D_1	E_2	48	A_2	B_2	C_1	D_1	E_2	Ø	A_3	B_2	C_1	D_1	E_2	33
A_1	B_2	C_1	D_2	E_1	20	A_2	B_2	C_1	D_2	E_1	103	A_3	B_2	C_1	D_2	E_1	21
A_1	B_2	C_1	D_2	E_2	26	A_2	B_2	C_1	D_2	E_2	127	A_3	B_2	C_1	D_2	E_2	13
A_1	B_2	C_2	D_1	E_1	124	A_2	B_2	C_2	D_1	E_1	Ø	A_3	B_2	C_2	D_1	E_1	2
A_1	B_2	C_2	D_1	E_2	122	A_2	B_2	C_2	D_1	E_2	Ø	A_3	B_2	C_2	D_1	E_2	1
A_1	B_2	C_2	D_2	E_1	12	A_2	B_2	C_2	D_2	E_1	115	A_3	B_2	C_2	D_2	E_1	37
A_1	B_2	C_2	D_2	E_2	7	A_2	B_2	C_2	D_2	E_2	96	A_3	B_2	C_2	D_2	E_2	29
Total					878	Total					998	Total					410

APPENDIX C

ERIC

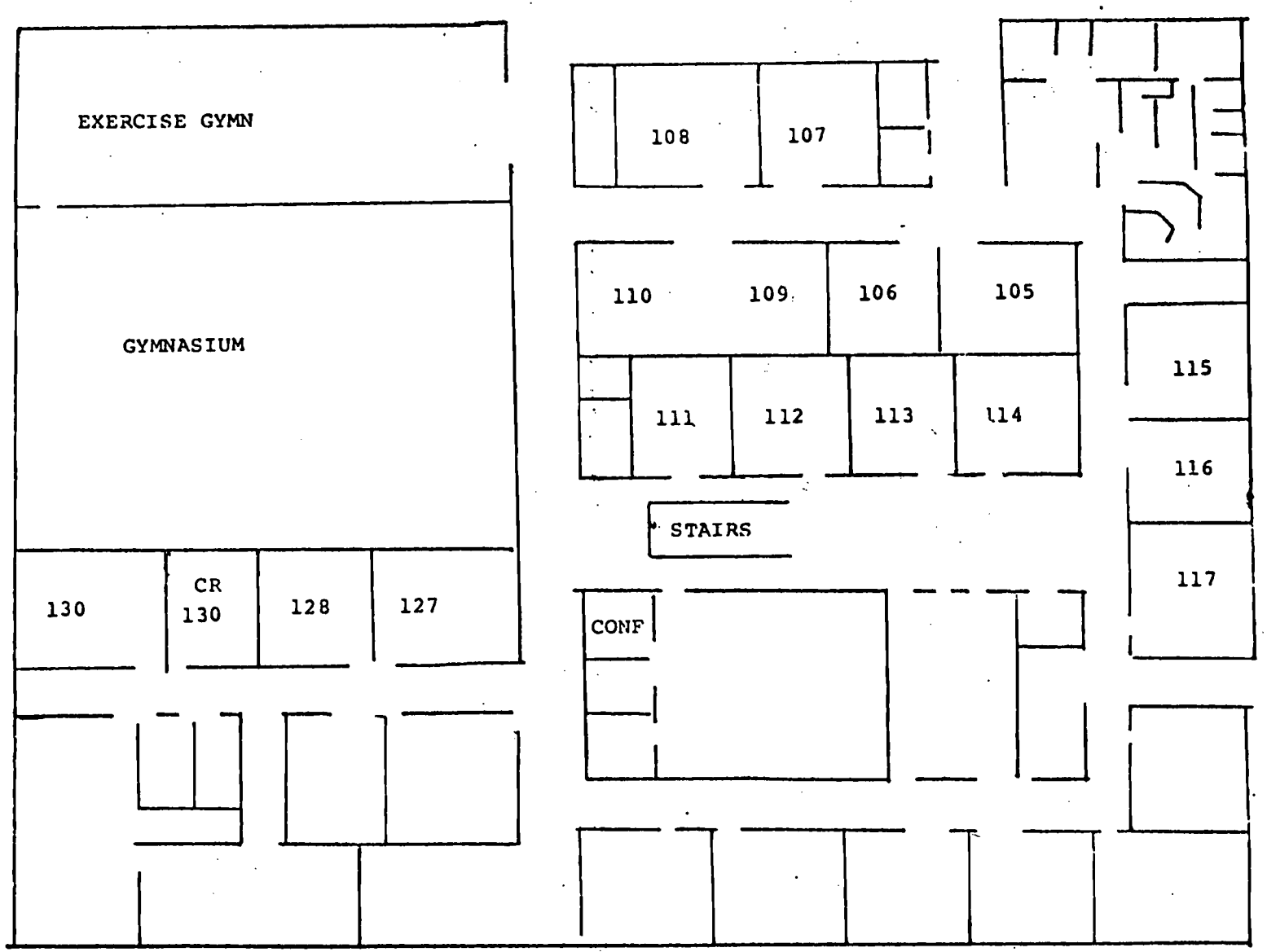
Table 13

Comparison of Physical Characteristics of the Three Schools

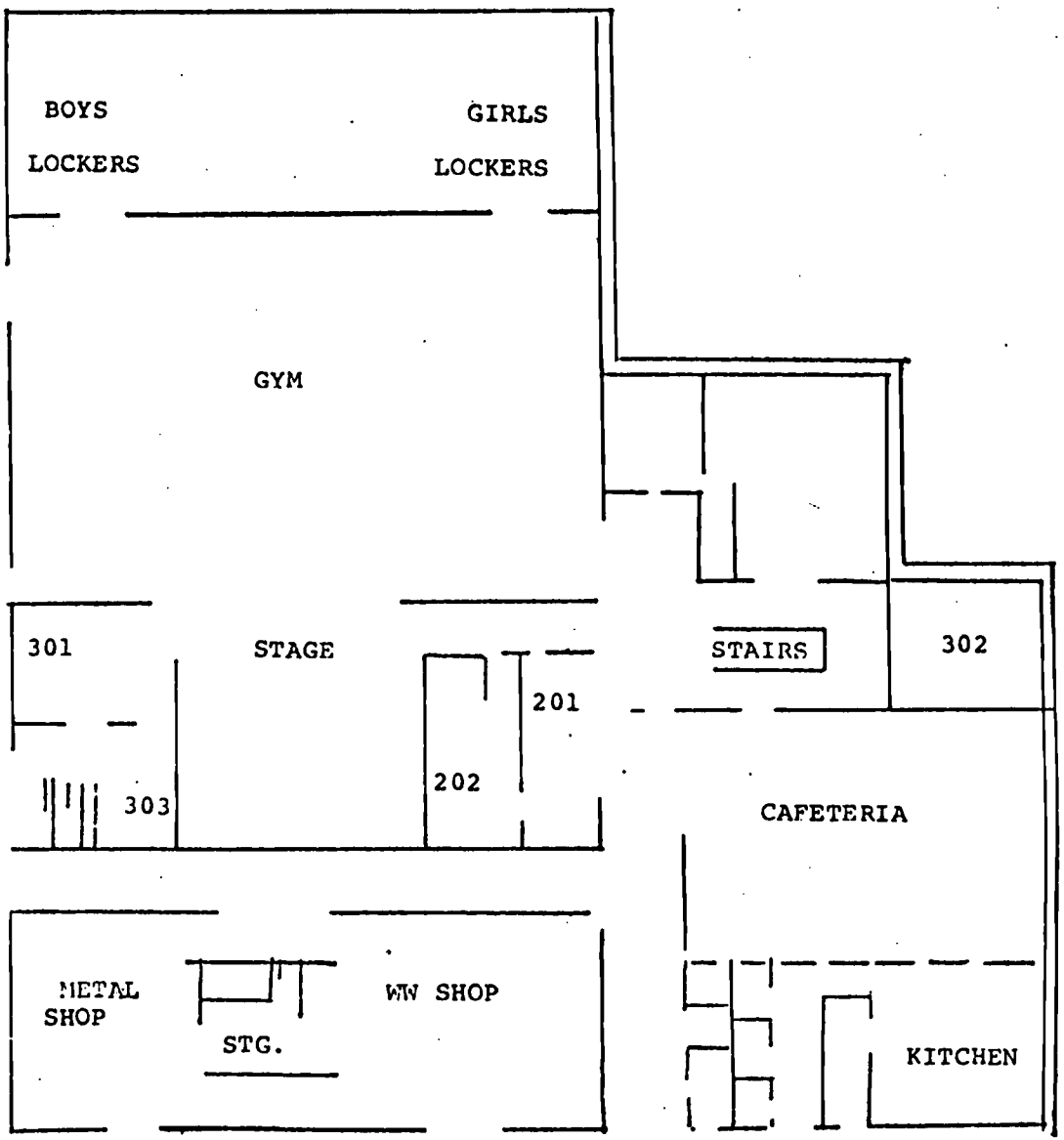
Characteristics	Schools in Study		
Physical	Experimental 1	Control 1	Control 2
Plant Type	Finger Plan	Compact	Rectangular
Exterior Walls	Brick	Brick	Brick
Interior Walls	Epoxy Paint	Brick/vinyl	Plaster
Windows	1 per classroom	None	Multiple
Height in Rooms	Nine feet	Ten feet	Twelve feet
Halls	Long wing type	Compact	Wide/high
Floors	Tile/carpet	Terrazzo	Wood
Library	Carpet/adequate	Tile/adequate	Old/inadequate
Administrative Area	Adequate	Excellent	Poor
Lighting	Fluor/excel.	Fluor./excel.	Incandescent/poor
Grounds	Excellent	Fair	Inadequate
Number of Classrooms	52	30	27
Lunchroom	Excellent	Excellent	Poor
Counseling Area	Excellent	Good	Poor
Security Building	Excellent	Excellent	Poor
Floor Levels	One	Two	Three
Chalkboards	Excellent	Adequate	Poor
Structure Built	1949 - Renovated 1974	1966	1932
P. E. Space	Good	Good	Fair
State of Maintenance	Excellent	Excellent	Poor
Cleanliness	Excellent	Fair	Poor

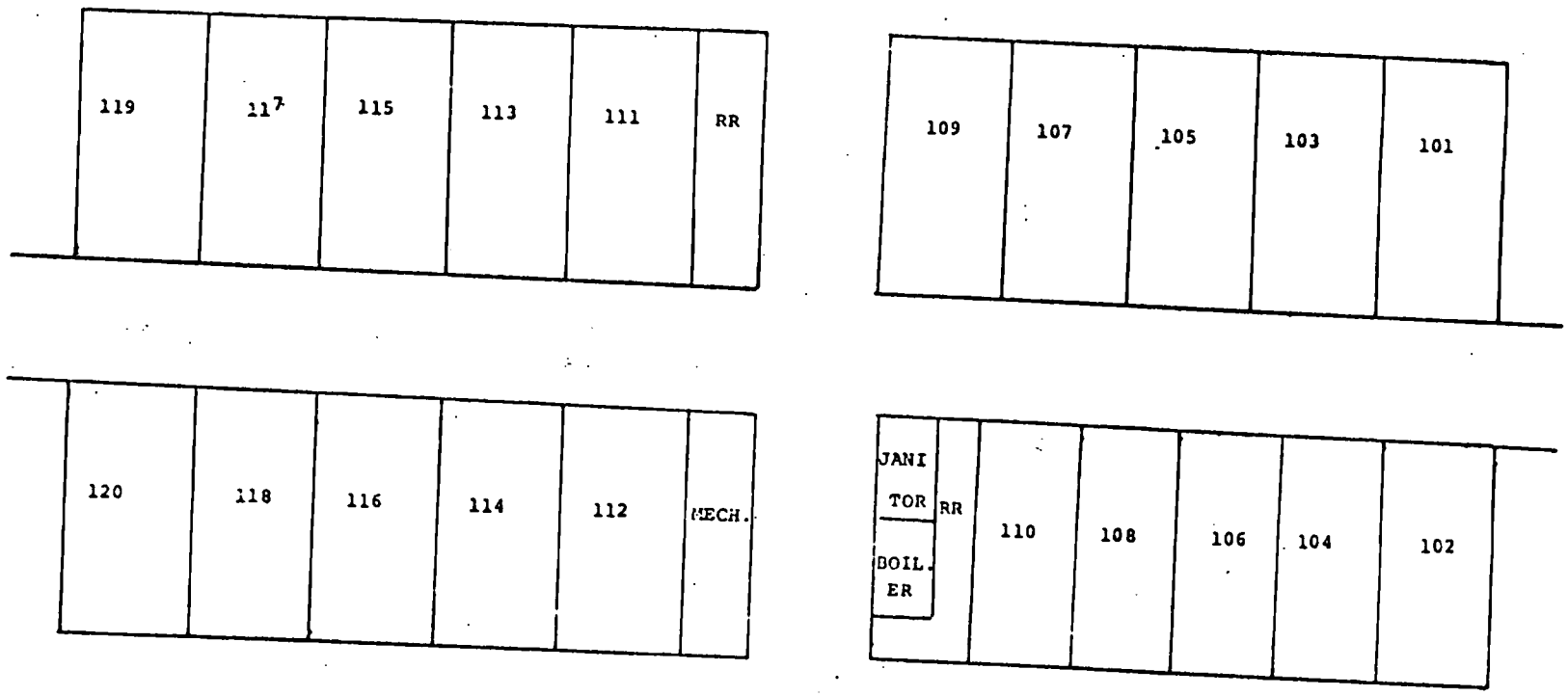
APPENDIX D

B A L L A R D A


EXERCISE GYMN
GYMNASIUM
108
107
110
109
106
105
111
112
113
114
115
116
117
STAIRS
CONF
130
CR
130
128
127

BALLARD A * LOWER LEVEL

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RR
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120
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JANI
TOR
BOIL.
ER
RR
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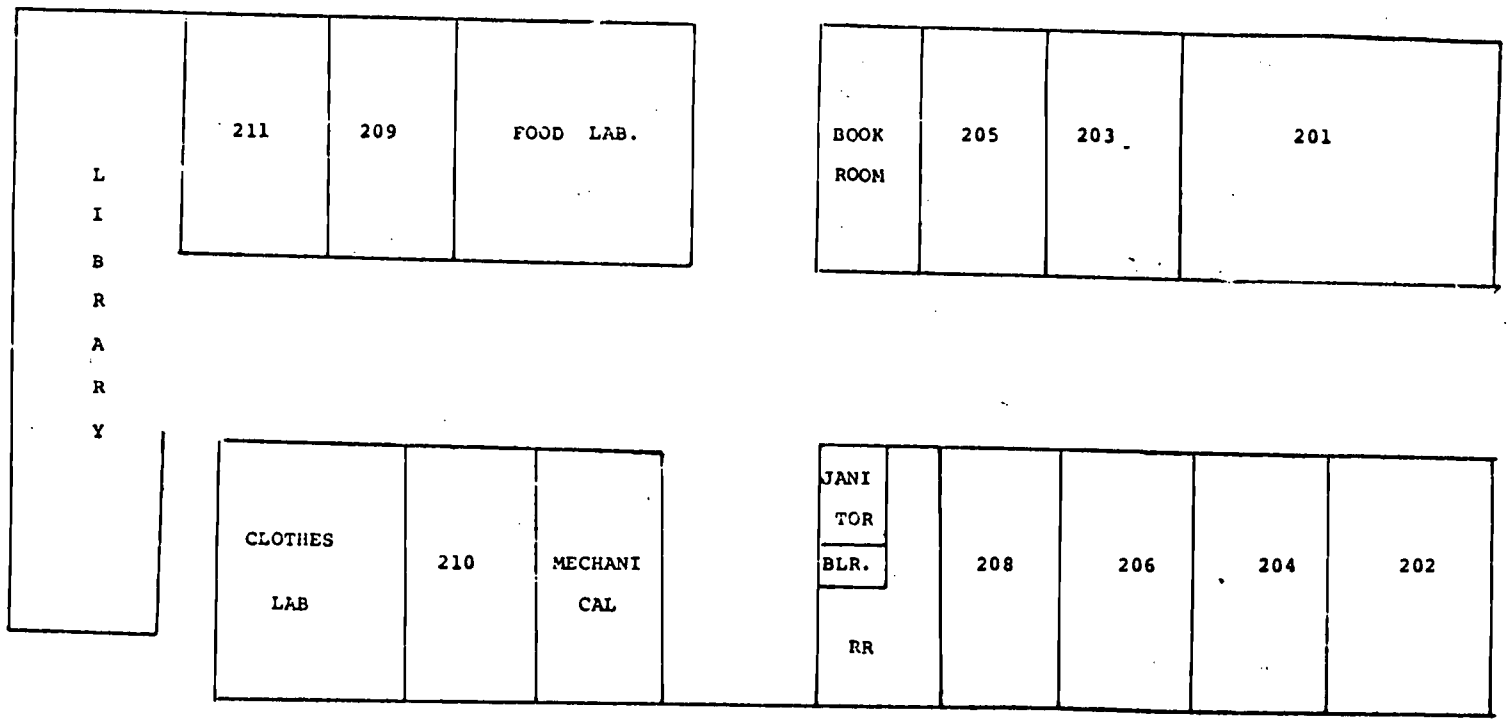
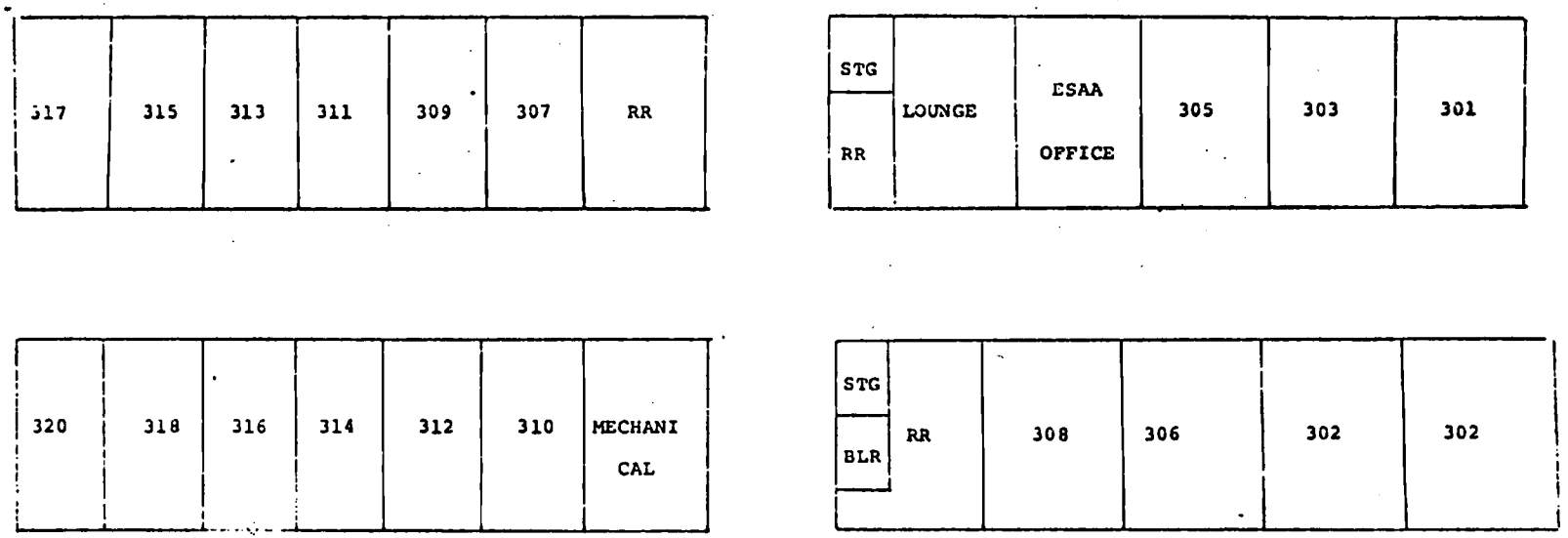
104
102

B A L L A R D B


LIBRARY
211
209
FOOD LAB.
BOOK ROOM
205
203
201
CLOTHES LAB
210
MECHANICAL
JANITOR
BLR.
RR
208
206
204
202

BALLARD B



B A L L A R D B

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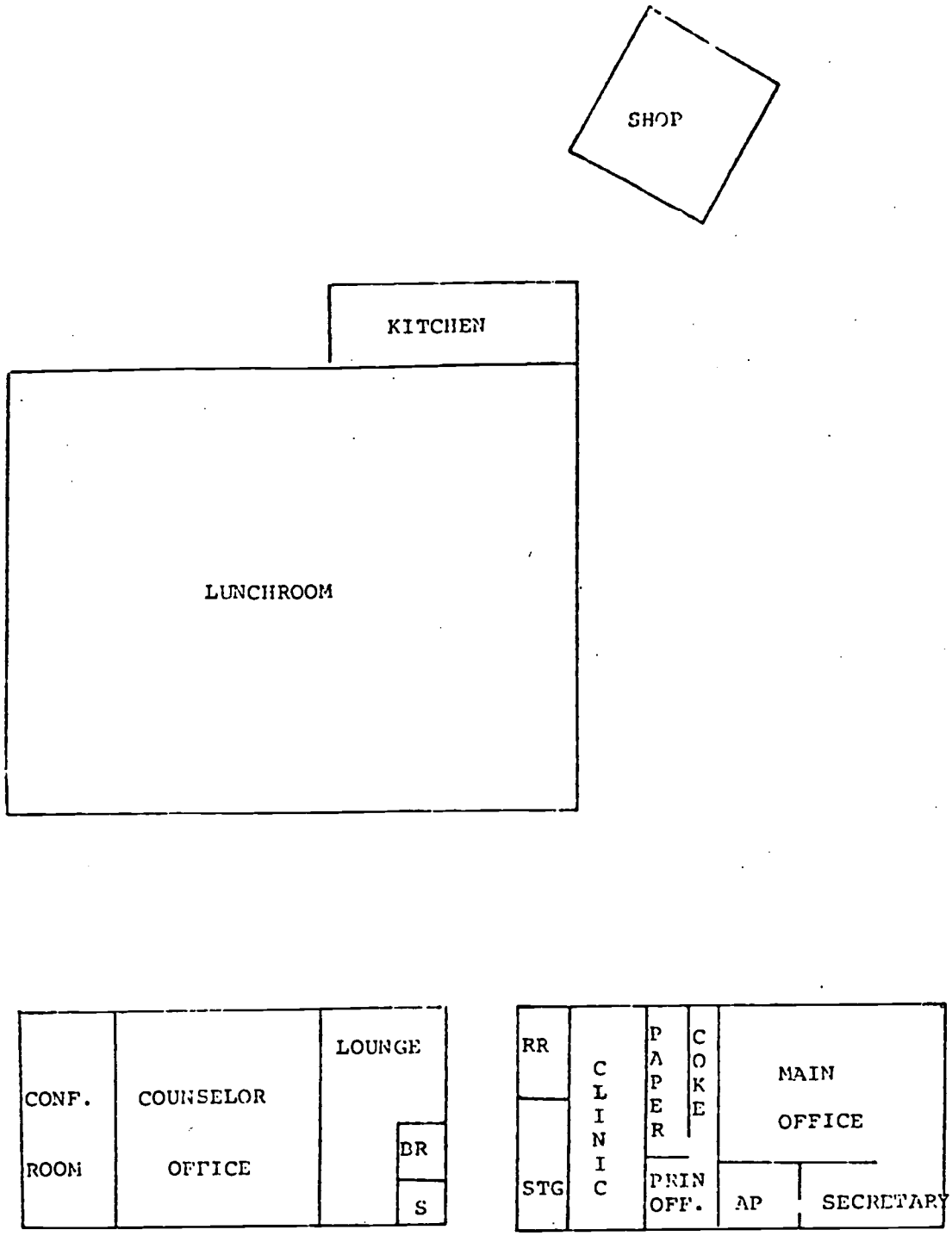

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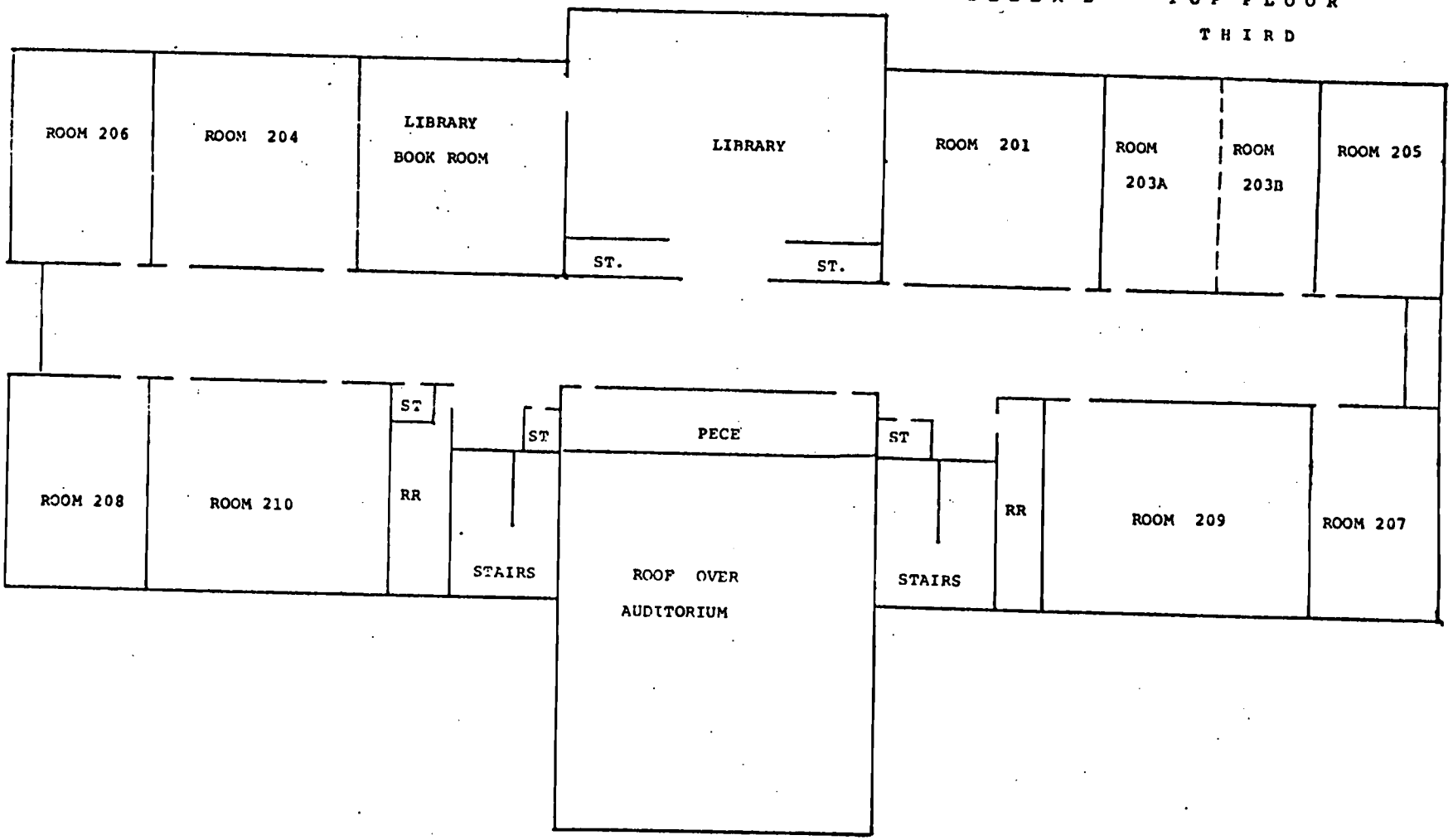
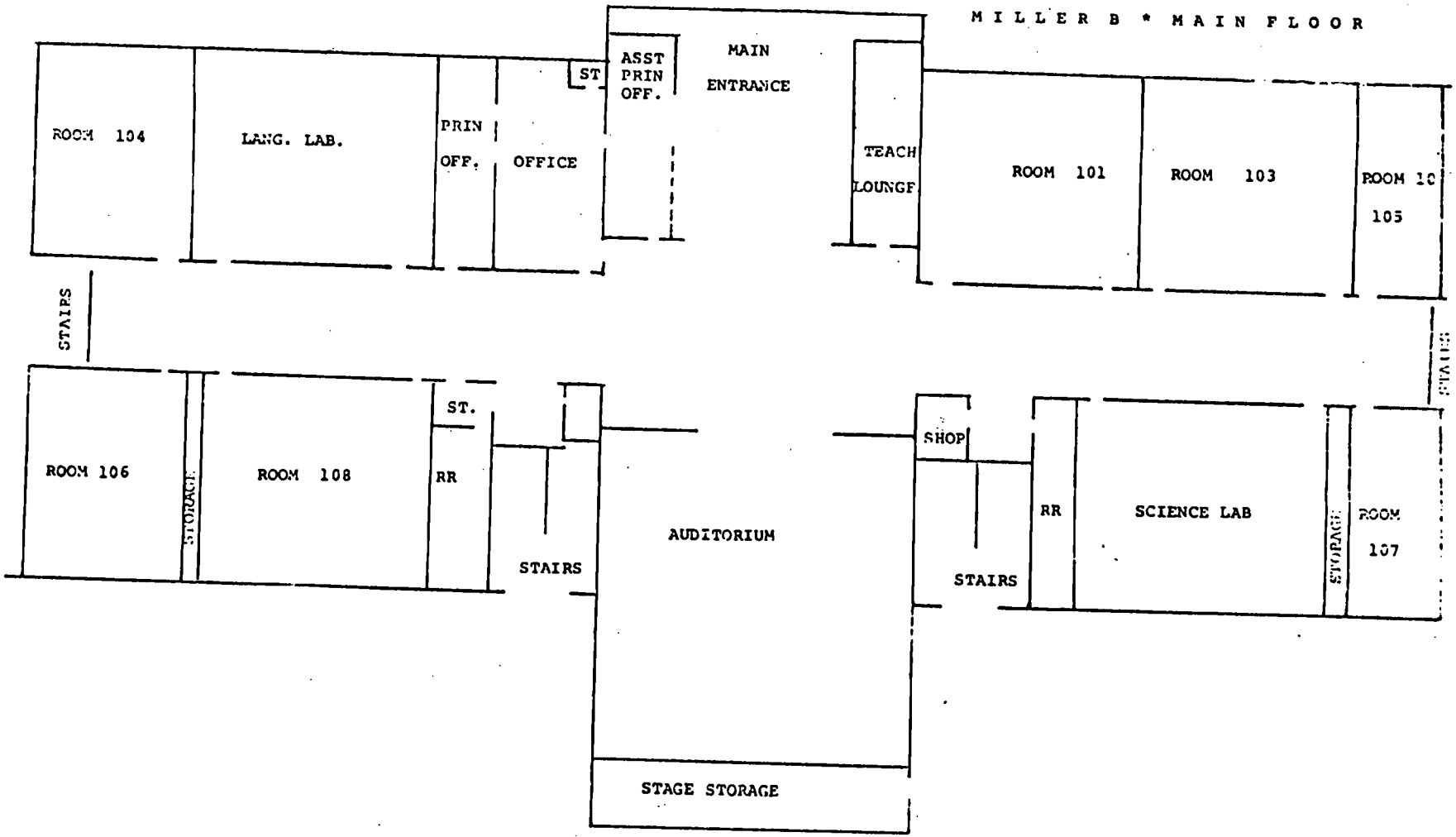
B A L L A R D B

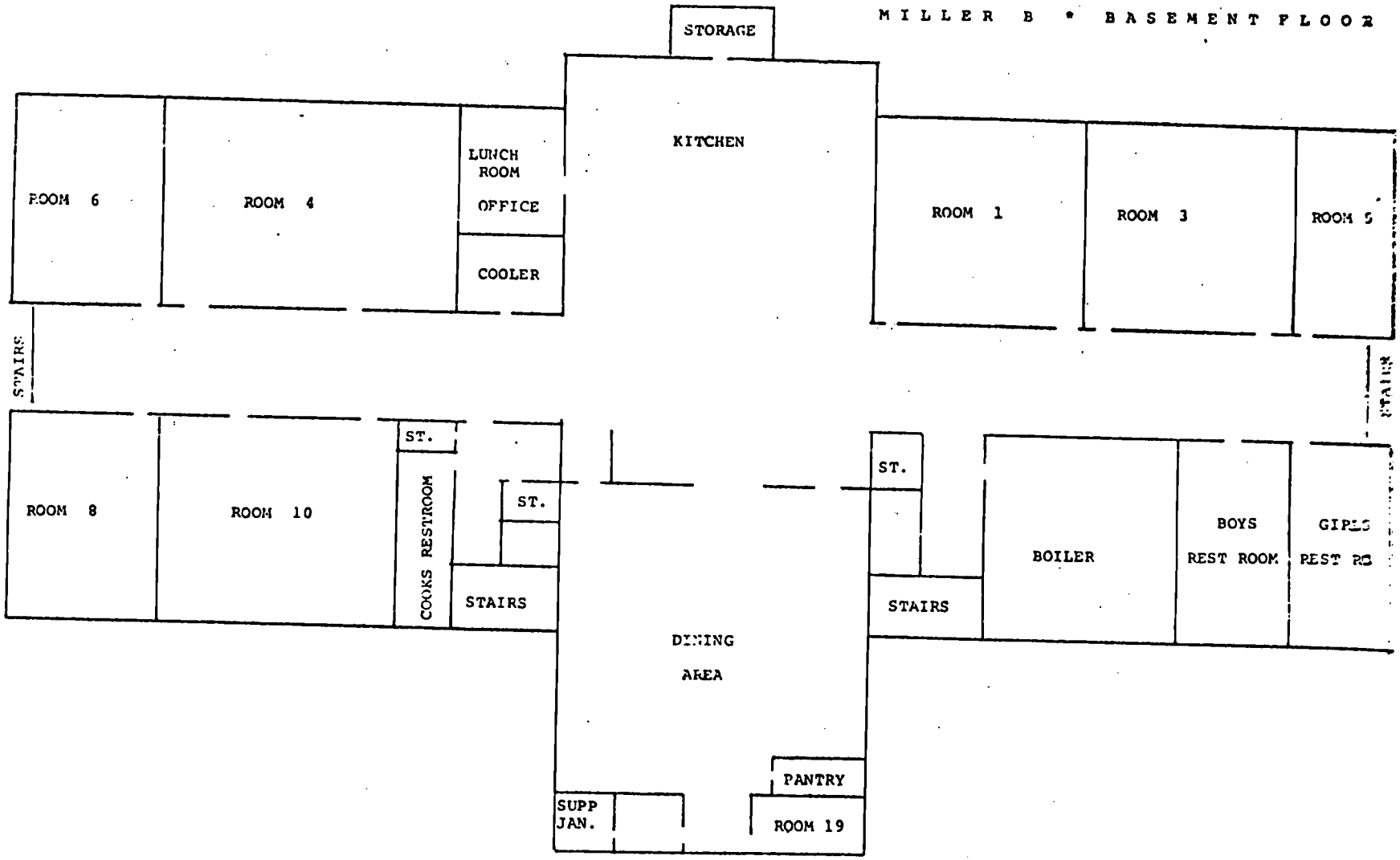
MILLER B * TOP FLOOR

THIRD




MILLER B * MAIN FLOOR
ROOM 104
LANG. LAB.
PRIN OFF.
OFFICE
ST
ASST PRIN OFF.
MAIN ENTRANCE
TEACH LOUNGE
ROOM 101
ROOM 103
ROOM 105
STAIRS
ROOM 106
STORAGE
ROOM 108
ST.
RR
STAIRS
AUDITORIUM
SHOP
STAIRS
RR
SCIENCE LAB
STORAGE
ROOM 107
STAGE STORAGE

MILLER B * BASEMENT FLOOR



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