Elementary School Effects: An Explication of Theory and Methods

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ELEMENTARY SCHOOL EFFECTS:
AN EXPLICATION OF THEORY AND METHODS

by

John William Fox

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Doctor of Philosophy

Western Michigan University
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John William Fox
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CHAPTER I
INTRODUCTION

The purpose of this study is to assess the impact of two school contextual variables, achievement context and socioeconomic status context, on elementary school students' educational plans. The effects of school composition variables on educational plans are investigated in this study since previous research has attributed relatively higher explanatory power to their effects than to more formal school characteristics (e.g., finances and programs) and measures of school quality (cf. Coleman, et al., 1966; Meyer, 1970).

In order to assess the impact of achievement context and socioeconomic status context on educational plans, a theoretical model, drawing on and extending previous research on the effects of school contextual variables, is proposed. The theoretical model tests the assumptions that school social status has a supportive normative effect on students' educational plans (cf. Wilson, 1963) while achievement context has a negative suppressor effect on educational plans (cf. Davis, 1966). The hypothesis proposed by Alexander and Eckland (1975) that supportive and suppressor effects on educational plans cancel out one another is critically examined.

The schools selected for investigation in this study were chosen using a purposeful stratified sampling procedure so as to be generalizable to a population of elementary schools fitting an eight fold typology of school characteristics including achievement level, socioeconomic status level, and racial composition. The data repre-
sent an "N" of 1911 students, excluding missing data observations, across 17 schools.

The statistical techniques of path analysis (cf. Duncan, 1975) were utilized to assess the impact of between school differences on educational plans. Analysis of covariance techniques were utilized to estimate between school components of variance (cf. Walker and Lev, 1953). White schools were disaggregated from black schools and separately analyzed.

Chapter II reviews the previous literature on school effects and presents a brief historical perspective on its intellectual development. Since much of the debate concerning school effects has been focused on methodological issues as well as substantive issues, a brief presentation of the analysis of covariance in path analytic terms is given in Chapter II. The criticisms of contextual analysis of school effects are considered in detail (cf. Hauser, 1974). Four previous studies of the effects of school composition variables on educational plans are thoroughly reviewed.

Chapter III presents an "ideal type" theoretical model that guides the investigations of this study. The model draws on previous research and extends their theoretical models by a consideration of several intervening variables in educational processes. A research model that approximates the ideal theoretical model is also presented in Chapter III.

Chapter IV presents the research methodology and statistical procedures of this study. The rationale for sample selection of schools
is discussed as well as the data collection procedures. The operational definitions of the variables proposed in the research model are given. The procedures for treating missing data and handling interaction are discussed. Chapter IV also indicates the rationale for disaggregating black schools from white schools in the analyses as well as the rationale for using weighted correlations.

Chapter V presents the findings of this study. The correlations of the variables in the research model are given. The findings utilizing a full contextual model and a contextually reduced model are compared. The results based on the full contextual model with statistically insignificant effects removed are likewise reported. The between school components of the variance of the variables in the research model are also reported.

Chapter VI contains the conclusions of this study. The net effects of school contextual variables, the structure of contextual effects in white and black schools, the between school components of variance, and general considerations of school effects at the elementary school level are among the topics discussed.

Chapter VII explores some of the major implications of this study in terms of social policy considerations and future theoretical concerns in school effects. This chapter also indicates the major limitations of this study.
CHAPTER II
REVIEW OF THE LITERATURE

Introduction

The general notion of school effects has had a long, interesting, and often stormy intellectual history in the annals of educational and social science literature. Succinctly stated, school effects are those differences between schools that lead to differences in student outcomes (e.g. educational plans, academic achievement, educational attainment, grades). The intuitive idea that schools vary in their educational quality and ability to produce desired student outcomes forms the basis for investigations of school effects. Determining and measuring differences between schools and uncovering an explanation of how these differences have an impact on educational processes may be of great importance in fulfilling the perceived or expected social function of the educational system (cf. Jencks et al., 1972). In addition, this could extend our general knowledge of how characteristics of institutions effect individuals (cf. Nelson, 1972).

Recently, however, the assumption that differences between schools lead to differences in student outcomes has been fraught with controversy. The Coleman Report (Coleman et al., 1966) indicated that the differences between schools that were measured in regards to human, physical, and economic resources were not as strongly related to student outcomes as they were previously thought to be (cf. Hodgson, 1971). Systematic reviews and reanalyses of the Coleman Report data (cf. Mosteller and Moynihan, 1972) and further similar research (cf.
Averch et al., 1972) did not substantially alter its major conclusions. Research by Jencks et al. (1972) suggested that school characteristics most amendable to social policy alterations have little direct impact on students' outcomes. Hauser (1970, 1971, 1974) has consistently maintained that analyses of school effects are so ladened with problems of interpretation and methodological issues that the entire topic of contextual effects should be dropped from investigation. Jencks and Brown (1974) suggest that the effects of school properties that they measured did not explain more than 4 percent of the variance of any typical student outcome measure. Hauser et al. (1974) maintain that school effects do not explain more than 4 percent of the variance of any outcome they investigated. These studies and others (cf. Sewell and Armer, 1966; Campbell and Alexander, 1965; McDill and Rigsby, 1973) have indicated that differential student outcomes in American schools are not readily explainable by observed variation among the types of school characteristics typically measured.

The volume of literature on school effects, as well as the persistence of investigations in the face of continuing and cogent theoretical and methodological debate, demonstrates the historical and current attraction of the topic to social scientists. It has been speculated that this attraction is due to social scientists' predisposition toward neutral explanations of poor achievement (cf. Moynihan, 1968), the sociological flavor of its explanations (cf. Hauser, 1974), and its salience to issues in educational research.

Studies on school effects have often employed the concept of
school climate to denote more relevant institutional characteristics of schools. Brown and House (1967) have indicated that by 1967 literally hundreds of studies of school climate had been conducted. Educational textbooks in recent years have devoted considerable attention to the general topic of school climate and school effects (cf. Johnson, 1970; Boocock, 1972; Brookover and Erickson, 1975), and several non-academic institutions have conducted investigations of their own (cf. State of New York; Office of Educational Research, 1974; Federal Reserve Bank of Philadelphia, 1975). Jencks et al. (1972:15), in commenting on the volume of previous research on school effects, have stated: "Research on the relationship between high schools' socioeconomic composition and its students' plans became a minor sociological industry during the 1960's."

The objective here is not to review all previous studies of school effects, they are too numerous, but to sketch a historical perspective on the intellectual growth of the idea. More detailed and extensive reviews of the literature are available in different sources though they are organized around different themes and issues than presented here (cf. Hauser, 1971; McDill and Rigsby, 1973; Brown and House, 1967; Sewell and Armer, 1966; Brookover et al, 1973; Averch et al., 1972).

The development of the idea of school effects has gone through three discernable but overlapping intellectual periods. The first was one of theoretical development and empirical demonstrations of between school differences. The second was largely an anti-thesis stage based on methodological refinements and additional conceptualizations of the issues. The third stage, continuing at the present time, is one
of further methodological refinement and continued theoretical explication. Historically, the first stage began with Waller (1932) and ended with Astin (1961) and/or Sewell and Armer (1966). The middle stage is exemplified by the work of Hauser (1971) and Jencks et al. (1972). The latest stage began with the explication of the "frog pond phenomena" (cf. Davis, 1966) and is best indicated by the recent work of Meyer (1970), and Alexander and Eckland (1975).

Historical Development

McDill and Rigsby (1973) have attributed the intellectual origin of the idea of school climate to Waller's (1932) The Sociology of Teaching. Waller (1932) conceptualized schools as closed social systems in which teachers and students comprised distinct subcultures competing for power and influence. He suggested that the student subculture would be based on opposition to the normative demands of teachers. Studies by Coleman (1961) and Gordon (1957) are probably the best examples of this general perspective. McDill et al. (1971) give a succinct and contemporary review of the subcultural thesis. In recent years, however, the assumption of schools as relatively closed social systems and the idea of analytically distinct student subcultures has been modified on the basis of refined conceptualization and empirical research (cf. Brookover and Erickson, 1975; Haller and Butterworth, 1960; Kandal and Lesser, 1969).

Other conceptual perspectives on school effects emerged from studies of worker productivity in the 1930's. Hypotheses concerning the effects of varying organization structures (e.g. size, number of coworkers) and the degree of bureaucracy (e.g. vertical and lateral
scope of administrative units) were soon translated into educational research and policy. A second concern that emerged from these studies was that of worker morale. This concern was based on the assumption that high morale lead to high productivity. An outcome of two general issues has been the advocation of various learning climates and/or organization structures without consistent evidence that they have an impact on student outcomes (cf. Boocock, 1972; Brown and House, 1967).

Pace and Stern (1958) explicated another approach to the study of school effects when they factor analyzed derived measures of "environmental press" based on an extension of the concept of "beta press" from psychological theory. "Press is reflected in the characteristic pressures, stresses, rewards, and conformity demanding influences of various environments ... as perceived by those who live in the environment" (Pace and Stern, 1958:270-1). The impetus to move in the direction of conformity demanding pressures was provided by Newcomb's (1943) earlier studies of Bennington College students. Newcomb (1943) emphasized the importance of reference groups and the pressures toward conformity that they produced.

Halpin and Croft (1962) extended the general methodology for demonstrating between school differences when they devised the Organizational Climate Description Questionnaire (OCDQ). The statement that "climate is to the organization as personality is to the individual" (Brown and House, 1967:401) served as theoretical cornerstone for work in this tradition since the OCDQ was based on the extension of personality theory to the domain and theory of organizations.
Devising instruments and demonstrating differences between colleges and high schools was such a "minor industry" of social scientists that Brown and House (1967:400) remarked: "The list of climate correlates seems endless." Feldman and Newcomb (1969) indicate many of the substantive and methodological problems of such a perspective on school climate when they review the literature on college environments and their effects on students.

Davis (1966) added an additional theoretical dimension to previous studies of school climate when he applied the concept of relative deprivation to educational processes. He reasoned that student's conceptions of their academic ability were a major influence on their educational plans. He also suggested that in the absence of any objective global measure of their own achievement, students would utilize their grade point average (GPA) as a referent for their conceptions of academic ability. Davis (1966) was able to demonstrate that GPA was more highly related to a student's educational plans than was a measure of the student's school quality. A necessary implication that followed from his analysis was the finding that school quality was negatively related to a student's GPA. His work cast doubt on previous school climate studies which had assumed high quality schools were supportive of higher educational plans.

Debates concerning the relative merits of "frog pond phenomena" introduced by Davis (1966) and the school climate perspective on normative support mechanisms are rather commonplace in the literature (cf. Thistlethwaite and Wheeler, 1966; Werts and Watley, 1969; Drew and Astin, 1972). On the one hand, the relative deprivation framework
suggests that schools that have high ability levels should have negative effects on students' educational plans. On the other hand, the school climate perspective and environmental press framework suggest that schools with high ability levels should have a positive effect on students' educational plans because of their normative climates for high achievement.

A review of the intellectual development of the notion of school effects would not be complete without considering professional trends and other global factors. Sociology of education did not come into its own until the late 1950's and early 60's. By that time much of the conceptual groundwork for investigations of school effects had already been laid by others, and such factors as desegregation were playing a major role in investigations of school effects. For example, Wilson's (1959) influential study of school effects placed a heavy emphasis on residential segregation as a final explanatory variable. While he used neighborhood composition as a proxy variable for underlying mechanisms of school effects, he clearly thought that those mechanisms could function through the formal properties of schools (e.g., finances and programs) as well as the more informal social processes of normative value climates.

Most researchers following Wilson (1959) considered both the formal and informal qualities of school organization as possible mechanisms for school effects on student outcomes (cf. Boyle, 1966; Meyer, 1970; Ramsoy, 1961; Turner, 1964). The findings of the Coleman Report (Coleman et al., 1966) concerning the relative explanatory power of formal and informal school organization characteristics has
lead many researchers to investigate school effects only in the area of informal social processes via composition variables.

METHODOLOGICAL CONSIDERATIONS

While literally hundreds of studies of school effects and/or school climates have demonstrated between school differences, several cogent considerations of their research designs and methodologies severely temper the certainty of their findings. The major criticism of the vast majority of these studies has been their lack of control for student input characteristics and the associated tendency to attribute between school differences to school effects rather than differences in student inputs.

Astin (1961, 1970) was the first to indicate the weakness of previous studies that had not controlled for student input characteristics. Conceptually, Astin (1970) saw a model consisting of student inputs, school effects, and students outcomes. Not controlling for the effects of student inputs on school effects would seriously bias the statistical estimates of school effects on student outcomes. Given Astin's (1961) general model, Werts and Linn (1969) were able to provide a parody on how the same data could be used to support different conclusions about the impact of school effects on student outcomes.

Sewell and Armer's (1966) finding that neighborhood context, as defined by socioeconomic status composition, did not explain more than 2 percent of the total variance of students' educational plans after individual sex, socioeconomic status, and intelligence were controlled, directly raised doubts about a number of previous studies that
had demonstrated school effects. In addition, this study provoked considerable debate and reanalysis that has continued to the present time (cf. Spady, 1970; Smith, 1972).

While there are numerous methodological issues concerning the investigation of school effects on student outcomes, these issues can be clarified by a presentation of an analysis of covariance model and a detailed consideration of the objections raised by opponents to the investigation of school effects.

Analysis of Covariance Model

Figure 1 is a path analytic model of the analysis of covariance similar to the one presented by Duncan et al. (1972). The model is not contrived. It portrays actual data taken from the work of Campbell and Alexander (1965). A similar presentation of analysis of covariance in path analytic terms is given by Hauser (1971).

Variable X in Figure 1 on page 13 represents the socioeconomic status of a student's parents while variable Y represents a student's educational plans. Variable \( X_{ij} \) represents the score of the \( i \)th individual in school \( j \) on socioeconomic status. Variable \( \bar{X}_j \) represents the mean score of all students on socioeconomic status in school \( j \). Variable \( x_{ij} \) represents the within school score of the \( i \)th individual on socioeconomic status in school \( j \). A similar notion applies to variable \( Y \), educational plans, with two slight additions. Variable \( \hat{Y}_j \) represents a predicted or adjusted school mean of educational plans based on information about the weighted average within school regression of \( y_{ij} \) on \( x_{ij} \). Variable \( Y_j^* \) represents an error term in school means - a predicted school mean, \( \hat{Y}_j \), minus the actual school mean, \( \bar{Y}_j \).
Figure 1. Path Analytic Model of the Analysis of Covariance

\[ X_{ij} = \text{socioeconomic status of the } i\text{th individual in school } j. \]
\[ Y_{ij} = \text{educational plans of the } i\text{th individual in school } j. \]
\[ X_j = \text{mean score of all individuals in school } j \text{ on socioeconomic status.} \]
\[ Y_j = \text{mean score of all individuals in school } j \text{ on educational plans.} \]
\[ x_{ij} = \text{within school socioeconomic status of the } i\text{th individual in school } j. \]
\[ y_{ij} = \text{within school educational plans of the } i\text{th individual in school } j. \]
\[ \hat{Y}_j = \text{predicted school mean of educational plans for school } j. \]
\[ E_1 = \text{error term of residual mean of school educational plans for school } j. \]
\[ E_2 = \text{error term of within school educational plans for the } i\text{th individual in school } j. \]
$E_1$ represents an error term of the residual mean of school educational plans for school $j$ not predicted by $\bar{X}_j$. $E_2$ represents an error term of within school educational plans for the $i$th individual in school $j$.

From standard path analytic theorems, the total correlation between socioeconomic status and educational plans (path $Y_{ij} X_{ij}$) can be decomposed into two independent components - a within school component ($X_{ij} X_{ij} * Y_{ij} X_{ij} * Y_{ij} Y_{ij}$) and a between school component ($X_{ij} \bar{X}_j * Y_{ij} \bar{X}_j * Y_{ij} \bar{Y}_j$). The total amount of explained variation that lies between schools in the case of socioeconomic status can be seen as path $X_{ij} \bar{X}_j$ squared or .20. The corresponding figure for educational plans is .11. This model of the analysis of covariance is basic to an understanding of the comments of both proponents and opponents of the contextual analysis of school effects.

The second stage in the intellectual development of the notion of school effects was a result of the methodological refinements in analysis techniques that are identified in Figure 1. The major substantive arguments of Sewell and Armer (1966), Hauser (1971), Jencks, et al. (1972) and others that schools have little effect on student outcomes rests on findings that demonstrate little between school variance in student outcomes.

The third stage of development in the notion of school effects has been the recognition and demonstration of suppressor variables in models of educational processes. In short, the critics of school effects had based their substantive conclusions on the net result of all between school differences. Drew and Astin (1972), Meyer (1970),
Nelson (1972) have all postulated and empirically demonstrated the presence of contextual variables that have conflicting and offsetting effects on student outcome variables. Even the strongest opponents of contextual analysis of school effects have recently documented the presence of these suppressor effects (cf. Hauser et al., 1974).

CRITICISMS OF CONTEXTUAL ANALYSIS OF SCHOOL EFFECTS

Hauser (1970, 1971, 1974) has been an outspoken critic of the contextual analysis of school effects and his comments on the involved issues need to be carefully assessed. He poses the following questions if a contextual effect has been demonstrated.

(1) What does the effect mean? What social mechanisms does it represent, and how do we know that they are involved?

(2) How large is the effect? Could it be a chance event, and if not, has it theoretical predictive, or policy value, or does it help explain a statistical relationship of interest?

(3) Is the apparent effect due to the omission of relevant explanatory variables?

(4) Is the apparent effect due to measurement error in control variables?

(5) Is the effect due to explicit selection on the dependent variable? (Hauser, 1974:366)

A careful consideration of Hauser's (1974) comments suggests that the questions that he poses are not as unique to contextual analyses as they might first appear. Implicit in the first question is the problem of the interpretation of school effects. Attributing school effects to school organization characteristics as measured by composition variables without utilizing other directly measured intervening variables as a demonstration of the underlying social mechanisms at work is equivocal. However, the use of proxy variables can be seen as a measurement...
problem which pervades all of sociological research (cf. Duncan, 1975). Moreover, Duncan (1975:117) has indicated a general similarity between measurement errors and specification errors in theoretical models. This general similarity can easily be demonstrated by the utilization of proxy variables in theoretical models of school effects. Proxy variables are not only indirect indicators of underlying variables, they typically represent tests of "residual hypotheses" since the social mechanisms of the underlying social processes are not specified with intervening variables. The most clear cut test of a theory of school effects would employ direct measures of the explanatory variables rather than attributing theoretical significance to unspecified relationships.

The second question posed by Hauser (1974) is implicitly a question of the magnitude of school effects. Previous research has cogently demonstrated that the net impact of all between school differences, both measured and unmeasured, on typically student outcomes is relatively small (e.g. 10-20 percent of the total variance or less). The most recent research suggests that only about 4 percent of the total variance of typically student outcome variables can be attributed to between school differences (cf. Hauser, et al., 1974, Alexander and Eckland, 1976; Jencks and Brown, 1974). A case for the theoretical explication of educational processes, however, can be made without an unmerited concern for just the total amount of variance explained in student outcome variables (cf. Duncan, 1975; Nelson, 1972).

in essence using the wrong theoretical model. Utilizing an inappropriate theoretical model will not produce unbiased estimates of the effect parameters of the variables in the model. "Since the omission of correlated explanatory variables will bias the estimated effects of the included variables, ... 'one should be prepared to argue that his theory of relations among the individual attributes is complete and correct, or at least defensible in relation to some explicit criterion, before speculating about residual group differences" (Hauser, 1970:659). The specification of theoretical models of social processes is clearly based on prior theory and research. Since theory and prior research may be interpreted differently by separate researchers, there is no scientific manner to evaluate conflicting viewpoints other than on the basis of their theoretical rationales and the research evidence they produce. In short, there is no way to prove that you have a correct model, you can only demonstrate that it is more appropriate than any other model.

Hauser's (1974) fourth question directly concerns measurement error. Measurement error in sociological research is always problematic, but it is especially problematic in contextual analyses where error in individual attributes upwardly biases estimates of contextual effects, and measurement error in contextual variables downwardly biases their estimates. Obviously, sets of Monte Carlo data need to be rigorously assessed to investigate the net effects of conflicting biases that often occur in contextual analyses.

The fifth question that Hauser (1974) poses is both theoretical and methodological. Theoretical in that an inappropriate model was
selected for investigation and methodological in that an independent and a dependent variable were confounded in an analysis. The implications of Hauser's (1974) comments on selection, however, can be easily over-extended. Hauser (1970, 1971) has consistently maintained that school effects could be attributed to selection factors, "High status or ambitious parents of unusually bright children may chose to live in areas where schools are reputed to be of high quality" (Hauser, 1971: 45). While such an explanation of school effects is logically plausible, it is also logically plausible to discredit any research on educational processes since one of the main functions of educational institutions is explicit social selection.

IN-DEPTH REVIEW OF SELECTED STUDIES

Studies of school climate utilizing various direct measures of normative value climates (cf. Sinclair, 1970; Pace and Stern, 1958; Halpin and Croft, 1962) have been excluded from this in-depth review on the basis that; (1) their research designs have not typically controlled for student input characteristics; (2) they demonstrate a lack of relationship with achievement outcomes when student inputs are controlled (cf. Andrews, 1965); and (3) for a variety of other substantive and methodological reasons (cf. Feldman, 1971). For example, while McDill and Rigsby (1973) did control for student input characteristics in their investigations, their derivation of direct factor analytic measures of school climate is extremely questionable. First, school means on 39 variables were factor analyzed for 20 schools. This procedure clearly violates the assumption of "R" factor analysis that you have more observations than variables. Second, the utilization
of school means ignores the problem of aggregation bias (cf. Hannan, 1971) and does not consider the question of variation of factor scores within and between schools. Third, the approach is problematic in that the derived factor measures are orthogonal or independent of one another thus severely limiting one's ability to specify relationships among these measures. Fourth, the utilization of additional variance explained as a criterion of evaluation implicitly excludes the role of suppressor variables in both theory and design.

In order to facilitate a succinct review of the previous literature on school effects that has demonstrated the presence of suppressor effects, the general theoretical models of Drew and Astin (1972), Meyer (1970), Nelson (1972), and Alexander and Eckland (1975) will be illustrated. The relevant statistical parameters of these models in terms of partial correlations or standardized path coefficients will also be presented.

Drew and Astin Model

The model and results of Drew and Astin (1972) represent the most recent and extensive explication of Davis's (1966) "frog pond phenomena" at the college level. Their model and results are illustrated in Figure 2 on page 20. The sample utilized represents over 4,000 college sophomores in 246 colleges and universities nationwide. The statistical parameters are partial correlation coefficients controlling for appropriate variables within the model and a list of over twenty-five control variables that had a statistically significant impact on GPA. GPA was gathered from the student's educational institution. Self concept was a student's self reported rating on a five point scale.
Figure 2. Drew and Astin's (1972) Model

Statistical parameters are partial correlation coefficients

Ability context was the average academic ability of students enrolled at the student's college or university as measured by standardized college admission tests. Educational aspirations were measured with a five point scale indicating the highest degree a student intended to obtain. As indicated in Figure 2, the impact of self concept on educational aspirations was not specifically reported by Drew and Astin (1972), although they indicated that it was statistically significant and greater than the impact of either ability context or GPA on educational aspirations. The model indicates that ability context has a large negative effect on GPA. Whether or not this negative effect has indirect negative effects on educational aspirations is not clear since the authors do not report the actual magnitude of the statistical parameter between self concept and educational aspirations.
Meyer's Model

The theoretical model and findings of Meyer (1970) are presented in Figure 3. The sample contains over 35,000 senior high school students in 518 high schools nationwide. Family social status represents a combined index of parents' education and occupation collapsed into five categories. Ability represents performance on a twenty item test of mental ability constructed by Educational Testing Services. Educational plans is a dichotomously coded self reported intention of attending college. School social status represents the percent of students in the upper two categories of family social status in a school. Ability context is defined as the mean score of a school's students on the ability measure. The statistical parameters represent partial correlations with appropriate controls for the variables in the model.

Figure 3. Meyer's Model

As Figure 3 shows, Meyer's (1970) findings indicate that the direct effect of school social status on educational plans (.11) is suppressed through its correlation with ability context which has
a direct negative effect on educational plans (-.11).

Nelson's Model

Nelson's (1972) theoretical model and findings are illustrated in Figure 4. The sample contains over 17,000 junior high school students in 45 public high schools in and around Minneapolis, Minnesota. Family socioeconomic status was measured by an index of parents' education divided into three categories. Educational plans were student's dichotomously coded self reported intentions to enroll in college. Intelligence scores were measured by performance on the Minnesota Scholastic Aptitude Tests. GPA was obtained directly from school records for all courses taken by a student. The GPA and intelligence distributions were divided into equal thirds. School social status was measured as the percent of high status students in a school. It also was collapsed into three equally divided categories.

Figure 4. Nelson's Model

As Figure 4 indicates, Nelson's (1972) findings indicate that
the direct effect of school social status on educational plans (.20) is suppressed by its direct negative effect (-.31) on GPA which has a direct positive effect on educational plans (.48). Although Nelson (1972) does not present direct statistical parameters, he does suggest through tabular analysis that the negative effect of school status on GPA is mediated through its association with intelligence context (cf. Meyer, 1970).

Alexander and Eckland's Model

Since the complete theoretical model of Alexander and Eckland (1975) is rather cumbersome and specifies causal relationships among variables somewhat differently than the previously presented models, unreported reanalyses of their data were undertaken to place their findings in a framework consistent with the models that have been previously reviewed. The derived theoretical model is illustrated in Figure 5 on page 24. The sample represents a follow-up study of over 42,000 sophomore high school students in 46 schools. The study is a follow-up to the data originally reported and analyzed by Meyer (1970). Ability was measured by a twenty item test of aptitude constructed by Educational Testing Services. GPA is a self reported response collapsed into four equal categories. Sex is coded as "0" for males and "1" for females. Father's occupation was coded on the basis of Duncan's Socioeconomic Index. Academic self concept was measured on a nine item simple summated factor analytically derived index. Parental influence and teacher influence were responses to the general questions: "To what extent have you discussed going to college with teachers or guidance counselors (or your parents)?" (Alexander and Eckland, 1974:16).
For ease of presentation, all exogenous variables have been "blocked." In the actual structural model, however, the separate exogenous variables affect all endogenous variables.
Responses were coded into three categories. School social status was based on the aggregated school mean on the Duncan Socioeconomic Index for father's occupation. Ability context was based on the aggregated school means for individual students' ability. Since the theoretical model derived from the work of Alexander and Eckland (1975) is rather complex and contains numerous statistical parameters, the results of the reanalyses performed are presented in tabular form in Table 1. The statistical parameters are standardized path coefficients.

Table 1. Standardized Regression Coefficients for the Full Contextual Model Derived from Variables and Findings Originally Presented by Alexander and Eckland (1975).

<table>
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<tr>
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<th>GPA</th>
<th>Teach Infl</th>
<th>Parent Infl</th>
<th>Self</th>
<th>Plans</th>
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<td>.153*</td>
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</tr>
<tr>
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<td>.014*</td>
<td>.071*</td>
</tr>
<tr>
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<td>-.114*</td>
<td>-.096*</td>
<td>-.109*</td>
<td>-.033</td>
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</tbody>
</table>

An * indicates statistical significance at the .05 level or better.

The findings shown in Table 1 indicate that ability context has direct negative impacts on teachers' influence (-.114) and parents' influence (-.096), two variables intervening between GPA and self concept that have not been included in previous studies of school effects. Ability context also has a direct negative effect...
on self concept (-.109), a result that is inconsistent with the findings of Drew and Astin (1972). Ability context has no direct impact on educational plans suggesting that its impact on educational plans is mediated through prior variables in the model rather than direct as previous investigators have suggested (cf. Meyer, 1970; Nelson, 1972).

Table 1 also indicates that school social status has significant positive effects on teachers' influence (.117), parents' influence (.168), and educational plans (.071). The relative magnitude of these effects suggest that the effect of school social status on educational plans is largely mediated through variables intervening between GPA and educational plans rather than as direct as suggested by previous research (cf. Meyer, 1970; Nelson, 1972). The results shown in Table 1 also indicate that parents' influence, a variable not incorporated in previous studies of school effects, has the largest direct impact on educational plans (.376).

LIMITATIONS OF PREVIOUS RESEARCH

While previous research (cf. Drew and Astin, 1970, Meyer, 1970; Nelson, 1972; Alexander and Eckland, 1975) has demonstrated the presence of suppressor effects of school social status and ability context on educational processes, the explication of the intervening social mechanisms of these effects has not been documented by empirical research. Although the work of Alexander and Eckland (1975) brings together the research traditions of school climate and the "frog pond phenomena," it implicitly fails to explicate either perspective by
incorporating intervening variables between contextual variables and the more proximal determinants of educational plans. In short, the most advanced theoretical models of school effects replicate previous models of within school processes with only the addition of contextual variables. Given the lack of theoretical explication, the most recent research on school effects remains a shallow reference to normative and comparative social processes (cf. Kelley, 1952) roughly attributed to school social status and ability composition variables.

The normative effect of school social status emerges from a long history of studies on the positive effects of school social status on educational plans (cf. Boyle, 1966; Michael, 1961; McDill and Rigsby, 1973; Ramsoy, 1961; Turner, 1964; Wilson, 1959, 1963). Unfortunately, much of the debate concerning the impact of normative school processes has been focused on its net impact on students' educational plans rather than how its impact on educational plans is mediated through intervening variables.

Campbell and Alexander (1965) were able to explicate and the impact of school social status on educational plans by proposing a two stage theoretical model of ecological and interpersonal influences. They were able to empirically demonstrate that peer influences were more important determinants of a student's educational plans than school social status. They also, however, demonstrated that school social status affected the probability that any given student would have high status friends with college plans. Their work suggests that
school social status has no direct effects on educational plans but that it does have positive indirect effects on educational plans by its direct positive effect on peer influences which affect educational plans. Since recent theoretical models of within school processes incorporate teacher, parental, and friends influences on educational plans, it appears that Campbell and Alexander's (1965) two stage theoretical model may be applied to these additional influences.

The comparative effects of ability composition variables on educational plans emerges from the research tradition following Davis's (1966) explication of the "frog pond phenomena." A basic premise in this theoretical perspective is the assumption of local ranking systems in educational institutions (cf. Meyer, 1970). A student's position in a local ranking system (e.g. GPA position) will be determined by his ability in comparison to other students in the educational institution. Thus, students of equal ability may vary in their local rank across schools. If GPA is a major factor in predicting educational plans, ability composition will have an impact on educational plans. From a social system perspective, GPA's are an ideal local ranking system. They are considered the unit of exchange between teachers and students and are a key to social system rewards. They also represent a public definition of performance, and uphold the norm of competition (cf. Coleman, 1961) in a pattern of contest mobility that is managed at a local level (cf. Turner, 1960).

Since local ranking systems (e.g. GPA) have consistently been found to be better predictors of college plans than individual ability (cf. Hauser et al., 1974; Alexander and Eckland, 1975), high ability
contexts are assumed to lower educational plans by their direct negative impact on the local rank position of any given student. In short, "students are less likely to plan on college as competition increases and as their ability appears diminished" (Meyer, 1970:64).

The idea that high ability contexts directly increase competition among students in a local ranking system is common in statements about the "frog pond phenomena (cf. Meyer, 1970; Nelson, 1972). Thus far, however, this notion of increased competition in high ability contexts has not been empirically assessed by incorporating intervening competition variables between school ability context and GPA in models of educational processes.

Recent studies of school effects on educational plans have not commented on the finding that ability context has a direct negative effect on self conceptions of academic ability (cf. Alexander and Eckland, 1975). While Drew and Astin (1972) indicate that ability context has insignificant effects on self concept (.007) at the college level, Alexander and Eckland (1975), at the high school level, indicate that ability context has a moderate negative impact on self conceptions (-.109). While this inconsistency in findings may represent nothing more than variation in research methodology and instruments, it may also indicate that the effects of ability context are mediated differently depending on the organizational level of the educational institution. Hauser's et al. (1974:25) comments that there is a "lack of variability in average grades among schools," and Alexander and Eckland's (1975) findings suggest the possibility that the suppressor
effects of ability context in high schools operate simultaneously on GPA and self concept. If this is true, it suggests that self conceptions are not entirely based on within school or local comparisons as suggested by Davis (1966). It also suggests that between school differences may have effects on self concept. Thus far, the previous research on school effects has not tested the idea that students may have perceptions of between school differences in the quality of their schools. This issue is important theoretically since the inferences that students make about the quality of their schools are likely to have effects on their self concept of academic ability and educational plans, even though more conventional measures of school quality (e.g. achievement, resources, programs) display little between school variation.

Another limitation of the previous research on school effects has been its exclusive focus on high school and college students. Thus far, no previous research has assessed school effects at the elementary school level even though such effects are suspected of being larger at this level (cf. Jencks et al., 1972:90-91).

There are several reasons why elementary school effects may have substantial effects on students. First, the smaller size, greater homogeneity, and larger number of elementary schools relative to high schools and colleges suggest that there is the potential for larger variation in between school characteristics. Second, their smaller size and more homogenous student bodies suggest that the comparative and/or normative effects on individuals may be less diffuse (cf. Kelley, 1952). Third, even if net elementary school effects are small, they may demonstrate a cumulative advantage over
time since students are exposed to them for longer periods. Since many of the implications of the "frog pond phenomena" rely on local comparisons, it might be expected that the outcomes of local comparisons within elementary schools would be stronger since elementary schools are typically more local in nature than either high schools or colleges. Similarly, however, it might be expected that the relatively high degree of localism in elementary schools may affect other aspects of educational processes and dilute school effects.

For example, Drew and Astin (1972) report relatively strong suppressor effects of ability context on GPA in colleges, while Alexander and Eckland (1975) report moderate suppressor effects of ability context on GPA in high schools. Again, while variations in research design and methodology may account for these findings, it is plausible that GPA has a different meaning in secondary and higher educational institutions. Parsons (1959), as well as a number of radical critics of the American educational system, have posited that early educational processes are directed more toward the socialization of values and commitments than the transmission of cognitive knowledge. If this is true, ability context may be expected to have less impact on GPA, self concept, and educational plans in elementary schools than in high schools and colleges.

An additional limitation of the previous research on school effects is that most recent models of school effects have not included race as a variable in their models (cf. Hauser et al., 1974; Alexander and Eckland, 1975; Jencks and Brown, 1975; McBill and Rigsby,
1973). While a massive literature exists on the impact of racial composition on student outcomes in the form of desegregation studies (cf. Coleman et al., 1966), its focus is almost entirely on the net impact of racial composition on academic achievement. Recent research on school effects has not considered the question of the similarity of school effects for black and white schools. The Coleman Report (Coleman et al., 1966) is suggestive in that it indicates that minority students may be differentially sensitive to their educational environments. The Coleman Report also indicated that enrollment in white schools typically depressed minority students' self conceptions of academic ability. The question still remains, however, as to whether or not minority students enrolled in minority schools are more sensitive to school effects than non-minority students enrolled in non-minority schools.
CHAPTER III

EXPLICATION, PRESENTATION, AND DEFENSE OF A THEORETICAL MODEL

The ideal theoretical model that guides this study is illustrated as a path analytic model in Figure 6 on page 34. The model is recursive in that all variables in the model are partially determined by all previous variables. No causal assumptions, however, are made about the relationship between parents' expectations and friends' expectations, and it is assumed that the error terms of these variables are correlated. The model presented in Figure 6 varies from previous models of school effects in that the variables of perceived competition, quality of school, and school peer plans are posited as intervening variables between the school composition variables of school social status and achievement, and the more proximal determinants of educational plans (cf. Drew and Astin, 1972; Meyer, 1970; Nelson, 1972; Alexander and Eckland, 1975). The within school component of the theoretical model is generally similar to the within model of educational processes posited by Alexander and Eckland (1975) and Hauser et al. (1974). Achievement, however, replaces intelligence and is treated as an exogenous variable rather than an endogenous variable. This decision not only deletes estimates of the often assumed bias of intelligence tests on social origin variables (cf. Hauser, 1972), it also has important theoretical consequences.

Turner (1966) has criticized the utilization of intelligence measures in educational processes on the basis that they typically represent measures of behavioral continuity rather than a potential
Figure 6. Proposed Model of Elementary School School Effects

For ease of presentation, all exogenous variables, intervening contextual variables, and expectation variables have been "blocked." In the actual structural equations model, however, the relationships among the "blocked" variables are specified. See text for details.
for cognitive growth. In short, he suggests that intelligence measures are disguised achievement measures largely dependent on prior achievement and exposure to educational experiences. Bidwell and Kasarda's (1976) criticism of the use of intelligence measures as predictors of achievement when both are measured at the same point in time reiterates Turner's (1966) perspective in a methodological framework. Studies of school effects by Alexander and Eckland (1975), Meyer (1970), Jencks and Brown (1974), and others have utilized measures of intelligence gathered at the same point in time as achievement scores. Other studies of school effects have utilized measures of intelligence gathered after considerable exposure to schooling (cf. Nelson, 1970; Drew and Astin, 1972; Hauser et al., 1974).

A cogent theoretical rationale for replacing intelligence measures with achievement measures in contextual analyses is that students may have no idea of the intelligence level of their peer as an aggregate, especially when intelligence tests are not routinely administered. Since much of the conceptual framework of school effects via informal social processes relies on comparative social processes it would seem essential that students have accessible information on which make comparisons.

Similarly, it would appear that the utilization of aggregate achievement levels in studies of school effects would allow an easier integration of informal social processes with formal social processes operating at the school level. Implicit in this perspective in the notion that school level policy is directed toward teaching at the mean achievement level rather than mean intelligence level of students. The
mechanism of ability grouping practiced by many schools is a direct analogy to the process postulated here except that it is a within school process rather than a between school process.

Explicating and extending the models of previous research on school effects suggests the following sequentially developed series of hypotheses.

Perceived competition will be an intervening variable between achievement context and GPA. Achievement context will have a direct positive impact on competition within schools and competition will have a direct negative impact on GPA. Achievement context will have no direct effects on GPA. This hypothesis is an extension of the work of Meyer (1970) and Nelson (1972).

Perceived school quality will be an intervening variable between achievement context and self concept. Achievement context will have a direct negative effect on perceived quality of school and perceived quality of school will have a direct positive impact on self concept. Achievement context will have no direct effects on self concept. This hypothesis is an extension of the work of Alexander and Eckland (1975) and represents an attempt to explicate the inconsistent findings of Alexander and Eckland (1975) and Drew and Astin (1972) concerning the role of achievement context on self concept.

Perceived school peer plans, teacher's expectation, parents' expectations, and friend's expectation will be intervening variables between school social status and educational plans. School social status will have direct positive effects on school peer plans, teachers'
expectation, parents' expectations, and friend's expectation and these variables in turn will have direct positive effects on educational plans. School social status will have no direct effect on educational plans. This hypothesis is an extension of Campbell and Alexander's (1965) two stage theoretical model of school social effects to a three stage theoretical model. Since school peer plans is posited as an intervening variable between school social status and the variables of teacher's expectation, parents' expectations, and friend's expectation, school social status is not expected to have direct effects on these variables. Similarly, school peer plans is not expected to have direct effects on educational plans.

While the rationale for the placement of competition, perceived school quality, and school peer plans as intervening variables between school contextual variables (i.e., school social status and achievement context) and the more proximal determinants of educational plans is based on the extension and explication of previous research, the relationships among these variables are problematic. The following assumptions have been made concerning these variables.

Increased competition within schools has a direct positive impact on perceived school quality. Increased competition and increased school quality have positive direct effects on school peer plans. Perceived school quality and school peer plans will have direct positive effects on GPA. Competition will have a direct negative impact on GPA. While the placement of this cluster of variables after GPA is possible in the theoretical model, this potential placement would lessen their role as intervening variables between contextual variables and GPA - a specific theoretical focus of this study.
Based on previous research on school effects, the within school hypotheses of the model can be stated as follows.

GPA is determined by exogenous social origin variables (i.e. sex, race, social status) and achievement.

Teacher's expectation is determined by GPA, exogenous social origin variables, and achievement. Parents' expectations are determined by teacher's expectation, GPA, social origin variables, and achievement. Friend's expectation is determined by teacher's expectation, GPA, social origin variables and achievement. No causal relationships are posited between friend's expectation and parents' expectations.

Self concept is determined by teacher's expectation, parents' expectations, friend's expectation, GPA, social origin variables, and achievement.

Educational plans are determined by self concept, teacher's expectation, parents' expectations, friend's expectation, GPA, social origin variables and achievement.

RESEARCH MODEL

The research model utilized in this study varies from the ideal theoretical model illustrated in Figure 6 in that an individual level measure of achievement was not available. While the lack of this variable is likely to provoke the claim that inappropriately specified theoretical model is used to assess school effects, it can be contended that the research model is a defensible approximation to the ideal model. While the lack of individual achievement is likely to
bias some of the statistical parameters estimated for the ideal model, the total amount of bias introduced is not as great as it initially might be thought.

Empirically, the lack of an individual achievement measure is a serious specification error only to the degree that it biases the estimates of other variable's effects on a given variable (cf., Duncan, 1975:101-112). In order to bias the effects of other variables, individual achievement must have substantial direct effects on the other variables in the model. Recent research on school effects by Hauser et al. (1974) and Alexander and Eckland (1975) indicates that their respective measures of intelligence and aptitude, the equivalents of achievement in the present model, had insignificant effects (less than .09) on most other variables in their models. Only GPA and Alexander and Eckland's (1975) measure of self concept were strongly affected by intelligence or aptitude. Alexander and Eckland's (1975) measure of self concept appears exceptional in the context of previous research in that it is strongly affected by aptitude and sex, as well as by GPA. Examination of their nine item factor analytically derived measure of self concept suggests that few of the items tap self assessments of academic ability (cf., Alexander and Eckland, 1974a). Based on previous research then, only the estimates of the variables utilized to predict GPA are expected to be significantly biased by the omission of an individual level measure of achievement.

A more critical concern in the research model is the problem of bias resulting from not controlling individual achievement while assessing the impact of achievement context on educational processes.
Previous research suggest that not controlling for individual level attributes upwardly biases estimates of the impact of corresponding contextual variables. Given this perspective, one might expect the research model to substantially overestimate the effect of achievement context. However, not controlling for individual level attributes when their corresponding contextual effects are opposite in sign suppresses the absolute magnitude of the contextual effect toward zero (cf. Hauser, 1971). The bias of not controlling for individual level attributes may be either upward or downward depending on the "true" contextual effect. The magnitude of this bias depends on two factors. The first is the degree to which the contextual effects are homogenous, in short, the degree of between school differences. The second is the slope of the individual level attribute on the dependent variable under consideration.

In order to estimate the absolute magnitude of the bias introduced into the research model by not controlling for individual achievement, the theoretical model derived from the work of Alexander and Eckland (1975) was reanalyzed deleting individual aptitude from the model. The results of this reanalysis are given in Table 2 on page 41. The results obtained when individual aptitude was controlled (cf. Table 1) and when it was not controlled (cf. Table 2) indicates an absolute mean difference of .023 in the statistical parameters of the models. The mean absolute difference in the statistical parameters for aptitude context was .042. The estimates of aptitude context were without exception lower when individual aptitude was not controlled and were
Table 2. Standardized Regression Coefficients for the Full Contextual Model Derived from Variables and Findings Originally Presented by Alexander and Eckland (1975): Ability Deleted from Model

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<tr>
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</tbody>
</table>

An * indicates statistical significance at the .05 level or better.

Most downwardly biased when individual aptitude level had a strong positive effect on a variable. As expected, the largest bias (.105) was the estimate of aptitude context on GPA. Assuming that achievement at the individual level has a strong direct effect on GPA, equivalent to Alexander and Eckland's (1975) finding of .483 for aptitude, suggests that the effect of achievement context on GPA in the present study will be downwardly biased .100 at a maximum.

In summary, the research model of study appears to be a reasonable approximation to the ideal theoretical model. The research model, however, is expected to produce biased estimates of social origin variables effects on GPA and underestimate the effects of achievement context on GPA.
CHAPTER IV
RESEARCH METHODS AND STATISTICAL ANALYSIS

Sample

The data utilized in this study represent a subset of data collected for a more intensive investigation of elementary school effects and climate (cf. Brookover et al., 1973). The research strategy of the original study indicated a sample of elementary schools that could be generalized to a typology of schools based on four general school characteristics; achievement level, socioeconomic status level, racial composition, and urban or rural location. Only urban schools are investigated in this study since some of the cells for rural schools were empty. While the schools and students in this study do not represent a random sample of any particular universe of schools or students, they do represent a highly heterogenous population of schools and students. The utilization of purposeful sampling procedures to insure heterogeneity has been adopted by many previous researchers of school effects (cf. McDill and Rigsby, 1973; Coleman, 1961; Wilson, 1959).

The placement of all elementary schools in the State of Michigan into the eightfold typology of achievement level, socioeconomic status level, and racial composition was accomplished on the basis of aggregated mean characteristics for these variables supplied by the State Department of Education for all fourth grade students in public schools in the spring of 1970. Achievement represents a standardized test of combined verbal and math achievement developed by the
Educational Testing Service for administration to fourth graders. The mean achievement level for all elementary schools was 50.95. Socioeconomic status was based on a factor analytically derived index of family consumption patterns. The mean socioeconomic status for all schools was 48.03. Racial composition was based on "Fourth Friday" enrollment figures supplied by all elementary schools for the determination of state aid.

The placement of schools in the eight fold typology was accomplished by dictotomizing the aggregated characteristics of schools into "high" and "low" categories on the basis of state means for elementary schools. The selection of black schools on the basis of achievement, however, was especially problematic in that only five of these schools were above or near the mean achievement level for all elementary schools in the state. One of these schools refused to allow data collection. The remaining four schools were placed into the typology on the basis of their overall fit. This made it necessary to classify two schools as "high" achievement schools even though their mean achievement levels did not exceed the state average. These two schools, however, represent the only two schools in the state that reasonably fit the predetermined typology. Table 3 on page 44 shows the characteristics and final classification of the eighteen schools selected for investigation. Difference between the aggregated characteristics of schools in the "high" and "low" categories are all significant beyond the .001 level.
### Table 3. Characteristics and Classification of Schools By Achievement, Socioeconomic Status, and Racial Composition

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<th>School</th>
<th>N Students</th>
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<th>Socioeconomic Status Level</th>
<th>Racial Composition</th>
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<td>518</td>
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<td>50.0 - High</td>
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</tr>
</tbody>
</table>

1. Racial composition is percent white.
2. Data collection not approved by school.

Student N's based on list wise deletion of missing data observations.

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**Data Collection**

After the cooperation of the selected schools had been secured, questionnaires were administered to all fourth, fifth, and sixth grade students. While the students were selected on the basis of the characteristics of the previous year's fourth graders, information was...
collected from current fourth and fifth grade students in order to insure stable estimates of school effects and direct measures of school climates. Examination of successive years of achievement data indicates that achievement levels of elementary schools are very consistent over time (cf. Brookover et al., 1973).

The questionnaires were group administered to students in their home rooms in a single day. The questionnaires were self administered or read to the students depending on staff researcher's assessments of the literacy of the students. No attempts were made to follow up students who were absent from school the day the questionnaires were administered.

Variables

The variables included in the research model of this study were operationally defined as single item indicators taken from the questionnaire. Attempts to construct scales and indices were not undertaken since conventional analyses based on correlational analyses (e.g. factor analysis, coefficient alpha) confound within school correlations with between school correlations and do not contain statistical procedures to test for school interactions of the constructed indices. Test-retest reliability coefficients are not available for the single item indicators.

Self reported sex was coded as a dummy variable, with female being coded as "1".

Self reported race was collapsed into a dummy variable with white being coded as "1".

Self reported father's occupation was recoded as a Duncan Socio-
economic Index score.

GPA was coded as a student's response to the question; "What marks do you think that you really can get if you try?" Responses were coded as (5) mostly A's; (4) mostly B's; (3) mostly C's; (2) mostly D's; and (1) mostly E's.

Friend's expectation was defined as a student's response to the question; "How far do you think your best friend believes that you will go in school?" Responses were coded as (1) finish grade school; (2) go to high school for a while; (3) go to college for a while; and (4) for finish college.

Teacher's expectation was defined as a student's response to the question; "How far do you think the teacher that you like the best believes that you will go in school?" Responses were coded as (1) finish grade school; (2) go to high school for a while; (3) finish high school; (4) go to college for a while; and (5) finish college.

Parents' expectations were defined as a student's response to the question; "How far do you think your parents believe you will go in school?" Responses were coded as (1) finish grade school; (2) go to high school for a while; (3) finish high school; (4) go to college for a while; and (5) finish college.

Self conception of academic ability was defined as a student's response to the question; "Forget how teachers mark your work. How good do you think your own work is?" Responses were coded as (1) poor; (2) below most students; (3) about the same as most students; (4) good; and (5) excellent.
Educational plans was defined as a student's response to the question; "How far do you think you will go in school?" Responses were coded as (1) finish grade school; (2) go to high school for a while; (3) finish high school; (4) go to college for a while; and (5) finish college.

Perceived quality of school was defined as a student's response to the question; "How do you think your principal would grade the work of the students in this school, compared to other schools?" Responses were coded as (1) would grade it much lower; (2) would grade it somewhat lower; (3) would grade it the same; (4) would grade it somewhat better; and (5) would grade it much better.

Perceived competition in school was defined as a student's response to the question; "How many students in this school will work hard to get a better grade on weekly tests than their friends do?" Responses were coded as (1) almost none of the students; (2) some of the students; (3) half of the students; (4) most of the students; and (5) almost all of the students.

School peer plans was defined as a student's response to the question; "If most of the students here could go as far as they wanted in school, how far would they go?" Responses were coded as (1) finish grade school; (2) go to high school for a while; (3) finish high school; (4) go to college for a while; and (5) finish college.

Fathers' occupational context was defined as the aggregated school mean on students' father's occupation as scored by the Duncan Socioeconomic Index.
Achievement context was defined as the aggregated school means of achievement as assessed by the Michigan Department of Education for the previous year's fourth graders.

Treatment of Missing Data

There are three commonly utilized methods for treating missing data values in statistical analyses; substitution of means, pair wise deletion, and list wise deletion (cf. Lalu, 1975). Since pair wise deletion of missing data values may produce statistically and logically inconsistent correlation matrices and substitution of means for missing data values attenuates correlations due to a reduction of the variance, list wise deletion was the procedure selected for treating missing data values.

The utilization of list wise deletion resulted in a 30 percent loss of observations in the present study. Examination of the distribution of losses across schools indicated that losses were greatest for black schools versus white schools, greatest for low achievement schools versus high achievement schools, and greatest for low socioeconomic status schools versus high socioeconomic status schools. Examination of losses across variables indicated that non-response to father's occupation represented the greatest single cause of missing data. Losses ranged from 10 percent to 64 percent across schools. While the loss of missing data observations in list wise deletion is unavoidable, a comparison of missing data means before list wise deletion with means after list wise deletion indicated no apparent pattern of bias or significant differences.
Methods of Analysis

Path analysis techniques were selected as the method of analysis in this study for several reasons. First, the framework of path analytic techniques makes explicit the assumptions about theoretical processes that are contained in a model. Second, path analysis findings are concise within the total structure of the postulated model. Third, path analysis requires no more stringent assumptions than those found in conventional multiple regression techniques. Fourth, path analysis offers a succinct and powerful alternative method to analysis of covariance (cf. Hauser, 1971; Werts and Linn, 1970; Feldman, 1971). Explications of path analysis techniques are given by Duncan (1975). Examples of its utilization in social science applications are given by Goldberger and Duncan (1973).

Interaction

In a simple three variable model of analysis of covariance, significant interaction indicates that the relationship between two variables, x and y, varies depending on the value of the third variable, z. In short, the slope of the regression line of y on x varies across different values of z.

Researchers vary in how they account for interaction in analysis of covariance. Hauser (1970) maintains that some heterogeneity is to be expected in data and that interaction effects that account for less than 10 percent of the total variance of a dependent variable can be substantively ignored. Blalock (1972) suggests that interaction effects in analysis of covariance may arise because of non-linear relationships among variables and that appropriate transformations will
decrease, if not eliminate, interaction effects. Since interaction effects in analysis of covariance indicate that the relationship between two variables is dependent on the value of a third variable (cf. Blalock, 1972), incorporating the third variable directly into the analysis may decrease or eliminate interaction effects. Hence, Hauser (1974) suggests that interaction effects may arise because of an incomplete or ill specified theoretical model. Obviously, the potential theoretical interpretations given to explanations of interaction are limitless.

Since analysis of covariance is a straightforward extension of analysis of variance techniques, tests for interaction are based on alternative methods of calculating the total explained sum of squares by utilizing a pooled estimate and an additive estimate within groups. Since the total explained sum of squares, however, is dependent on varying groups sizes and homogeneity of variance across groups, it is not surprising that tests for interaction are based on prior statistical assumptions (cf. Blalock, 1972).

Bartlett's test for homogeneity of variance (cf. Walker and Lev, 1953) for each of the variables in the research model across the seventeen schools in the final sample only supported the assumption of equality of variance for the variables of sex and competition. Attempts to meet the assumption of equality of variance for other variables by commonly utilized log and square root transformations were not successful (cf. Blalock, 1972). Examination of these results also suggested that deleting one or several variables or schools from the analysis would not alter the findings concerning the lack of homogeneity of
variance. Visual inspection of the cross tabs of the variables did not suggest that the lack of equality of variance was due to non-linear relationships. These tests and checks suggest that the lack of equality of variances was the result of ceiling and bottom effects in the measurement of the variables (cf. Duncan, 1975).

The inability to establish the equality of variances among the variables across schools effectively precluded any tests for interaction in the research model.

Disaggregation of Schools

Black schools and white schools in the present study were disaggregated and separately analyzed. The rationale for this decision is based on empirical and theoretical considerations.

Empirical problems were encountered in attempting to sample black schools in a typology of schools based on achievement level, socioeconomic status level, and racial composition of all elementary schools in the state of Michigan. As it might be recalled, only a few black schools in the state were near the mean achievement level of all schools in the state. This situation made it necessary to classify two black schools as "high" achieving even though their achievement levels were below the mean. Analyzing all schools together, given this situation, would confound the effects of achievement context in white and black schools, especially within the context of the weighting procedures used in this study. Disaggregating the schools allows a clear cut and direct assessment of the similarity in the impact of achievement context on educational processes.
Weighted Correlations

The correlations of all the variables in the research model were weighted by the number of cells in the typology analyzed, the number of schools in each cell of the typology, and the number of students in each school. This procedure gives equal weight to all cells in the typology, all schools within a cell, and all students within a school. It insures that the assumption of equality of sample sizes in analysis of covariance is met as well as the implicit assumption of an equal number of schools in each cell of the typology. Weighted means and standard deviation were also calculated.
CHAPTER V
FINDINGS

Correlation of Variables

The weighted correlation, weighted means, and weighted standard deviations of the variables in the research model are given in Table 4 on page 54 for white schools and Table 5 on page 55 for black schools. Since inspection of the weighted standard deviations of the variables across white and black schools indicates only small differences, standardized rather than unstandardized path coefficients are utilized to indicate the findings of this study (cf. Duncan, 1975).

Full Contextual Models and Contextually Reduced Models

White schools

The results of the path analysis of the variables in the full contextual model for white schools are given in Table 6 on page 56. The full contextual model explains 48 percent of the variance of educational plans in white schools.

In order to estimate the increment to explained variance of educational plans that the contextual variables (i.e., achievement context, fathers' occupational context) and the intervening contextual variables (i.e., competition, school quality, and school peer plans) add, the research model was reanalyzed omitting these variables. The contextually reduced model explains 46.5 percent of the total variance of educational plans indicating that the contextual and intervening contextual variables explain an additional 1.5 percent of the total variance of educational plans in white schools.

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Table 4. Weighted Correlations, Weighted Means, and Weighted Standard Deviations for Variables in Research Model for White Schools; \( N = 1090 \) with Missing Data Observations Deleted

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Table 5. Weighted Correlations, Weighted Means, and Weighted Standard Deviations for Variables in Research Model for Black Schools; N = 821 with Missing Data Observations Deleted

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Table 6. Standardized Regression Coefficients for Full Contextual Model; White Schools

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An * indicates significance at the .05 level or better based on total number of unweighted cases.
Black schools

The results of the path analysis of the variables in the full contextual model for black schools are given in Table 7 on page 58. The full contextual model for black schools explains 37 percent of the total variance of educational plans. The contextual reduced model, omitting achievement context, fathers' occupational context, competition, school quality, and school peer plans, accounts for 36.5 percent of the total variance of educational plans. Hence, these variables explain an additional .5 percent of the total variance of educational plans in black schools.

Between School Variance of Variables in the Research Model

Table 8 on page 59 indicates the estimated net proportion of the total variance of the variables in the research model that lies between schools. These estimates are based on the squared weighted correlations of the individual level variables with their corresponding school means (cf. Hauser, 1971; Duncan et al., 1972; Walker and Lev, 1953).

Examination of Table 8 on page 59 indicates that relatively small amounts (e.g., less than 5 percent) of the variance of the variables, with the exception of race and father's occupation, occurs between schools. The large degree of between school variance for race and father's occupation are not exceptional since the sample design of this study explicitly selected schools that were divergent in these characteristics.
Table 7. Standardized Regression Coefficients for Full Contextual Model; Black Schools

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An * indicates significance at the .05 level or better based on total number of unweighted cases.
Table 8. Proportion of the Total Variance of Variables Estimated to be Between Schools

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Full Contextual Models With Insignificant Effects Removed

White schools

The results of the path analysis of the full contextual model for white schools with insignificant effects removed are given in Table 9 on page 60. Removing variables with insignificant effects reduces the explained variation of educational plans from 48 percent to 47.7 percent.

The findings in Table 9 indicate that achievement context does not have a direct positive effect on competition nor does it have a negative effect on school quality as hypothesized.

As assumed, competition has a direct impact on quality (.107),
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An * indicates statistical significance at the .05 level or better based on total of unweighted cases.
and both quality and competition have direct effects on school peer plans (.063 and .112).

Contrary to expectations, fathers' occupational context has no direct impact on school peer plans. School peer plans is affected by achievement context (.143), competition (.112), father's occupation (.088), and quality (.063). The effect of achievement context on school peer plans was not anticipated on the basis of prior conceptualization or research.

As it might be recalled, the statistical parameters of the variables affecting GPA are likely to be biased since individual achievement was not included in the model. Examination of the full contextual model in Table 6, however, suggests that the effect of achievement context on GPA would have been approximately -.130 if individual achievement had been included in the model. This hypothesized result based on the re-analyses of Alexander and Eckland's (1975) data, however, is contrary to the hypothesis that the negative effect of achievement context on GPA would be mediated through competition rather than being direct. The effects of sex (.090) and father's occupation (.158) on GPA are likely to be upwardly biased but they are consistent with prior research (cf. Alexander and Eckland, 1974). The effect of quality on GPA (.104) was not anticipated.

Direct effects on teacher's expectation are obtained with father's occupation (.206), school peer plans (.201) and GPA (.175). The effect of school peer plans was hypothesized and the effect of father's occupation is consistent with prior research. The relative magnitude of effects in comparison to GPA, however, was not expected. GPA was
expected to have the highest effect on teacher's expectation.

Direct effects on friend's expectation are produced by teacher's expectation (.447), school peer plans (.130), quality (.101), GPA (.070), and sex (.058). Again, the relatively low impact of GPA was not expected. The effects of sex and quality on friend's expectation were not expected.

The direct effects on parents' expectations are teacher's expectation (.517), GPA (.133), and school peer plans (.083). These effects were expected in the order of their magnitudes.

The effects on self concept are GPA (.357), quality (.164), friend's expectation (.120), and father's occupation (.056). The effects of quality and father's occupation on self concept were not expected.

The direct effects on educational plans are parents' expectations, (.352), friend's expectation (.225), teacher's expectation (.184), school peer plans (.124), self concept (.106), and GPA (-.057). The direct effect of school peer plans was not expected and the negative effect of GPA on educational plans is surprising.

The findings in Table 9 on page 60 support the general hypotheses that achievement context and fathers' occupational context do not have direct effects on students' educational plans. The hypothesis, however, that the effects of achievement context on educational plans would be mediated through competition and quality is clearly not supported. The hypothesis that school peer plans would mediate the effect of fathers' occupational context also is not supported.
The results of the path analysis of the full contextual model for black schools with insignificant removed are given in Table 10 on page 64. Removing insignificant effects from the full contextual model reduces the explained variation of educational plans from 36.5 percent to 36.4 percent.

The findings in Table 10 indicate that achievement context does have a direct positive effect on competition (.279) as hypothesized. Its positive effects, however, are offset by the unanticipated negative effects of father's occupational context on competition (-.334). The total effect of achievement context on competition through direct and indirect effects is -.040. Race also has an unexpected negative effect on competition (-.109).

Achievement context, as predicted, has a negative effect (-.205) on quality but its effects are nearly completely offset by the unexpected positive effect of fathers' occupational context on quality (.107). The total effect of achievement context on perceived school quality, both direct and indirect, is -.064.

As in white schools, competition has a direct positive effect on quality (.154). Sex also has a positive effect on quality (.079).

School peer plans in black schools is only affected by competition (.139). The hypothesized positive impact of fathers' occupational context on school peer plans is not found, nor is a positive impact of achievement context on school peer plans found.

Again, since the statistical parameters of the variables affecting GPA are likely to be biased, the full contextual model for black schools (cf. Table 7) is examined. Inspection of this table suggests that the
Table 10. Standardized Regression Coefficients for Full Contextual Model with Insignificant Effects Deleted: Black Schools

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R2  | .048| .042| .021| .078| .156| .284| .329| .147| .364|    |

An * indicates statistical significance at the .05 level or better based on total of unweighted cases
effects of achievement context would not have been a significant effect if individual achievement had been included in the model.

While this hypothesized finding is consistent with the hypothesis that achievement context has no direct effects on GPA, it is not consistent with the hypothesis that the negative effects of achievement context on GPA would be mediated through competition since competition has a slight positive effect (.099) on GPA rather than a negative effect.

Direct effects on teacher's expectation are produced by GPA (.248), school peer plans (.229), and father's occupation (.153). These effects are similar to the ones found in white schools but their relative magnitudes to each other vary. GPA has the strongest effect in black schools but the weakest effect in white schools. School peer plans retains its intermediate position in both white and black schools. Father's occupation has the least effect in black schools but the highest effect in white schools.

Direct effects on friend's expectation are found with teacher's expectation (.389), school peer plans (.183), and GPA (.158). The effects of quality and sex on friend's expectation in white schools are absent in black schools. Peer plans and GPA have relatively higher impacts on friend's expectation in black schools than in white schools while teacher's expectation have a relatively lower effect.

The direct effects on parents' expectations are teacher's expectation (.448), school peer plans (.169), and GPA (.146). These effects are similar to the ones found in white schools except that school peer plans has a relatively lower effect in white schools while teacher's
The direct effects on self concept are GPA (.310), sex (.101), and friend's expectation (.070). The effects of father's occupation and quality found in white schools are not present in black schools. The effect of sex on self concept was not anticipated. The effect of friend's expectation on self concept is much lower in black schools than it is in white schools.

The direct effects on educational plans are parents' expectations (.322), friend's expectation (.208), teacher's expectation (.175), and GPA (.079). The effects of teacher's expectation, friend's expectation, and parents' expectations are similar in magnitude to the effects found in white schools. The effects of school peer plans and self concept on educational plans found in white schools are absent in black schools. The negative effect of GPA on educational plans in white schools becomes a positive effect in black schools (.079).

The findings in Table 10 on page 64 support the hypothesis that achievement context and fathers' occupational context do not have direct effects on educational plans. The hypothesis that the effects of achievement context would be mediated through competition and quality is supported although its total impact on these variables is cancelled out by opposite sign effects of fathers' occupational context. The hypothesis that school peer plans would mediate the effects of fathers' occupational context is not supported.
CHAPTER VI
CONCLUSIONS

Net Effects of Contextual Variables

The findings in Chapter V indicate that the contextual variables of achievement context and fathers' occupational context, and the intervening contextual variables of perceived competition, school quality, and school peer plans explain an additional 1.5 percent and .5 percent of the total variance of educational plans in white and black schools. These findings imply no conclusion other than the addition of contextual and intervening contextual variables adds relatively little explained variance to educational plans of students.

The small net effects of the contextual variables and intervening contextual variables may be the result of several different and quite distinct processes. For example, school contextual effects may be large but extremely mediated in their impacts on educational plans, or they may be small but have direct effects on educational plans, or they may be large but offsetting as suggested by Alexander and Eckland (1975).

The Lack of Direct Effects of Contextual Variables on Educational Plans

As it might be recalled, there are two general perspectives concerning the effects of contextual variables on educational plans. The normative school social status perspective suggests that schools high in social status provide a normative climate of support for high educational plans. Campbell and Alexander (1965), however, demonstrated
that the effect of school social status was largely mediated through interpersonal influences rather than being a direct effect on educational plans. This study extended Campbell and Alexander's (1965) two stage theoretical model (i.e., school social status to interpersonal influences to educational plans) to a three stage theoretical model (i.e., school social status to school peer plans to interpersonal influences to educational plans).

The relative deprivation perspective on the effects of school contextual variables on educational plans suggests that schools high in achievement indirectly depress educational plans through their negative effects on GPA. GPA, in turn, affects self concept, which then affects educational plans (cf. Davis, 1966). This study extended previous work in this tradition by incorporating several intervening variables between achievement context and GPA into a theoretical model.

While these research traditions vary in their focus on variables that are assumed to have contextual effects on educational plans, they are similar in that they posit that the effects of contextual variables on educational plans will be mediated rather than direct. The findings of this study confirm these general hypotheses in that no evidence was found that either achievement context or fathers' occupational context had direct effects on educational plans of students in either white or black schools.

Contextual Effects in White Schools

The findings of this study indicate that the effects of school contextual variables in white schools are small, mediated, and com-
pletely confined to the impacts of achievement context. Fathers' occupational context had no direct effects on any of the variables in the theoretical model. The only effect of a school contextual variable was that of achievement context on school peer plans. As previously suggested, fathers' occupational context was expected to have this effect. The findings in Chapter V, however, do indicate that the effects of school peer plans on educational plans are largely mediated through teacher's expectation, friend's expectation, and parents' expectations. School peer plans, however, does retain a direct positive impact on educational plans. The pattern of these findings indicates that achievement context in elementary schools fits the theoretical model of normative school effects that Campbell and Alexander (1965) attribute to school social status.

The notion that achievement context may be a source of normative rather than comparative social functions is not new. Prior debates concerning the merits of the relative deprivation model and school climate model of contextual effects were based on the implicit assumption that achievement context was the single source of these diverse effects (cf. Werts and Watley, 1969; Drew and Astin, 1972). The fact that Campbell and Alexander (1965) attributed normative social processes to school social status may have been erroneous in that they did not control for achievement context, a variable highly correlated with school social status at the aggregate level.

The direct effects of quality on friend's expectation and self concept in white schools suggests that perceptions of between school differences may have significant effects on intermediate determinants.
of educational plans. It is important to note, however, that these effects cannot be attributed to between school differences in achievement context or fathers' occupational context. In short, it appears that students in white schools utilize other variables as indicators of school quality. The substantive significance of this finding becomes clearer when the differences between white and black schools are discussed in the following section.

Contextual Effects in Black Schools

The findings in Chapter V of this study indicate that the effects of school contextual variables in black schools are large but offsetting and truncated in their effects on educational plans. Achievement context has a large effect on competition (.279) but it is offset by a large negative effect of fathers' occupational context on competition (-.334). Similarly, achievement context has a large negative effect on quality (-.205) but it is offset by a large positive effect of father's occupational context on quality (.107). The pattern of these findings suggests that achievement context functions as a source of comparative social processes in black schools while fathers' occupational context functions as a source of normative social processes.

Unlike white schools, achievement context has no effect on school peer plans nor does school peer plans have any direct effect on educational plans. In short, contextual variables in black schools have no effects on educational plans either directly or indirectly.

Again, unlike white schools, perceived school quality has no effects on the more proximal determinants of educational plans such
as friend's expectation or self concept. Perceived school quality in black schools, however, is largely determined by school contextual variables.

Differences Between Contextual Effects in White and Black Schools

A major finding of this study is that school contextual variables have substantially larger effects in black schools than in white schools even though their effects are offsetting and truncated in their impact on educational plans.

A second major finding is that achievement context operates as a source of normative social processes in white schools while it operates as a source of comparative social functions in black schools.

In accounting for these findings it is necessary to re-examine some of the assumptions of prior theoretical models of school effects. Implicit in the theoretical explications of the "frog pond phenomena" are the suppositions that local comparisons of achievement by students arise in part because of the lack of universal criteria of achievement (cf. Meyer, 1970; Davis, 1966) and that students utilize local reference groups in making evaluations of their achievement. Developments in national testing and state wide assessment programs suggest that the constraints against universal comparisons of achievement have largely been removed. These developments do not imply that universal measures of achievement have replaced local comparisons or that local comparisons are theoretically unimportant. They merely suggest that students may have access to more universal measures of achievement.
Given two potential systems of evaluation, local and universal, how might we predict which students would utilize which system of self evaluation. Off hand, it would appear advantageous for students who rank low on universal criteria to utilize a system based on local comparisons. Local comparison systems allow the potential of high rank in achievement, even if achievement by more universal criteria is relatively low. Local comparisons may not only protect the self esteem of individuals who are low on universal criteria, they are also consistent with Turner's (1960) explication of the American educational system as one of contest mobility. Alternative ranking systems lower the probability that any one student will be a "final loser" in contest mobility and thereby uphold the norm of competition even though competition is defined in the context of a local reference group.

The problems of selecting high achieving black schools in this study suggests that the achievement differences between white and black schools are greater than the differences between white schools. The findings that black students appear to be more sensitive to school contextual effects than white students (cf. Coleman, et al. 1966) can be interpreted as an indication that black students are more likely to utilize local reference groups and local comparisons in assessing their achievement levels.

White students do not appear to make local comparisons to the degree that black students do because of their relatively advantageous position on more universal criteria of achievement. In fact, the role of achievement context in white schools appears to operate as a
normative influence rather than a comparative influence on educational plans. This suggests that achievement context in white schools may be a mechanism of incorporating more universalistic criteria of achievement into within school processes. Several of the unanticipated findings of this study appear to support such an interpretation. First, GPA, a local measure of achievement, has a slight negative effect on educational plans in white schools. Second, perceptions of school quality have effects on several intermediate determinants of educational plans even though it is not affected by contextual variables. These effects are totally absent in black schools.

School Effects at the Elementary School Level

The integration of varying conceptualizations of school contextual effects with general considerations of elementary school educational processes suggests that the impact of school contextual variables are unlikely to have more than minor effects at the elementary school level. This conclusion is based on two general considerations. First, the findings of Chapter V indicate that there is relatively little between school variation in the variables utilized in the research model. Second, current conceptualizations of school effects suggest that their impacts on educational plans are mediated through intervening variables rather than being direct. Since GPA, the intervening variable in the relative deprivation perspective, and school peer plans, the intervening variables in the school climate perspective, are located several stages prior to the strongest determinants of educational plans, it appears that school contextual effects cannot have very large effects on educational plans.
It is important to note, however, that as variables more proximal to school contextual variables increase in their relative weight as predictors of educational plans, the potential for larger school effects increases. For example, parental influences on educational plans appear to diminish as the level of educational institution increases and school effects appear to increase. While changes across educational institutions are often accompanied by changes in educational and social emphasis (cf. Parsons, 1959), the net effects of these changes may be offsetting.
CHAPTER VII

IMPLICATIONS AND LIMITATIONS

Implications for Social Policy

The findings of this study indicate that the net effects of school contextual variables on educational plans are rather small in both white and black elementary schools. Examination of the between school variance of the variables utilized in this study suggests that most of their variation occurs within schools. This finding suggests that the impact of any between school differences, measured or unmeasured, is likely to have a very small impact on student outcomes. These findings also suggest that the manipulation of school composition variables at the elementary school level are unlikely to have any major impact on student outcomes.

Implications for Theory

A reexamination of the theoretical notions of the "frog pond phenomena" (cf. Davis, 1966) suggests that its conceptualization of school effects on educational plans is largely based on the premise of local comparisons and the absence of universal criteria of achievement. If the trend toward more universalistic assessment of achievement continues, it would appear that students will have some element of choice in determining which standard of self evaluation to utilize.

Local comparisons and local reference groups, however, are likely to retain a central position in educational processes because of
their practical importance to educational institutions as a means of social control and motivation of students. The impact of achievement context on educational processes is likely to vary depending on the particular balance of universal versus local norms of achievement that students hold. An educational system based on contest mobility with an emphasis on continuing competition would mitigate against students' internalization of universal norms of achievement with disabling social psychological "costs" if they rank low on universal standards of assessment. In such situations, it is likely that students internalize the norm of competition but that the norm is circumscribed by local comparisons and local reference groups.

Limitations of the Research Model

The research model of this study did not utilize an individual level measure of achievement in assessing the impact of achievement context on educational processes in elementary schools. Reanalysis of Alexander and Eckland's (1975) findings on contextual analysis and examination of previous research (cf. Hauser et al., 1974), however, suggests that the amount of bias was probably low overall and that it could be taken into account in those specific situations where it was projected to be high. Reanalysis and previous research results, however, offer no absolute guarantee that the findings of this study would have been the same if an individual level measure of achievement had also been incorporated in the model.
Limitations of Methodology

The path analytic techniques utilized in this study are straightforward extensions of the analysis of covariance used by other researchers in investigations of school effects (cf. Alexander and Eckland, 1975; Hauser, et al., 1974). While such techniques represent the strongest available for testing hypotheses of school effects, they are not without limitations. The elaboration of varying sources of interaction path models have not kept pace with the substantive issues that interaction may imply in analyses of school effects. In short, decision rules for attributing interaction to unequal sample sizes, lack of homogeneity of variances across schools, improperly specified theoretical models, the presence of non-linear relationships and other diverse sources of interaction have not been well developed in the literature. Short of total disaggregation of complex path models by schools, it is nearly impossible to attribute any source of interaction to either statistical or substantive issues with any certainty. It is unfortunate that much of the debate concerning school effects has been focused on the net impact of between school differences rather than the issue of variation in within school processes. Until variations in within school processes are well understood both statistically and theoretically, it appears that investigations of between school differences will neither be systematic or productive.
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