

INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.
2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.
3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in "sectioning" the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again — beginning below the first row and continuing on until complete.
4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from "photographs" if essential to the understanding of the dissertation. Silver prints of "photographs" may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.
5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

University Microfilms International

300 North Zeeb Road
Ann Arbor, Michigan 48106 USA
St. John's Road, Tyler's Green
High Wycombe, Bucks, England HP10 8HR

MASTERS THESIS

13-10,450

HESSE, Bruce Edward, 1949-
AN EXAMINATION OF THE ECOLOGICAL
PSYCHOLOGY LITERATURE WITH RESPECT TO
SCHOOL SIZE, BEHAVIORAL PSYCHOLOGY AND
CULTURAL SURVIVAL.

Western Michigan University, M.A.,
1977
Psychology, social

Xerox University Microfilms, Ann Arbor, Michigan 48106

An Examination of the Ecological Psychology
Literature with Respect to School Size, Behavioral
Psychology and Cultural Survival

by

Bruce E. Hesse

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

Western Michigan University
Kalamazoo, Michigan
August 1977

ACKNOWLEDGEMENTS

The writing of this thesis was encouraged and guided by many sources. Interested fellow graduate students have provided the necessary verbal community which maintained much of the verbal repertoire related to this topic. Of considerable importance was the attention, criticisms, advice and general encouragement provided by Dr. Jack Michael. Without his help and effective teaching strategies I would still be struggling with the complexities of the subject matter. I am grateful to my committee members Dr. Brian Iwata and Dr. Howard Farris for their interest and helpful suggestions in this project. A special thanks to Guy Dennehy for his perceptive comments which focused my attention on key issues.

Bruce E. Hesse

TABLE OF CONTENTS

CHAPTER		PAGE
I	INTRODUCTION	1
	Definitions of Social Behavior and Size	1
	Large vs Small	2
	Disciplines and Types of Analysis Relevant to Group Size	5
II	ECOLOGICAL PSYCHOLOGY	7
	Origin, Definition and General Assumptions	7
	Introduction to the Ecological Psychology of Barker & Wright	8
	Behavior Setting Theory and the Behavior Setting Unit	10
III	RELEVANT RESEARCH ON SIZE	15
	The Effects of school Size on Student Participation in School Activities	15
	Other Characteristics Related to School Size	28
	The Issue of Undermanning, A Finer Grained Analysis	29
	Problems with the Early School Research	33
	General Summary of the Assumptions Based on the Research	36

IV	THEORETICAL RELEVANCE OF THE BEHAVIOR SETTING METHODOLOGY	41
	Examining School Effectiveness	41
	A Revised Behavior Setting Survey Approach	43
	The Pros and Cons of Working with Behavior Setting Units	45
V	APPLYING THE EXPERIMENTAL ANALYSIS OF BEHAVIOR	49
	Definition of Relevant Terms and Concepts	49
	A Behavioral Explanation of the Effects of Size	52
VI	CONCLUSION	55
	Steps Toward a Solution to the Ills of Largeness	55
	The Trend Toward Largeness	58
	Implications	60
	REFERENCES	63

INTRODUCTION

The environment is affected both directly and indirectly by the activities of its occupants who, in return, are profoundly influenced by these and other environmental changes. The changes may be direct and simple or indirect and quite complex. The social environment is no exception, and the understanding of its effects is still far from complete. The successful methods of investigation of the natural sciences would seem to be a promising approach. Their relevance to the study of human behavior has been well argued by B. F. Skinner and much has been learned about the behavior of the individual. If this approach can be applied to the analysis of people in groups without the invention of additional principles one source of complexity may be eliminated.

Definitions of Social Behavior and Size

As noted by Skinner (1953) "Social behavior arises because one organism is important to another as part of its environment". He defines social behavior as "the behavior of two or more people with respect to one another or in concert with respect to a common environment". Of the many variables which affect this relationship an often mentioned but seldom carefully studied feature is size of the group. Social organizations are composed of individuals interacting with each other in various numbers. To carry out the function

of the group a certain number of activities must be performed by an appropriate number of people, the aspect of this interaction in terms of the number of activities and the number of people involved is referred to as "size".

Large vs Small

It seems to be generally assumed that as an organization grows it becomes better. This is revealed in our everyday reference to the size variable. Businesses are successful if they "grow", towns are "prosperous" if they attract industry or increase their boundaries, and universities are "impressive" if their expansion is evident. Organizations which only maintain their size are "stagnant" while those that shrink are said to "be dying". A general "expansionist" notion is basic to many who influence social policy. The possibility that larger facilities set the stage for serious social problems is often overlooked as a result of this emphasis on growth.

Some argue that smallness has advantages which outweigh those of largeness; for certain purposes it is considered more reasonable to keep social units small. This point has been taken from an evolutionary, a psychological and an economic stance. For example, Rene Dubois (1968) has argued:

"During its evolution, the human species probably became adapted to social life in small groups,

where each member knew each of the others personally. Perhaps there was a need for larger social gatherings from time to time, but certainly not often".

B. F. Skinner (1976) asks:

"What is so wonderful about being big? It is often said that the world is suffering from the ills of bigness, and we now have some clinical examples in our large cities. Many cities are probably past the point of good government because too many things are wrong".

The British economist E. F. Schumacher (1973) writes:

"When it comes to action, we obviously need small units, because action is a highly personal affair and one cannot be in touch with more than a very limited number of persons at any one time".

If smaller units are more or less useful than their larger counterparts the question of "why" emerges. What are the conditions under which one unit size has relevant and observable advantages over another unit size? In other words, what is an optimal size and why? Schumacher (1973) addresses this issue briefly:

"For every activity there is a certain appropriate scale, and the more active and intimate the activity the smaller the number of people that can take part. What scale is appropriate? It depends on what we are trying to do".

The things that we do define the practices of our culture. A culture evolves when new practices further the survival of those who engage in them. Cultural survival is a criterion by which a practice could be judged. If we intend to work for the survival of

the culture, by attempting solutions to current social problems as well as transmit key cultural practices from one generation to the next, the study of appropriate unit size should prove advantageous.

Skinner optimistically points out that small communities would make possible "the application of a behavioral technology". For example a small Walden II community could serve as a pilot experiment.

"It is a setting in which it should be possible to increase our understanding of human behavior with the greatest possible speed. Here is our chance to answer the really important questions facing the world today. Questions not about economics or government but about the daily lives of human beings". (1976)

Thus, a key advantage to a small unit would be its managability, making experimentation more reasonable. Taking this a step further Skinner argues that with an increased understanding of the relevant functions of a social environment, social reformers could more effectively make changes in the "face to face control of people by people". These changes could best be accomplished in small groups.

"...people always control people on a small scale. We act on others as parents, friends, acquaintences, teachers, counselors, not to say entrepreneurs and politicians in small segments of the world. It is there that the Experimental Analysis of Behavior is most directly applicable". (1976a)

Disciplines and Types of Analysis Relevant to Group Size

Any analysis begins with the division of the field of study into useful units. Traditionally, individual organisms have been studied in psychology and sociology has dealt with group phenomena. This division of labor has become less useful as advancing methodology reveals significant interdependencies between these levels of analysis. New disciplines have arisen to address these interdependencies, with the blend revealed in their names (Social Psychology, Community Psychology, Ecological Psychology, Human Ecology, Behavioral Social Psychology, Environmental Design, and Behavioral Ecology). Each area (and others) has attempted to explain group behavior and many mention size as an important feature. Unfortunately, the use of widely divergent units of analysis prevents each from taking maximal advantage of the others' "findings". In this discussion the "unit of analysis" will refer to what the investigator examines, measures or counts.

For a complete and accurate description of functional or casual relationships regarding social issues and particularly the size variable, a longitudinal analysis is needed. An understanding of the survival value of cultural practices requires longitudinal projection and methodologies which include this are particularly useful. Those which embrace the notion of "ecology" are especially interesting.

Willems (1974) claims that both the fields of applied behavior analysis and ecology could profit from cooperative research efforts since both share some fundamental assumptions. The purpose of this paper will be to examine this claim by surveying the theory and research findings derived from the non-behavioral approach of "ecological psychology". This survey will include background on the origins of ecological psychology, a discussion of major postulates related to the theory, a report of the relevant research findings related to the size issue and some general criticisms. An attempt will be made to discover what this line of research has to offer the behavioral field when study of the size variable is considered. A behavioral treatment of the research findings will be offered with suggestions on how assumptions based on these findings could be applied to school problems.

ECOLOGICAL PSYCHOLOGY

Origin, Definition and General Assumptions

Ecology comes from a Greek word meaning "home" or "homeland". In biology, ecology refers to the study of the habitat of plants and animals. Studied are the structures, population characteristics, and functions of the inter-related system. When this approach is applied to the field of psychology the blend is referred to as Ecological Psychology (with further blends being created by different groups who label their work as Human Ecology, Behavioral Ecology, etc.).

According to William LeCompte (1972):

"Ecological Psychology is defined as the study of natural, unarranged patterns of social and physical stimuli in the immediate environment of the individual and their effects on his behavior and experience".

In a general sense the application of ecological concerns to the study of human behavior has involved the observation of individual behavior in a number of settings to determine consistency and variability as well as particular interaction effects. Resources for dealing with any problems are assessed in terms of the total system. Certain basic assumptions are stressed (Golann, 1975):

- 1) Interdependence--A system is composed of elements which are so related that changes in one part of the system will

result in changes in other, related parts of the system.

2) Adaption--The way in which organisms or systems are altered by environmental influences to meet survival criteria. The importance of situational determinants of behavior is stressed and the point is noted that behavior effective in one setting may be maladaptive in another setting.

3) Cycling of Resources--Studied is the manner in which available resources are recruited, developed and utilized. Also important is the quality and quantity of these resources.

4) Succession--This being the time perspective and order of changes in practices with respect to the adaption process. Included here is the process which views current practices in terms of their historical origins as well as their projected, future effects.

Introduction to the Ecological Psychology of Barker & Wright

In 1947 Roger G. Barker and Herbert F. Wright founded the Midwest Field Station to study human behavior in its natural habitat. Their intention was to use the methodology of the earlier phases of science which included the "descriptive, natural history, ecological" approach. They hoped to develop field techniques for measuring, recording and analyzing large samples of complex behavior observed over time. Attempts were made to identify a meaningful "unit" for analysis. Looking over their lengthy ob-

servational records they noticed that in certain, quite different settings (basketball games, drug stores, Sunday School classes) groups of people tended to behave in a similar fashion, year after year, despite constant changes in the individuals involved. This discovery of "standing behavior patterns" led to the identification of a unit for analysis in future research. This unit, the "behavior setting" led to the development of "behavior setting surveys" which were used to map out the various activities available to people within a certain environment. This effort provided quantitative measures of important aspects of the interaction between the individual and his environment. With this tool, Barker and Wright were able to make comparisons of diverse environments in terms of "what people did" in each. Attempting to make their analysis more precise, measures were taken of the responsibility and degree of involvement of each person's participation in the behavior setting. Referred to as the "degree of penetration", involvement was scored within a range from "onlooker" to "single leader" with four steps in between, each providing for the person more authority to direct and support the activities which defined the setting.

From these efforts evolved a theory of ecological origins dealing with population size and organization. This "Behavior Setting Theory" led to more research which attempted to deal directly and extensively with the effects of size on human behavior.

Of central importance to the understanding of the rationale and methodology of this relevant research (to be reported later), a clear picture of the basic theory and unit of analysis is needed.

Behavior Setting Theory and the Behavior Setting Unit

Barker's background included a strong tie to the notions of Kurt Lewin and the area of Gestalt psychology referred to as "field theory". His research and that of his students concerned the study of environments divided into their respective behavior setting units. The goal of this work was to verify the correctness of the Behavior Setting Theory, or alter it if necessary.

Theoretically, the unit of "behavior setting" is considered a stable entity in relation to that which surrounds it. Its unity is maintained by a balance of many forces which come to bear on the setting from a variety of independent sources. These can come from the community, within the setting itself, or from the individuals who populate the setting. It is due to this variety of sources of control that a setting maintains its stability. There is hypothesized a "thing-medium" relationship between the setting and its parts. For every setting there is an optimal number of parts. As the number of parts decreases below the optimal point, the forces acting upon the individuals increase in both strength and range of

direction. Since individuals are involved in the behavior setting, it exists due to the benefits these individuals derive from it; if no one profited from the setting, it would cease to exist.

Barker (1960) asserts that large organizations are well populated with enough or more than enough people to perform the essential tasks. The behavior settings which characterize large organizations are not threatened by lack of manpower. However, those small organizations with complex settings and many tasks, are normally characterized by lack of personnel to carry out all tasks, thus, these settings are likely to be "undermanned". These "undermanned" settings are said to affect their members in ways which differentiate them from other settings. Thus, Barker has assumed that the "degree of manning of the behavior settings" varies directly with organization size.

A precise definition of a "behavior setting" will become more apparent once it's elements are revealed. Of primary importance to the setting is what Barker refers to as "standing behavior patterns" or "persisting, extra-individual behavior phenomena". Most standing patterns are characteristic of particular places, things and time. These behavior patterns fit with the nonpsychological context of the surroundings (the physical world so to speak) in the sense that one eats in a cafe but not in a library or writes with

a pencil but not with a shovel. (Barker & Wright 1954)

According to Wicker (1968) a behavior setting is:

"an ecobehavioral unit whose characteristics include occurrence at a specifiable time and place, a systematic arrangement of people, other physical objects and certain patterns of behavior".

To Gump (1971) behavior settings have:

"non-behavioral factors of milieu and time, standing patterns of behavior occurring over time and relationships between behavioral and non-behavioral factors".

According to Barker (1964) settings are "organized assemblies of behavior episodes, physical objects, spaces and durations". These settings "have coercive power over individuals; no one dances in Mr. Johnson's chemistry class and no one carries out chemistry experiments at the sock hop".

The sock hop has non-behavioral factors (dance floor, record player and record), standing patterns of behavior (dancing or requesting dances) and relationships between the two. Likewise, the chemistry class has test tubes, tables and chemicals (the physical objects), predictable patterns of behavior (weighing, mixing and heating chemicals) and relationships between the two (experiments).

The research approach to explaining behavior in terms of behavior settings begins with the identification of the varieties of settings within a specified area. A behavior setting survey is

constructed in the following manner. (Barker & Wright, 1954)

1) The physical environment is observed with notice given to bounded areas or written materials are consulted which name places or particular activities (for example a drug store, a football game, a high school play, etc.)

2) Only those places which possess typical repeated patterns of behavior, occurring under similar circumstances in the same general locale are considered potential settings.

3) The places are subdivided into parts which contain the greatest number of people behaving in a similar manner due to the influence of the particular circumstances in which they are immersed. An example would be the 9:00 AM Worship Service of the Presbyterian Church rather than just Presbyterian Church (which would include activities of many different forms such as bingo, choir practice, sunday school, etc.).

4) Finally, combine those settings which are not independent of those to which they are linked and deal with them as subunits of the same, inclusive setting. For example, Monday Basketball Practice is not independent from Tuesday or Wednesday Basketball Practice and can be considered simply as Basketball Practice with subunits consisting of the particular day.

A setting can be described in terms of the number of days in a year it occurs (occurrence), the number of hours it functions during

a year (duration), and the total number of different persons who inhabit it for a period of time during the year (population). Occupancy time can also be calculated (the number of persons times the amount of time each spends in the setting).

RELEVANT RESEARCH ON SIZE

During the late fifties and early sixties Barker and his associates turned their attention to issues related to an application of their theory and procedures, particularly to a study of size differences. They chose as their targeted population various Kansas high schools considered to be representative of typical large or small organizations.

This was an important choice given the significant role of education in our culture. As noted by Skinner (1976b):

"the extent to which a culture develops the capacities of all of its members is the best measure of its strength and presumably the best predictor of its survival".

With reference to school size Skinner also states (1976):

"city schools show how much harm bigness can do to education and education is important because it is concerned with the transmission and hence survival of a culture".

The Effects of School Size on Student Participation in School Activities

Initially, student participation in inter-school and extra-curricular activities was studied (Barker & Hall, 1964). Examined were reports from government agencies, schools and school organizations. The targeted 218 Kansas schools were divided into nine categories according to school size, the range going from the

smallest school (18-60 students) to the largest (2,054-2,287). Since smaller schools were more numerous (191 had populations less than 300 and of these 131 had less than 100 students) and no distinction was made between three and four year high schools, the findings are considered only "suggestive". The number of participants in each category was expressed as a ratio of participants per thousand students per category. Two trends were revealed:

- "(a) the number of participants per thousand students is smallest in the largest schools
- (b) the number of participants per thousand is greatest in either the second or the third size category (with a school mean size of 155 students)" (Barker & Hall, 1964)

All the participation curves reached a peak in the smaller but not the smallest schools. This particular fact could be an artifact of the research design which measured only inter-school district contests and conferences. The very small schools entered (as schools) less often; thus, there was less chance for participation by their students.

Also examined were yearbook reports of activities engaged in by graduating seniors of 36 Kansas schools. It was discovered that small school seniors reported more school related extra-curricular activities than the large school seniors by a factor of over two to one. Also, small school students reported involvement in a wider variety of school activities than large school students.

This information sparked further research of a more detailed nature. Gump and Friesen (1964a) decided:

- "(a) to describe similarities and differences in the richness of nonclass offerings in large and small schools.
- (b) to determine the extent to which such offerings were actually used by large vs small school students.
- (c) to compare the quality of participation in the settings of large and small schools".

A behavior setting survey approach (described on p. 10) was used. Students were asked to fill out a questionnaire which listed the many settings available in their schools (as revealed from the completed survey). More specifically, they were asked what settings they had entered and what they did in each of these. One large school (2,287 students) and four small schools (83 - 151 students) were studied. From the behavior setting theory the authors predicted the following: "Participation of large and small school students should differ in the extent of penetration into behavior settings".

The rationale for this is as follows: "When enrollments of schools increase, the number of their settings do not increase proportionately". This means that more people are available to maintain the minimum requirements that support the setting, thus with an excess of people "there is a reduction in forces on any one person to engage in the central and important setting functions". The large school students will engage in fewer behaviors that are important

to the settings and hence will not be as involved as the small school students whose settings are undermanned. The result is that in small schools there will be strong pressures from others toward participation and the assumption of significant tasks.

The results verified the stated hypothesis. The mean number of students per setting (as calculated by dividing the number of students in the junior class by the number of available settings) was over three times as great in the large school as in the small schools. Even with a slightly larger variety of settings offered in the large school, on the average, the students surveyed participated in nearly equal numbers of settings regardless of school size. The small school students actually participated in a wider variety of settings per student than the large school students (who had a larger variety from which to choose).

The measured degree of participation by the various students reflects the "quality" of participation. Large school students on the average, entered the settings as "audience persons or as members only", more than small school students. The small school students held "responsible positions" more than twice as often as large school students and they "held high level performances six times as frequently as did large school juniors". Fifty-eight percent of the large school students were in three or less settings while only

twenty percent of the small school students participated as infrequently. When viewed in whole, the data for large schools yielded a total of 794 students exposed to 189 settings with an average number of 3-1/2 performances reported per student. The combined small schools data revealed 23 students exposed to 48 settings with an average of 8.6 performances reported per student. The general trend indicated that when school size increased beyond 340, the performance rates per student began to decline.

With these findings supporting the theory, the next step was to assess the students' reactions to this state of affairs. Gump and Friesen (1964b) wanted to know what the students felt about their involvement in the reported settings. In their words they wanted to discover what "participation in settings meant to large and small school juniors". A satisfaction report procedure was employed in which students in the previously reported research were asked to note the settings in which they participated that were satisfying, and to explain what they did that resulted in this "feeling of satisfaction". These responses were scored and coded into forty categories, then further grouped into eight clusters. Differences between large and small schools were then assessed. It was found that small school students reported more satisfactions related to "competence development" (learning to do things better), to

"challenge and big action" (hard work and self-testing by doing a lot or doing something very important) and "uplift value" (providing appreciation of and assistance toward higher cultural values expressed in art, literature or religion) than large school students. The large school students reported more satisfaction s dealing with "vicarious enjoyment" (watching others participate), "large entity affiliation" (being part of a crowd with no evidence of personal face to face relationships), "learning about their school's persons and affairs" and "gaining points via participation". **

With differences clearly indicated between large and small school students, the question of "why" was the next step in the analysis. Of particular concern was the explanatory value inherent in the behavior setting approach. Were the "forces" hypothesized in theory, actually discernible within the context of large and small schools?

** Each of the schools had a point system to encourage students to participate in "activities that might not be attractive enough without such an extrinsic reward". The authors speculate that small school students were "satisfied enough by intrinsic reward to ignore the points issue". The large school students "failing to achieve significant intrinsic rewards, may have reported the points as one thing they did get out of the setting". These points were referred to as Honor Points. There were certain school wide recognitions contingent upon earning a specified number of points.

Willems (1964) set out to study the "forces" which controlled participation in the various behavior settings. Asking students to record their "reasons for participation", Willems analyzed them in terms of their source of origin. These sources were the person himself (own forces of wishes, wills, needs), other persons in the environment (induced forces of the wishes, expectations or wills of others) and the impersonal environment (impersonal forces of machines, temperature, weather, etc.). Each student's reported "reasons" were categorized into "own" or "foreign" force categories (with the impersonal category ignored). Own forces were referred to as "attractions" and foreign forces were considered "pressures". In addition to this a more structured "card-sort" method was used. "Reasons" were printed on cards and then sorted by the students into "yes" or "no" boxes relative to the various activity settings.

The subject students were divided into two groups, those who were well suited to school and those who were not (the marginal students). Marginal students had IQ scores less than 99, two D's on their report card, mother and father non-graduates of high school and in non-professional or non-managerial occupations while the regular students had IQ's greater than 105, C's and above, parents who finished 10th and/or 12th grade and in professional or managerial positions. The number and types of forces reported by each group were compared in relation to school size. The

results indicated that small school students reported both more "forces of attraction" and "pressures to participate" than large school students. Also, there were more "pressures" than "attractions" reported by the small school students, (it appears that the contingencies involving escape or avoidance of aversive consequences were either more prevalent or more reportable than the contingencies involving positive reinforcement). Within the small school setting there was little difference between the number and types of forces reported by marginal and regular students. Yet, in the large school the marginal students were quite different, reporting both fewer attractions and fewer pressures than the regular students.

It was concluded that in small schools, marginal students were not left out, were needed and actively encouraged to participate. Large school marginal students were sort of "outsider" groups, unaffected by many of the attractions and pressures involving regular, large school students. An interesting point brought out by these results was that marginal students of small schools reported more forces to participate than did the regular students of the large schools.

Once again the results were interpreted to lend support to the behavior setting theory. This theory (reported in the language of the authors earlier, but here translated into more behavioral

terms) states that behavior settings provide opportunities for people to emit relevant behaviors. Due to the circumstances of the setting, for the contingencies to be effective, a certain number of participants are necessary. When the number is below the optimal each person must do more to maintain the activity, producing a wider variety of individual reinforcers and making the existing contingencies more effective. With a surplus of individuals, less behavior per person is required, leading to less frequent and less setting-relevant reinforcers for each person, with the consequential drop in the effectiveness of prevailing contingencies. Other, concurrent activities effectively compete with the setting and "fewer forces to participate" are reported by the individual.

This particular line of research was extended to include an investigation of a so-called "sense of obligation". (Willems, 1967) In the words of the author a sense of obligation was "a personal feeling of 'I ought to' or 'I must' with reference to attending, participating in, or helping with a group activity, with the stipulation that this personal feeling or disposition be reliably identifiable in a response protocol". Willems appeared to be interested in the existing contingencies maintained by the group as can be reported by its members. These, most likely, are what maintain the attending, participating or helping behaviors rather than the coll-

ateral "personal feelings" associated with them. His research approach (which employs only self report data of particular "feeling states") is weak. Many times, what can be readily reported by the subjects is not the important controlling variable but merely an artifact of the situation.

Studied were two large schools (populations 2,287 & 2,051) and two small schools (populations 83-151 & 81-103). The subjects were high school juniors classified as marginal students or regular students by the same standards mentioned earlier.

The students were asked to report the reasons they attended various, all voluntary, non-class activities (like school plays, sports events, pep club, etc.). The results were scored in terms of the "sense of obligation" criteria. Small school students reported more "sense of obligation" than large school students, the marginal students being the major source of the differences. In the small school the regular and marginal students were similar in their reports but in the large schools the marginal students reported much less obligation than regular students. A high correlation was found between sense of obligation, induced forces and number of performances as well as between induced forces and number of performances. No such correlations were found for reported "own forces".

Willem concludes that:

- 1) "The principle impact of school size appears to be upon marginal students".
- 2) "Sense of obligation is a function of external pressures of feedback toward participation".
- 3) "That sense of obligation mediates performance and induction pressures".

Up to this point, the reported research has been primarily directed toward the documentation of differences found between students of large and small schools, as it relates to the degree of manning of the settings found within these schools. The first criticism one may raise concerning this work is the lack of adequate experimental design controls. For example, since the large schools were located in large, somewhat urban communities and the small schools were in smaller, more rural communities, one might suggest that urban/rural differences accounted for the findings rather than school size. A possible solution to this problem would be to study schools of differing sizes in either all urban settings or all rural settings. Campbell (1964) examined three groups of students, each coming from rural towns but going to high schools of different sizes. The groups consisted of the following:

"small local"--students attending their own town's school

(town size 200, school size 53).

"consolidated"--students from surrounding communities of about the same size as "small local" but who were transported to a district high school with a population of 370 students.

"larger local"--students who attended the district high school but who also lived in the town where the school was located. The town population was 551 with a school of 370 students.

The students in each group were matched on the basis of sex, class in school and percentile rank on the Differential Aptitude Test. This process yielded 61 matched trios. Two variables, commuting and size of school, were nicely isolated with the third variable of community size being somewhat confounded (the larger local group lived in a rural community, yet it was over twice the size of the towns providing the other students for the study).

A questionnaire format was used. Students were presented with a variety of school behavior settings and asked to check the ones they participated in, give the reasons for participation and state what they did in each. The reasons were scored in terms of "own or foreign forces" and the participation reports were scored in terms of levels, ranging from just being present, to active participation, to assuming a position of responsibility.

"Small local" students reported more foreign forces to

enter a setting, more "performance participations", and reported participating in a broader range of settings. Those groups of students attending the larger consolidated school reported more entry level participations (just being there). In equal numbers for all groups were "total number of reasons" reported. In looking at the reported satisfactions of the students, the results only partially confirm previous findings. The small school students mentioned values of "Big Action and Test and Vicarious Enjoyment". The emphasis on "Big Action and Test" confirms an earlier finding by Gump and Friesen while the emphasis on "Vicarious Enjoyment" contradicts both the earlier finding and the explanation based upon the theory.

Campbell summarizes the effects of placing students in larger schools as causing a decrease in:

- (1) external pressures aimed at increasing participations in extracurricular activities
- (2) a sense of personal responsibility associated with extracurricular activities
- (3) the number of school settings penetrated to the performance level
- (4) the range of settings penetrated
- (5) the number of school settings judged to be most worthwhile
- (6) the number of satisfactions associated with physical well being, acquiring knowledge and developing intellectual interests, developing a self concept and a zest for living"

About consolidated, larger schools, Campbell says the following:

"Through its structural organization, its instructional

procedures, and its extracurricular activities, the larger school needs to ensure that ALL its students participate actively and acquire a genuine sense of attachment and contribution to group goals. There is temptation in a larger school to concentrate upon extra goals and standards which can be achieved by only the most talented students at the expense of the rest".

Other Characteristics Related to School Size

In opposition to the points stressed thus far were the findings of Wright (1964) concerning the advantages of large schools. As schools approached enrollments of 1,000 there were more varieties of courses offered. Schools larger than 1,000 offered no wider a variety of coursework just more sections of the same. Larger schools had more qualified teachers, more experienced teachers, more masters level teachers, a larger percent teaching in their major field and less teacher turnover. SAT scores were higher in larger schools. The small schools (under 500) produced students who earned fewer degrees, got lower college grades and lower test scores. The large schools (1,200-1,600) had better inner-staff relations and school-community relations while the small schools had only better teacher-student relations.

Other variables than the size of the school could be influential. Teaching practices most likely have an effect upon student behavior, as does the grade organization pattern of the school. In

fact, Kimble (1968) concluded that grade organization was more important than school size on the classroom behavior of teachers. A closer look at the school environment was needed.

The Issue of Undermanning, A Finer Grained Analysis

Alan Wicker (a one time student of Barker at the University of Kansas) has been involved in research concerned with the theory of undermanning. An early study (Wicker, 1968), using the basic methodology of the behavior setting questionnaire, attempted a finer grained analysis of the effects of size. Data were collected from 107 eleventh grade, small school students of four schools ranging in junior class size from 17 to 49 and located in towns with populations of from 450 to 1200. Eighty-four eleventh grade, large school students (from a town of 22,000 and a junior class size of 400) were also sampled. Six behavior settings were listed (varsity basketball games, organization business meetings, plays, dances, money raising projects and school sponsored trips).. The students were asked to list the settings attended and indicate what they did in each. Records were kept of the number of persons claiming performances (leadership or doing an essential setting function) and non-performances (no essential tasks mentioned). A bipolar adjective check list was employed to measure the subjective experiences of the students. The manning index (or degree of under-

manning) consisted of the number of persons reporting performances in a particular setting divided by the total number of persons reporting attendance at that setting (regardless of performance level).

In five of the six settings, undermanning was more prevalent in the small schools (the school sponsored trip was the exception). The degree of manning varied considerably across both activities and schools with varsity basketball games and plays producing the greatest difference in manning levels between schools. These two settings also produced the greatest difference between large and small schools in terms of the student's reported experiences. Small school students, as expected, reported more feelings of "competence, challenge, working hard, being needed, etc.". These reported experiences also differed within schools, being more dependent upon manning level of the activity than upon general school size. Seventy-two percent of the small school students reported active performances while only forty-two percent of the large school students reported such. When the performance or non-performance variable was held constant (i. e. when only the reported experiences of performers were compared between large and small schools or only the experiences of non-performers were compared) the school size differences disappeared.

It was concluded that the degree of manning within the schools

was not uniform across all the types of settings available, as was assumed earlier. Regardless of the size of the school, those students in the undermanned settings were more likely to be performers and those students in the overmanned settings were more likely to be non-performers with a few performers. Since on the whole, overmanned settings were more characteristic of large schools, these will produce fewer performances by the average student. A distinction has thus been made between the effects of sub-unit size and total organization size. In the words of Porter and Lawler (1965)

"the effects of one type of size (total organization size) may be confounded by the effects of the other type of size (size of sub-units within total organizations)!".

Additional research on these issues involved the study of churches rather than schools. Using a similar behavior setting survey methodology, it was found that members of small churches attended more frequently, spent more hours in church behavior settings and pledged (as well as gave) more money. The degree of undermanning increased as church size decreased and small church members "entered a wider range of behavior settings and had more responsible positions in the settings entered". It was noted that there were lower rates of absenteeism and member

turnover in the smaller (as compared to the larger) churches and the small church members were characterized as more productive (with reference to church tasks) as well as being more satisfied with their tasks. Wicker (1969) hypothesized that:

"the greater the percentage of hard working persons (models) in a situation, the greater the pressure on others present to also work hard".

In later work (Wicker et al, 1972), the effects of "level of professional staffing" and "the physical capacity" of behavior settings (again with churches) were investigated using the behavior setting, undermanning/overmanning analysis. The improved staffing (increased numbers and professional status of the staff) did not significantly improve participation. Thus, small churches with their undermanned settings were more effective in inducing participation than the larger, better staffed churches. The physical capacity of behavior settings proved to be an important variable affecting member participation. Those settings with a large capacity were likely to be undermanned while those with a limited capacity were adequately manned or overmanned. The earlier data did not consider settings in terms of physical or social restraints determining setting capacity and hence school size was the only "cause" mentioned for differences in participation. (A more complete treatment of this is to be found later in the section "Problems with the Early

School Research"). Also found to contradict earlier "undermanning theory" was the finding that:

"member participation is a linear function of organization size, there was no support for the hypothesis that participation is a curvilinear, negatively decelerating function of size... Apparently, at any level of church size a given increment in membership yields a constant increment in average participation".

Problems With the Early School Research

The work of Wicker (1968, 1969) has sparked a more critical view of the undermanning explanation of differences between large and small organizations. According to Wicker, the early research had several weaknesses. First, (as mentioned earlier) was the failure to control for community size and rural/urban differences. Second was the total reliance on self-report data. Third, the research cited involved correlational designs, so it could be argued that the differences obtained between large and small organization members were due to some correlate of organization size other than degree of manning. Finally, the most important issue, the use of the particular undermanning index was questioned.

The initial manning index (concerning the relation between the number of available persons within a school and the number of variable behavior settings) was considered to be insensitive to differences in manning levels of various settings within either the

large or the small school. Even in large schools there might be undermanned settings as well as the more common overmanned settings while small schools could have manning patterns similar to large schools (overmanned) along with their characteristically undermanned setting. The initial manning index (as calculated) was more of a summary measure of the degree of manning within an entire organization. In theory:

"the degree of manning refers to the relationship between number of essential tasks to be performed in a setting and number of persons potentially available to perform those tasks". (Wicker et al. 1972)

A more precise measure would involve the number of tasks per number of available persons per setting, avoiding the summation step prior to the construction of the index for each setting. Perhaps a general score could be derived from the resulting distribution as a whole. Thus, such things as setting requirements and standards as well as temporal relationships between settings could be included in the analysis. It is this type of information that would lead to a complete analysis of the contingencies which control the behavior of the setting.

Given these considerations, it is hard to determine if the settings in the earlier studies were actually undermanned at all. The notion that the degree of manning of the settings is simply and directly related to the total number of members in the organization is inaccurate.

A more precise specification of the degree of manning is suggested by Wicker et al (1972). His concern is not with the absolute number of tasks or persons but the "number of persons required to carry out the tasks in their proper sequence". Settings are viewed as having two sets of members, performers and non-performers. Manning level is then determined separately for each set, employing the concepts of "maintenance minimum" (the minimum number needed to maintain the setting), "capacity" (upper limit of persons who can be accommodated by the setting) and "applicants" (the total number of those who not only seek to gain entrance but also meet the eligibility requirements). Three possible conditions of manning can thus be specified for each set of occupants, performers or non-performers. There is "undermanning" where the number of applicants is less than the maintenance minimum which is less than or equal to the capacity, "adequate manning" where the maintenance minimum is less than or equal to the number of applicants which is less than or equal to the capacity, and "overmanning" where the maintenance minimum is less than or equal to the capacity which in turn is less than the number of applicants. A setting can therefore have two different degrees of manning at the same time, one manning level for performers and one for non-performers. Physical and social forces place limitations on the

number of performers and non-performers within a setting. Physical forces refer to such things as room size or supporting structures while social forces can be rules, customs or mere ordering of events. For example a grocery store check out lane may be undermanned with respect to performers (a cashier but no bagger) and overmanned with respect to non-performers (a long line of customers ready to check out). Social custom maintains this state of affairs even though a non-performer could become a performer (by bagging his own groceries).

Wicker (1972,1973, Wicker et al 1972) theorizes that adequate manning is a fairly stable state, generating no "strong pressures toward change". Undermanning and overmanning are said "to generate forces toward adequate manning". Undermanning conditions lead to activities which will increase the number of applicants to the setting and overmanning will lead to activities which will decrease the number of applicants.

General Summary of the Assumptions Based on the Research

The study of the size variable has progressed from the initial, somewhat unprecise formulations reported by Barker and Gump (1964) to the more exacting work of Wicker (1968, 1969, Wicker et al 1972). The early researchers, working with the school

population and small community populations attempted to test certain assumptions which (at least intuitively to them) differentiated those populating large organizations from those in the small organizations. These included the notions that students from small schools were more tolerant of their peers, were more important to the settings they occupied, viewed others in terms of what they could do rather than as "personality types" and were more satisfied due to direct involvement as opposed to spectator involvement. In contrast, the large school students were less likely to be direct participants in activities, more likely to be spectators. They were less likely to be affected by deviation countering controls influencing active participants, less likely to report satisfactions related to direct involvement and less likely to report a sense of obligation to the school. Thus, as concluded by Barker and Gump (1964):

"The findings indicate that the small school students lived under greater day-by-day attraction, obligation and external pressure to take part in the various behavior settings of their schools".

From this it was surmised that a school should be small enough that all of its students are needed and none are redundant.

This early work dealt with the general characteristics of the large and small school students as well as with a summary measure of involvement (i. e. the total number of settings was compared

with the total number of students, individual setting manning characteristics were ignored).

More recent work concerning the size issue asks questions of a more detailed nature. Of central importance is the question "why"? The answer "because one is small and the other large", is of little help. Concerning the issue of increased participation within small schools one author (Wicker 1968) speculated that in some manner the practices of small schools were more effective in directing students into settings which needed members or away from those which did not. But here again we are faced with the task of defining these "practices" and isolating key variables which differentiate the large from the small schools.

It has been suggested that "current psychological theory can contribute to an understanding of this problem" and that several worthwhile "theories" could be integrated to produce a satisfactory, testable explanation (Wicker 1972). Wicker (1972) urges the following:

"studies must not treat persons or settings merely as objects to be measured, but rather as interacting components of a system. Complexities must be grappled with, even at the expense of certain niceties of research design".

The undermanning research has taken the study of size influences one step closer toward a more complete analysis. Even general effects cannot be fully explained in broad terminology.

The very manner in which one describes the subject matter to be analyzed limits the type of analysis which may be employed. Long range effects as well as conditions both in the history and in the future must be considered, but not at the expense of the study of immediate setting conditions. Relevant to this point are the findings of Baird (1969). He found that small school students reported more achievements in high school (as did Barker and his associates) but college achievements were not significantly different among students from large or small schools. In fact when the size of colleges was examined, small college students reported more achievement (regardless of high school history) than large college students. Thus it was concluded that there were no lasting effects of school size (as could be determined by the research method of surveying ACT test applicants). When going to college, small high school students were affected the same as others by large universities on the whole.

The notion that sub-unit manning characteristics are a more direct predictor of behavioral involvement than total unit size has directed interest to the "mechanisms" involved within settings and away from the general correlational concerns of earlier works. The interest in "mechanisms" sets the stage for a more functional analysis (to be discussed more fully later). Wicker (1973) noted

a most important observation:

"overt behaviors in settings are primarily a function of the immediate setting conditions. Levels of participation seem to be most readily predictable from current situations, and not from the occupants' history".

THEORETICAL RELEVANCE OF THE BEHAVIOR SETTING METHODOLOGY

Examining School Effectiveness

Let us now return to the size question as it directly applies to the school environment. The research reported earlier indicates that larger schools maintain proportionately fewer behavior settings, resulting in more students per setting than in the smaller schools. The result of this is overmanning and less effective controls within the setting. Since participation (emitting responses producing various consequences) increases the effectiveness of the setting controls, those who do not participate are less likely to benefit in a positive way from the setting. A large school which fails to create enough settings to avoid overmanning could fail to develop the capacities (in the form of cultural training) to the fullest extent of many of its students. However, since participation is multiply controlled, providing extra settings will only eliminate one potential source of problems. Other controlling variables must also be considered.

Those students rejected from (or at least prevented from actively participating in) legitimate settings will not simply wait until they are needed. The social environment is filled with competing contingencies, some of which will surely provide significant

reinforcers to maintain participation for this excess population. Many of these competing contingencies may well be counter productive to the school's main function, transmitting the culture.

If the schools are to prevent harmful deviance (or at least not maintain conditions which produce or maintain it) they must assess their organizational structure in terms of the behavior it produces. This can be done by looking at the various behavior settings, determining which are key settings and which are actually irrelevant. By providing enough of the key settings (those that control behavior essential for effective cultural training) to avoid overmanning, one source of potential deviance is eliminated.

The modern school system is faced with an immense task. Education costs have increased as have many other costs. Behavior problems within schools are on the rise, juvenile crime is extensive and effective solutions are yet to be produced. A cost effective approach is needed. Special programs designed to identify the potential deviant and engage him in activity which might prevent further problems could be one approach. Yet this seems merely a temporary measure not really addressing itself to the causal variables of the deviance. The behavior setting approach would emphasize the deviance producing characteristic of the school (its overmanned settings) and attempt to deal with them directly.

What is needed is modification of the "behavior setting survey". The better survey would stress the values to the individual and to the culture of the behavior generated and maintained by the setting. This better classification of settings would enable one to make changes in the school environment. Important activities could be strengthened by using the limited resources for the identified key settings while leaving less important settings alone.

A Revised Behavior Setting Survey Approach

Examples of behavior setting surveys, complete with lists of setting varieties as well as individual settings within each variety were listed by Barker and Gump (1964) for two high schools during the high school year 1959-60. For the small school (117 students) 33 varieties were listed with a total of 105 settings. For the large school (2,287 students) 43 varieties were listed with a total of 491 settings. These settings were the school parts which functionally contributed to the analysis of school size differences. For the purposes of the current analysis, Barker's setting surveys were used as examples. Each setting variety was considered in terms of its importance in accomplishing the immediate as well as long term goals of a school. These goals were here determined to be the maintaining of effective contingencies which alter students' verbal and nonverbal repertoires along culturally specified guidelines.

The ultimate effect of this would be the production of individuals who contribute to the survival of not only themselves and immediate others but the culture as a whole. Skinner (1968) has described the purpose of education in a similar fashion:

"Ideally a system of education should maximize the chances that the culture will not only cope with its problems but steadily increase its capacity to do so".

In revising the settings listed by Barker and Gump, three logical criteria were employed. These evolved from the study of the material reported earlier and a general familiarity with social systems of control. First the number of people affected by the setting was considered. The wider the effect, the more influential the setting. Second, the consequences of the setting for its members as well as for the school as a whole were considered. Those settings producing consequences of a minor or limited nature (as defined by the general goal of "education for effective function") were excluded. Finally, the degree of interpersonal control available within the setting (the degree of face-to-face interaction of individuals) was considered. Those providing conditions for greater interaction were judged more influential than those that did not.

From the Barker and Gump list the following setting varieties were selected as being significant. In alphabetical order they are:

1. Athletic contests indoors
2. Athletic contests outdoors
3. Dances
4. Dinners and Banquets
5. Educational Class groups
6. Government and School offices
7. Library
8. Meetings: Executive (student counsel)
Organizational Business
Social-Cultural
Social-Recreational
9. Outings (class trips)
10. School parties
11. Plays, Concerts and Programs
12. School Special Days
13. Volunteer Work

Also noted were those setting varieties which appeared significant but in a potentially counter-productive manner (i. e. they allowed for competing contingencies that could distract students from more acceptable activities). These settings being:

1. Classroom free time
2. Home room
3. Dances
4. Halls
5. Coat rooms
6. Rest rooms
7. Cafeteria

Disruptive or harmful acts seem more likely to occur in these settings.

The Pros and Cons of Working with Behavior Setting Units

From the previous list one can see that schools provide a varied environment. When questions are asked concerning the

effectiveness of schools in general or of their specific programs, answers tend to be vague and meaningless with little specific information provided. More useful answers might be provided if the actual prevailing contingencies operating within the school were described. Once again the problem is where to begin and what to describe. The parts of the school are most likely related such that when one area is changed, other areas are also influenced. Expressing these parts as behavior settings leads to a useful description of the school. The unit of the behavior setting appears useful for several reasons. The descriptions of the settings involve familiar terms. Settings are obvious, observable units where behavioral differences can be noticed (for example a child behaves differently when on the playground than when in the library and distinct repertoires relevant to each setting can be observed). The setting classification is adaptive and can change as the settings change; thus, not becoming obsolete when customs change.

Using the suggested behavior setting varieties list as an outline, one can begin to analyse the school in terms of the behavior it produces in certain areas at certain times. Putting together a "behavior setting survey" provides a catalogue of behavior patterns exhibited by several individuals independent of the particular individuals involved. This approach seems more practical than

trying to observe and record the individual behaviors of all persons within the school. Treating these composite response classes (within behavior settings) as functional units constitutes a more molar analysis and perhaps one relevant to the study of the school as a whole.

The major drawback to the setting approach lies with the difficulty in judging the degree of interdependence among settings. For example, which are the functional setting units and which are mere extensions or sub-units. For the analysis to be adequate yet not unnecessarily complex, the units must be recognizable as having different controlling variables. Observation over time of response topography (naturalistic observation of ongoing behavior) with reference to observable environmental stimuli (those having discriminative as well as reinforcing or punishing effects) is part of a functional analysis. The object is to describe a unit composed of an identifiable response class which may be functionally related to one or more independent variables. The approach is primarily concerned with the prediction of future behavior and ultimately the demonstration of controlling relationships. This demonstration is accomplished by the manipulation of independent variables which brings about observable changes in dependent variables. The field of study referred to as the Analysis of Behavior provides

much relevant data. The analysis of schools with respect to size influences can profit from this data and the methodologies which produced it.

APPLYING THE EXPERIMENTAL ANALYSIS OF BEHAVIOR

Through careful observation it is possible to discover important interactions between behavior and the environment. These may be many and complex yet the fact remains that simple, direct observation, no matter how extensive or prolonged, reveals only a small part of the whole. More information is produced by a simple cumulative record where one can estimate rate of responding accurately, compare different rates and discover interdependencies among stimuli, responses and reinforcers through controlled manipulations. A prevailing probability of reinforcement, particularly under various intermittent schedules, is the important variable. If we look at the contingencies of reinforcement, we can then interpret behavior more successfully. (Skinner, 1969)

Definition of Relevant Terms and Concepts

When attempting to explain the interactions between behavior and environment, three important aspects of the situation must be noted. First is the occasion or setting in which the behavior of interest occurs. Second is the specific description of the behavior in measurable terms (frequency or rate or even duration) and third, are the changes in the environment (consequences) which are produced by the particular targeted behavior. We refer

to the third aspect, the consequences, in terms of their effect upon the future occurrence of the behavior (response probability). If the response is less likely to occur in the future due to the contingent consequences, this is commonly referred to as punishment. If, on the other hand, response probability is increased we refer to this as reinforcement. The interrelationships among the setting characteristics, the behavior and the contingent consequences are the contingencies. We observe environmental control of behavior when, through alteration of either setting conditions (technically any stimuli present when reinforcement occurs, referred to as discriminative stimuli or S^D s) or contingent consequences (reinforcers or punishers) a shift in response probability occurs.

In the previously reported research a great deal of emphasis was placed upon descriptions of setting characteristics without a strong statement about the relative contingencies of reinforcement. Additional concepts from the experimental analysis of behavior would make such a statement possible. First we must define the relevant terms.

Response class refers to those responses showing selected properties characteristic of an identifiable set of contingencies. These properties include some operation common to all members of the class which establishes the circumstances under which responses of particular topographies achieve certain consequential effects.

These effects function to increase or decrease the probability of occurrence of members of this class, given similar circumstances.

Response chains refer to a particular sequence of responses connected through function. One response produces conditions which allow or induce a subsequent response and each brings the organism closer to the terminal link and reinforcement.

Stimulus and response generalization refer to processes which explain shifts in controlling relations. When a stimulus acquires or loses its capacity to control behavior simply because of its similarity to another stimulus (which has either lost or gained such control by other means) we say the effect has generalized (the controlling relation has been altered through stimulus generalization). When a particular response occurs at a different rate (or changed probability) simply because it shares properties with other responses whose rates (or probabilities) have been changed by other means, once again a "generalization" has occurred. This is referred to as response generalization because the change is affected through a relationship of response characteristics.

By definition the proposed unit of analysis (the behavior setting) designates a particular response class under the control of a number of variables. These variables include the physical and temporal aspects of the setting (discriminative stimuli) and the

behavior of others within the setting (as social stimuli as well as social reinforcement and punishment). Together the response class and controlling variables define the contingencies of reinforcement which maintain the setting and hence the functional unit. If the reinforcing consequences generated by the behavior setting exceeds the total amount of reinforcement which could be achieved by the participants acting separately, the integrity of the unit is maintained. What is observed is a setting which (in the words of Barker) has "coercive power over individuals".

A Behavioral Explanation of the Effects of Size

Employing terms from the experimental analysis of behavior, it is now possible to interpret the results of the school size literature. Smaller schools with fewer participants in the behavior setting units maintain a set of circumstances in which reinforcing consequences generated by the settings exceeded that which could be gained individually.

The settings studied concerning school size differences were all "extra curricular" and highly dependent upon social reinforcement. Social reinforcement requires the mediation of another organism and hence it may vary capriciously. Different responses may produce similar effects or one response may produce many different effects, the result being a complex network of controlling variables.

With fewer people, less diversity is introduced. To achieve the group reinforcement, each setting task must be completed. With just enough people to complete these tasks it is more important that the setting members maintain appropriate behavior within the setting. The directed social reinforcement provided by each member combines to achieve a greater effect upon the individual. When settings are overmanned, more people are available, less control is exerted on specific individuals because there are more than enough people available. The combined effects of social reinforcement are diluted. Setting members participate less, penetrate the setting less, report fewer forces to participate and in general are less affected by the setting.

The key behavior settings within a school involve contingencies which maintain behaviors of a certain class and generate complex response chains. If desired behavior is maintained in one setting by strong contingencies, there is a tendency for this behavior to be exhibited in other circumstances having similar stimulus properties, (i. e. stimulus generalization). In this way more behavior comes under the control of a wider variety of school parts. In a similar way, when appropriate behaviors are strongly reinforced in an effective behavior setting, responses having similar properties may also be strengthened (response generalization). Deviant behavior may be weakened by involving those

individuals in relevant behavior settings which strengthen incompatible responses to the deviant behavior either directly (strengthening the specific incompatible response) or indirectly (strengthening the response class consisting of responses which are coordinated or co-vary with the desired incompatible response).

Of course the same processes operate on inappropriate as well as appropriate behavior. If the viable school settings are ones which provide significant reinforcement via group participation in activities contrary to the stated purpose of the school (the familiar "student subculture" for example), it is not surprising that this behavior comes under the control of many parts of the school through stimulus generalization or the repertoires broaden through response generalization.

Schools can only be effective if their parts (behavior settings) are effective. Overmanned settings detract from this effectiveness by diluting the control of designed contingencies as well as providing conditions which allow competing contingencies to gain strength.

CONCLUSION

Barker, Gump, Wicker, Willems and others have demonstrated differences in large and small school populations. The natural consequences of keeping schools small have facilitated conditions which maintain an effective school environment. Larger schools have evolved into a system which violates these conditions. The research involving the behavior setting unit, has proved useful in viewing the issue from a broader perspective. It has led to an initial statement of the problem (the ill effects of overmanned settings) of large schools. The application of concepts from the behavioral field completes the picture by stating the circumstances in terms of suggested functional relationships.

Steps Toward a Solution to the Ills of Bigness

As noted by Skinner (1953):

"The formalized experience of science, added to the practical experience of the individual in a complex set of circumstances, offers the best basis for effective action".

By manipulating contingencies, observing resultant changes in behavior, recording accurate data and formulating realistic conclusions, progress toward solutions to complex problems is furthered.

Among the shared values of applied behavior analysis and behavioral ecology (Willems, 1974) the empirical methods of science, (related to observable behavior and environmental influences) are most important. It would be the goal of the study of appropriate unit size to make clear the consequences of various operations performed upon the system as a whole. LeLaurine and Risley (1972) and Twardoz, Cataldo and Risley (1974) have demonstrated an experimental methodology which has clearly shown the effects on behavior of the manipulation of setting events. Their work with pre-school populations has concentrated on issues related to the design of effective physical environments to encourage specific types of behavior.

As noted earlier, more than descriptive methodology is needed if effective action is to be taken. A blend of the procedures from the experimental analysis of behavior with the ecological field is suggested (Willems, 1974). A method for making such an integration is described in useful detail elsewhere (Bijou, Peterson, and Ault, 1968). Of primary importance to that discussion is the use of frequency measures by both ecological and experimental field studies. The authors stress four important procedures for conducting such studies, these being related to:

- '1) Specification of the situation in which a study is conducted;

- 2) definitions of behavioral and environmental events in observable terms,
- 3) measurements of observer reliability,
- 4) methods for collecting, analyzing and interpreting the data".

The research on school size has demonstrated the importance of examining characteristics of the various behavior settings within a school. If one wished to correct some of the problems of large schools, a reasonable first step would be to examine the beneficial features of small schools and perhaps attempt to model their organizational ratio (number of settings per number of available students) when designing large schools. Using measures of deviance (frequencies of truancy, vandalism, fights, etc.) as dependent variables one could design experimental investigations in which settings were altered, added, or deleted. The effects of these independent variable manipulations could then be measured as changes in frequency in the dependent variable. Strategies of this sort would lead to statements about the functional significance of the various setting characteristics. Since small schools are less complex and have naturally occurring beneficial features, research showing adequate control of important variables would be more likely in that environment. The feature of small scale manageability is important.

It seems relevant at this point to mention some of the circumstances which seem contrary to the notion of small scale devel-

opment. These can collectively be referred to as a "trend toward largeness".

The Trend Toward Largeness

The stated benefits of smallness has not halted the design and construction of larger schools with overmanned settings. The conditions which influence community school boards, community planners and citizens to "think big" must be considered if any alternatives are to be considered. Of primary importance are those characteristics of large schools which maintain the naive notion "the bigger the better".

The most obvious characteristic is the impressiveness of the large, complex facility itself. Massive gymnasiums and auditoriums (where tax payers can come to watch atheletic events), large buildings with many rooms and corridors all lend support to the notion that it is the large schools which provide the necessary conditions for a better education. Since the school is supported by public revenue, the larger the community served, the more tax dollars available. The prestige which accompanies impressive facilities surely must play a part in convincing small communities to consolidate. From a larger group of students, better atheletic teams can be selected, outstanding scholars are more likely and in general there is a greater probability that some students will be highly

successful. Given these conditions it is the larger schools which are likely to make a name for themselves and thus can attract more qualified personnel to improve upon or maintain high standards. As mentioned earlier, teachers in the larger schools were more experienced, qualified and educated.

Large schools offer a wider variety of courses and activities to their students, provide more specialized training and better facilities. These points are stressed when consolidation is considered. Other, less obvious features (such as the abundance of overmanned settings with the consequential drop in contingency effectiveness for a larger number of students) are not seriously considered when the decision is made to "become larger" in route to "becoming better". The failure of many large schools to effectively handle school related problems (course failure, truency, vandalism, student crime) is seldom viewed in terms of organizational variables related to unit size. These problems are usually blamed on other obvious features such as poverty, ghettos, urbanization, etc. The goals of the school seem (at times) to be in conflict with the ultimate goal of cultural survival. Major concerns seem to be the conservation of economic resources and the immediate good this will provide to the community. The costs of short sighted planning are usually not immediately evident. The most apparent solution is not always the best (a point the field of

ecology consistantly makes).

Why do the larger schools fail to create a wider variety of settings for their unlucky students? Perhaps it is because having fewer settings concentrates the resources (both in talented students, money and equipment) while having more settings dilutes the mixture such that over all success (when competing with other schools) is hindered. It appears that some difficult decisions are required concerning major objectives and only an extensive examination of the total effects of actions will provide the relevant information upon which good decisions can be based.

Implications

As mentioned earlier, largeness has produced conditions with some undesirable characteristics. The trend toward making schools larger and larger to handle more students has compounded this. The impressive facilities, qualified staff and specialized programs have been labeled the fruits of progress. In these organizations, select individuals receive advanced and specialized training while a larger group is either ignored or relegated to a non-participating role. The question posed here is "Is this in the best interest of the culture?" It might be argued that with the advanced facilities of large schools, a select few will be produced who will improve significantly the chances of cultural permanence. Yet,

the problems created by the large school's failure to effectively involve a good sized group of "deviants" in worthwhile activities must be considered as the price of this approach. On the other hand the small schools, with their less impressive facilities and only general training appear to maintain effective contingencies for a greater proportion of students but produce fewer outstanding individuals.

One solution to this dilemma would be the incorporation of small school advantages into the design of necessarily large schools. A technology can improve things if relevant data can be collected, and the approaches mentioned earlier are most likely useful.

The suggestion at this point would be to examine the system (a school for example) in terms of the available settings and students as well as the contingencies affecting individuals in each setting. An ecological approach would be used because it fits well with the value of "cultural survival". Applying the principles of behavior from the experimental analysis of behavior along with the general methodology of science would yield statements about functional relationships. Important questions could be posed and then answered empirically. For instance, which settings can handle population overloads with the least adverse effect on the important controlling contingencies? When setting limits are known, more

effective management is possible. If overpopulated settings reduce the effectiveness of appropriate contingencies then an effective management system could provide new settings, make existing undermanned settings more attractive or limit population. The means for doing each of these will most likely come from a technology of behavior which has expanded it's scope to include the complexities now being pondered by those who view their work as "Ecological".

REFERENCES

- Baird, L. L. Big school, small school: A critical examination of the hypothesis. Journal of Educational Psychology, 1969, 60, 253-260.
- Barker, R. G. Ecology and motivation. Nebraska Symposium on Motivation, 1960, 8, 1-50.
- Barker, R. G. Ecological Psychology: Concepts and methods for studying the environment of human behavior. Stanford: Stanford University Press, 1968.
- Barker, R. G. & Gump, P. V. (Eds.) Big School, Small School: High School Size and Student Behavior. Stanford: Stanford University Press, 1964.
- Barker, R. G. & Hall, E. R. Participation in interschool events and extra curricular activities. In R. C. Barker & P. V. Gump (Eds.) Big School, Small School: High School Size and Student Behavior. Stanford: Stanford University Press, 1964.
- Barker, R. G. & Wright, H. F. The Midwest and Its Children, The Psychology Ecology of an American Town. New York: Row, Peterson and Company, 1954.
- Bijou, S. W., Peterson, R. F., and Ault, M. H. A method to integrate descriptive and experimental field studies at the level of data and empirical concepts. Journal of Applied Behavior Analysis, 1968, 1, 175-191.
- Campbell, W. J. Some effects of high school consolidation. In R. G. Barker & P. V. Gump (Eds.) Big School, Small School: High school size and student behavior. Stanford: Stanford University Press, 1964.
- Campbell, W. J. Some effects of size and organization of secondary schools on the experiences of pupils in extracurricular behavior settings. In Campbell, W. J. (Ed.) Scholars in Context, the Effects of Environments on Learning. John Wiley & Sons Australia Pty Ltd., 1970.

- Dubois, R. Environmental determinants of human life. In Glass, D. C. (Ed.) Environmental Influences. Rockefeller Univ. Press, 1968.
- Golann, S. E. Current and Future Trends in Community Psychology, Human Sciences Press: New York, 1975.
- Gump, P. V. "The Behavior Setting", Landscape Architecture, (January 1971), 130-134.
- Gump, P. V., & Friesen, W. V. Participation in nonclass settings. In R. G. Barker & P. V. Gump (Eds.) Big School, Small School: High school size and student behavior. Stanford: Stanford University Press, 1964. (a)
- Gump, P. V., & Friesen, W. V. Satisfactions derived from non-class settings. In R. G. Barker & P. V. Gump (Eds.) Big School, Small School: High school size and student behavior. Stanford: Stanford University Press, 1964. (b)
- Kimble, R. A study of the relation of school size and organizational patterns to certain teaching practices. Unpublished Masters Thesis, 1968.
- LeLaurin, K. and Risley, T. R. The organization of daycare environments: "zone" versus "man-to-man" staff assignments. Journal of Applied Behavior Analysis, 1973, 5, 225-232.
- LeCompte, W. "Ecological Psychology" HACETTEPE Bulletin of Social Sciences and Humanities, 1972, (Dec), Vol 4 (2), pp 153-161.
- Porter, L.W. & Lawler, E.E. Properties of organization structure in relation to job attitudes and job behavior. Psychological Bulletin, 1965, 64, 23-51.
- Schumacher, E. F., Small is Beautiful: Economics as if People Mattered. Harper & Row, 1974.
- Skinner, B. F. Science and Human Behavior. New York: Macmillan Co., 1953.

- Skinner, B.F. Technology of Teaching. New Jersey: Prentice Hall Inc., 1968.
- Skinner, B.F., Contingencies of Reinforcement, A Theoretical Analysis. New Jersey: Prentice Hall, 1969.
- Skinner, B.F., "Walden II Revisited". Introduction to Walden II, 1976 edition, New York: Macmillan Pub. Co.
- Skinner, B.F., Human Behavior and Democracy. Address given at the American Psychological Association Convention, 1976 (a)
- Twardosz, S., Catlado, M.F., and Risley, T.R. An open environment design for infant and toddler day care. Journal of Applied Behavior Analysis, 1974, 7, 529-546.
- Wicker, A.W. Undermanning, performances, and students' subjective experiences in behavior settings of large and small high schools. Journal of Personality and Social Psychology, 1968, 10, 255-261.
- Wicker, A.W. Size of church membership and member support of church behavior settings. Journal of Personality and Social Psychology, 1969, 13, 278-288.
- Wicker, A.W. Processes which mediate behavior-environment congruence. Behavioral Science, 1972, 17, 265-278.
- Wicker, A.W. Undermanning theory and research: Implications for the study of psychological and behavioral effects of excess populations. Representative Research in Social Psychology, 1973, 4, 185-206.
- Wicker, A.W., McGrath, J.E., & Armstrong, G.E. Organization size and behavior setting capacity as determinants of member participation. Behavioral Science, 1972, 17, 499-513.
- Willems, E.P. Forces toward participation in behavior settings. In R.G. Barker & P.V. Gump (Eds.) Big School, Small School: High school size and student behavior. Stanford: Stanford University Press, 1964.

Willems, E.P. Sense of obligation to high school activities as related to school size and marginality of student. Child Development, 1967, 38, 1247-1260.

Willems, E.P. Behavioral technology and behavioral ecology. Journal of Applied Behavioral Analysis, 1974, 7, 151-165.

Wright, G.S. Enrollment size and educational effectiveness of the high school. U.S. Office of Health, Education and Welfare, 1964.