A MULTILEVEL ANALYSIS EXAMINING THE COMMUNITY AND SCHOOL EFFECTS ON STUDENT RACIAL AND SCHOOLING PERCEPTIONS, AND STUDENT ACADEMIC ACHIEVEMENT

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Dedicated to

My Parents
for years of love and support

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ABSTRACT

A MULTILEVEL ANALYSIS EXAMINING THE COMMUNITY AND SCHOOL EFFECTS ON STUDENT RACIAL AND SCHOOLING PERCEPTIONS, AND STUDENT ACADEMIC ACHIEVEMENT

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This study addressed four research objectives. The first two examined the individual-level relationships between parent and child (student) racial and schooling perceptions, and the relationships between these student perceptions and their academic achievement. The second two questions sought a select reexamination of these relationships, to determine whether the community and school contexts contributed any additional group-level effects on student perceptions and academic achievement.

Multivariate regression analyses determined the order, direction, and magnitude of the individual-level relationships. Statistically significant relationships were submitted to an exploratory contextual analysis designed to detect group membership effects on a student criterion measure using a dummy variable-covariate approach. The results from the equations detecting significant group-level effects were compared to those produced by three related contextual analysis models designed to specify the sources of these effects.

The analyses showed that the parent and child perceptions were positively related and that many of the student schooling perceptions correlated directly with academic achievement. The central finding of these analyses reiterated the importance of the relationship between parent and child academic expectations and its implications for student achievement. Despite the significance blacks attributed to the schooling process, their actual experience with it generally

reflected low academic ability expectations from a number of sources, and low academic success.

The exploratory contextual analyses revealed that the community parameters largely failed to identify group-level effects on student perceptions. The school contextual analyses revealed that the particular high school a student attended added a small contribution to student achievement. The results produced from the three analytic techniques, which replaced the community and school identifier variables with group average scores, demonstrated that these measures generally captured and specified the source of the group-level effect identified with the dummy variable-covariate technique. The model expressing the predictors as individual- and group-level deviations consistently provided the most plausible results. The average social status of the community and school generally accounted for these contextual effects. The final sections of the text provide a comparative evaluation of these techniques with a discussion of this study's contributions and limitations, and suggestions for future research.

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CHAPTER I

THE PROBLEM

INTRODUCTION

Historically, our society has often treated the educational institution as a lever of social reform for remedying societal problems. The racial desegregation of public schools is indicative of such reform attempts. Working from the premise that racial mixing overcomes the combined disadvantages of race and residence (Boocock, 1980), our government has forced schools to racially desegregate through reorganization and busing. Intended to grant minority students equal access to educational facilities and services (Brookover and Lezotte, 1981), school desegregation has generally sought to improve minority student academic achievement and self-esteem, while fostering better racial relations between blacks and whites (Gerard, 1983).

Since influencing the 1954 Brown decision that mandated national school desegregation, educational researchers have intensively studied the effects of desegregation, primarily on black and white academic achievement. James Coleman's Equality of Educational Opportunity Study (1966) which demonstrated that blacks performed better academically in predominately white schools than in all black schools, triggered a flourish of desegregation studies that has only recently waned with the national public concern over declining student academic achievement. Literally thousands of studies have probed students (mostly), teachers, and parents to determine the attitudinal and behavioral consequences of school racial desegregation.

Despite the number of studies conducted, reviewers synthesizing the results generally agree that evidence of the effects of desegregation remains both

inconclusive (Bradley and Bradley, 1977; Cook, 1984; Crain and Mahard, 1983; Gerard, 1983; St. John, 1975; Thomas and Brown, 1982; Weinberg, 1977) and largely uninformative for policy making (Braddock and McPartland, 1982; Cohen, 1975; Gerard, 1983). Reviewers unanimously criticize the methodological shortcomings and theoretical development in this literature (Cohen, 1975; McConahay, 1978; Thomas and Brown, 1982).

Most significantly, researchers typically consider desegregation as a treatment variable, while admitting their lack of control over or understanding of the day-to-day community-school-classroom dynamics that ultimately determine the success or failure of desegregation plans (Crain and Mahard, 1983). As Sheehan (1980:29) maintains "desegregated schooling is never a pure treatment. Given the real-world constraints under which researchers must operate, it has been extremely difficult to isolate situations differing only in terms of ethnic composition. There is always some degree of confounding".

Most of these reviewers suggest that desegregation cannot be understood with simple input-output studies (e.g., Hawley, 1978) nor are they particularly meaningful without an understanding of the social milieu (i.e., community and school) in which desegregation takes place (McConahay, 1978; Rossell, 1978). Many reviewers agree that future desegregation research must study the classroom processes that perpetuate the gap in black and white student achievement (e.g., Brookover, 1984; Persell, 1977).

The issue of school desegregation forms the backdrop for the present investigation. It provides the research setting and variables for the application of an innovative statistical technique for examining social contextual effects. Rather than trying to demonstrate the beneficial or detrimental effects of desegregation, this study examines how the social context affects individual-level perceptions and behaviors within a racially desegregated school system.

Specifically, this study seeks to demonstrate the influence the community exerts on the relationship between parent perceptions of race and schooling and their children's racial and academic perceptions. Secondly, it explores how the school, with its particular racial and academic orientations, influences student academic achievement.

This topic is timely. It converges on the requests for studies examining the effects of the social milieu during desegregation (Cohen, 1972; Crain and Mahard, 1982b; McConahay, 1978; Rossell, 1978; St. John, 1975), with the application of a contextual analysis technique developed by Boyd and Iverson (1979) that directly assesses the unique contribution of the individual- and group-level effects on individual-level variables. Much of the personal impetus for this contextual analysis stems from an early exposure to Blau's (1960) enlightening demonstration of the "structural effects" of the group on individual-level attitudes, and the studies on conformity in small group settings (Hare, 1976), coupled with the Brookover et al. (1979) studies demonstrating the effects of school climate on student achievement.

RESEARCH OBJECTIVES AND THEORETICAL OVERVIEW

Unquestionably, parents shape their children's perceptions of themselves and the world (Kerkoff, 1972). Within the family context, children develop their self-identity molded from continual interaction with their social and physical environments. Through this interaction, children acquire an evaluative sense of personal efficacy and a disposition toward learning. Children also incorporate (not replicate) their parents' beliefs, values, and prejudices toward others. Children generally acquire their intergroup attitudes by age six, first affectively and nonverbably then cognitively; and these attitudes remain relatively stable over time (McConahay, 1978). Even at the age of two or three, children can distinguish

racial differences (McConahay, 1978). Furthermore, the family continues to exert a strong influence on the child, even in late adolescence, in determining educational aspirations and achievements (Kandel and Lasser, 1969). The present investigation compares parent perceptions of race to their children's (as students) racial perceptions, and examines the relationships of parent perceptions and expectations toward schooling with their children's racial and academic orientations.

The second research issue centers on the effects of student perceptions of race and schooling on their academic achievement. Most desegregation studies treat student self-other perceptions and academic achievement as criterion measures of change. The growing body of research on effective schools suggests (e.g., Bickel, 1983), however, that we carefully examine the relationship between student learning expectations and their academic achievement. Similarly, studies of school climate (Anderson, 1982) show evidence that schools provide a climate of learning expectations that students incorporate into their general and academic self-conceptions that, in turn, directly influence their academic achievement. These studies indicate that "significant others" (e.g., parents, peers, and school staff) shape children's perceptions of their self-worth and academic ability. Unfortunately, these evaluative others often judge minority students on their diffuse status characteristics, such as race (Cohen, 1982) and socioeconomic status (Brookover et al., 1979), as they equate these characteristics with low competence. These evaluations become self-fulfilling (Good, 1980) when minority children internalize them into their conceptions of ability.

The present investigation draws from these studies in examining the relationship between student self-other evaluations (self-other perceptions of academic ability, sense of control, importance of education, future aspirations, school academic climate) and their academic achievement. As with the first

research issue, the objective is to determine how individual-level perceptions impact or influence other criteria, in this case, student achievement.

The third and fourth objectives of this study use the two previous research questions as the springboard for investigating the community and school contextual effects on these relationships between parent and student perceptions and student achievement. Similar to Boocock's (1980) approach, the present investigation treats the family, community, and school as symbolic and physical environments where values, norms, and expectations develop through social interaction which, in turn, define appropriate attitudes and behavior for individuals. Within these social contexts, participants come to share many of the same attitudes, perceptions, expectations, and evaluations surrounding their behavior. These norms, role definitions, expectations, etc., are not passively accepted by the participants, but are subject to personal degrees of interpretation, acceptance, resistance, and rejection (Apple, 1981).

In this sense, participants create, through their interactions, an attitudinal and behavioral climate pervasive to that setting that makes demands on their involvement, conformity, and deviance. Such demands are usually accompanied by sanctions or consequences enforced formally and informally by the participants (Etzioni, 1964). Researchers (e.g., Blau, 1960) have demonstrated that organizational settings typically maintain normative climates that exert influence on worker-client relations, often independent of individual-level attitudes of the participants within these settings.

The present investigation considers the school and, more loosely, the community as social systems that influence students and parents to "conform" to certain race and schooling perceptions, integral to these symbolic and physical environments. It is further assumed that in classifying schools, and communities for that matter, according to their overall or average perceptions, there will be

distinguishable differences among schools and communities in their race and schooling perceptions. These perceptual differences between similar contextual units provide the fundamental basis for contextual analysis.

Contextual Analysis

Contextual analysis, traceable to Durkheim's (1951) work on Suicide (Davis, 1961), is also described in literature as "structural effects" (Blau, 1957, 1960) and "compositional analysis" (Davis, 1961). Coleman (1961:446), in his chapter on "relational analysis", says contextual analysis "consists of relating a characteristic of the respondent's social context and the independent variable - to a characteristic of the individual himself". Riley (1964) contrasts structural analysis, that focuses on the group and uses individual variables to specify the result, to contextual analysis, which focuses on individuals and uses differences between groups to specify individual relationships.

The present investigation draws from this tradition with an interest in combining the "macro" (aggregate) and "micro" (individual) sociological approaches (Barton, 1968) to the investigation of parent and student race and schooling perceptions and student achievement within a racially desegregated school context. Specifically, it seeks to determine the contribution community perceptions make on individual-level parent and child perceptions. Similarly, it examines the additional effect school-level perceptions exert on student achievement over and above the effects of their individual-level perceptions.

To conduct contextual analysis, researchers typically use aggregate measures such as rates, population density, community size, and socioeconomic composition. Mathematical approximations of these measures, within identifiable contextual boundaries, provide suitable alternatives for contextual analysis when they are unavailable or inappropriate for a particular investigation (Boyd and Iverson, 1979).

The present study uses an approximation technique developed by Boyd and Iverson (1979) that assigns to individuals within a given context, such as a school building, the group score averaged from their responses on a given variable within that unit. Entering this score that represents the group perception for the unit and the individual's perception score into the regression equation, the variation in the individual-level dependent variable can be attributed to the within-group effects of the individual-level score, the between-group effects across group scores, and an interaction term indicating the consistency of the within- and between-group effects.

This statistical technique based on the ordinary least sums of squares model is similar to the analysis of covariance (ANCOVA) technique in that both approaches separately assess group- and individual-level effects. In fact, statistical analysts such as Hauser (1970a) recommend using ANCOVA to determine group membership effects on individual-level data.

Boyd and Iverson's (1979) contextual effects model makes an important departure from the standard ANCOVA technique at this point. Because ANCOVA uses nominal variables to identify group effects (identical to dummy variable regression), it measures only the undifferentiated or composite group and interaction effects. In contrast, the contextual effects model, using metric variables at both levels, associates group and interaction effects with specific variables (Boyd and Iverson, 1979:64).

Because the group variable in this model is computed from the individual-level variable, the two are highly correlated. To remove this correlation, Boyd and Iverson (1979) developed a centering technique (described in detail in Chapters II and III). This correction then permits the unique partialling of the variance components in the dependent measure.

The present investigation uses the Boyd and Iverson (1979) contextual analysis technique to determine if the community, in which parents and their children reside, exerts an additional influence (i.e., contributes to the explained variation) on the child/student's self-other perceptions over and above the individual-level effects of the parent perceptions. The Boyd and Iverson (1979) technique is specially adapted in this case in that it has not been used to examine variable relationships between pairs of respondents, only relationships within respondents.

The final objective in this study centers on determining the contextual effects of student perceptions within schools on their academic achievement. As mentioned above, many researchers have discovered that schools vary considerably in their perceptual learning climates that, subsequently, affect the within school levels of academic achievement (e.g., Anderson, 1982; McDill et al., 1967).

The data set in the present study identifies students within schools, making it possible to conduct a contextual analysis on student achievement using the individual-level student perception variable of interest, and a group average on this variable derived from and assigned to the respondents within a given school. This procedure will separate out the amount of variation in student achievement due to the individual perception, the average school perception, and the interaction between the levels of these two variables.

Having reviewed the four major research objectives for study, they are formally stated as research questions below. These questions are followed by descriptions of the research setting and data set, a listing and description of the parent and student variables, and a discussion of the community and school parameters used for the contextual analysis.

RESEARCH QUESTIONS

Each parent and student variable relationship is not formulated into a research question. In keeping with the research objectives described above, these questions are stated in the general format. The specific research questions using the variables of interest appear in Chapter III of this text.

I. What is the relationship between parent perceptions of race and schooling and their children's perceptions of race and schooling?

II. What is the relationship between student perceptions of race and schooling and their academic achievement?

III. Does the community perceptual climate affect the individual-level relationship between parent perceptions of race and schooling and their children's perceptions of race and schooling?

IV. Does the school-level perceptual climate affect the individual-level relationship between student perceptions of race and schooling and their academic achievement?

RESEARCH SETTING AND DATA DESCRIPTION

The data used in this secondary analysis come from a larger set provided by the College of Urban Development (CUD) at Michigan State University. Funded by the Rockefeller Foundation, the CUD project collected data one year prior and three years following the court-ordered school desegregation of New Castle County, Delaware. This judicial decision forced the county to consolidate its original eleven school districts into four attendance areas.

The CUD project managed to collect data on five of these districts, sending questionnaires to the randomly selected homes of students and their parents. Of the 2,333 (14%) parent-student pairs originally responding in 1978, 1027 pairs (45% of the original) responded in 1979, 492 in 1980, and 298 in 1981.

The 1979 cohort was selected for the present investigation on the assumption that parent and student race and schooling perceptions during this time were the

most salient. The restriction that both the parent and child race be identified and identical left 848 matched parent and child pairs, racially identified as either white (N = 676) or black families (N = 172), available for this investigation.

RELEVANT VARIABLES

From the parent and student questionnaires (Appendix A), individual items were factor analyzed. Six parent scales and six student scales were identified and are used in the present investigation. Appendix B identifies the particular items used to construct the scales presented below. Using a classification similar to the CUD study (Green et al., 1982), these scales are grouped according to racial and schooling perception categories. Included in this list is an academic achievement measure for students and a social status measure for parents. The achievement variable serves as a criterion measure for examining the effects of student perceptions. The social status measure serves as the indicator of socioeconomic status and is used throughout the analysis largely as a control variable in examining individual-and group-level relationships.

STUDENTS

Racial Perceptions

1. Racial Attitudes - assesses student beliefs about interracial schooling, housing, dating, marriage, and socializing (social clubs, guests).

Schooling Perceptions

2. Self-Other Perceptions of Academic Ability - assesses student perceptions of academic ability from the perspectives of self, teachers, and parents.

3. Future Aspirations - assesses student perceptions of educational attainment from the perspectives of self, teachers, and parents.

4. Importance of Education - assesses the value a student places on education and the perceived parental support for educational efforts.

5. School Academic Climate - assesses student perceptions of teacher and student support for academic effort.

6. Sense of Control - assesses student perceptions linking personal effort to successful educational outcomes.

Achievement

7. Student Academic Achievement - All students in the Spring of 1979 took the California Achievement Test (CAT). The correlation between the math and reading subtests was .85 or greater with the total battery score (CUD Final Report, 1982). The total battery raw scores are standardized into national percentile ranks to permit comparisons among grade levels within and between schools.

PARENTS

Racial Perceptions

1. Racial Attitudes - assesses parent beliefs about interracial schooling, housing, dating, marriage, and socializing (social clubs, guests).

2. Attitudes Toward School Desegregation - assesses parent beliefs and expectations about interracial schooling and the perceived support for desegregation among neighborhood parents and students, and teachers in their child's school.

Schooling Perceptions

3. Perceived School Quality - assesses parent perceptions of the academic orientation of their child's school and staff encouragement of their child's achievement and attainment.

4. Evaluations and Expectations of Child's Performance - parent assessment of their child's academic ability and educational potential.

5. Importance of Education - assesses the value a parent places on education and their perceived support of the child's educational efforts.

Social Status Perceptions

6. Social Status - assesses parent perceptions of their educational, occupational, and income standing relative to other residents in New Castle County.

CONTEXTUAL PARAMETERS

Parents in this data set are identified by general residential boundaries. These identifiers are consistent with those used with other community studies of racial desegregation (Crain and Mahard, 1982b; Rossell, 1978).

Community Identifiers

1. Neighborhood Racial Composition - Parent perceptions of the racial mix within their neighborhood (boundaries not specified). This variable has five categories:

   1. All White
   2. Mostly White
   3. Half Black / Half White
   4. Mostly Black
   5. All Black

2. Former School District - The school district where parents reside. The original eleven districts were reorganized into four attendance areas. Maps of these original districts and the attendance areas appear in Appendix C. Subjects from five school districts participated in this study. Each of these districts are described in terms of their racial composition and socio-economic status ranking according to the CUD 1978 Interim Report. These include:

   District I. (Wilmington) - Located in the eastern section of New Castle County, this district was 56 percent white (highest black district) and ranked the lowest in socioeconomic status of all eleven districts.

   District II. (De La Warr) - South of Wilmington, 66 percent of this district's population is white (the second highest black population in the county) and it ranked tenth in socioeconomic status.

   District III. (Mt. Pleasant) - Located in the northeastern section of the county, its population is predominantly white (97%) and ranked fifth in socio-economic status.

   District IV. (Newark) - A predominately white district (97%) Newark ranked fourth in socioeconomic status. It is located in southwestern New Castle County.

   District V. (Marshallton - McKean) - Near the center of the county, 95 percent of the district is white and socioeconomically ranked sixth.

3. Former School Code - Identifies students with the school they attended the previous year, prior to desegregation. It is used as an approximation of their local community on the assumption they previously attended neighborhood schools.

School Identifiers

1. School Code - Identifies students with the school they attend. Schools are identified as elementary, junior high, or senior high. Students are identified by school and grade level.

2. Attendance Areas - These boundaries divide the New Castle County into four areas. Schools are identified within these zones. Appendix C contains a map depicting New Castle County, divided into the four attendance areas, and the original former school districts.

ANALYSIS OVERVIEW

Following a descriptive analysis of the data by parent and student characteristics, a multivariate stepwise regression analysis assesses the significant individual-level relationships between the parent and student perception variables, and the relationships between student self-other perceptions and their academic achievement. Theoretically meaningful and statistically salient variables are retained for the contextual analysis.

The initial contextual analysis is exploratory. Contextual units, such as schools, are coded as indicator (dummy) variables and entered as the group variable with a particular individual-level variable into a regression analysis on the dependent variable of interest. This technique is consistent with Hauser's (1970a) suggestion that researchers use an ANCOVA model in locating contextual effects. This initial step determines if group membership contributes any additional explanation to individual-level relationships.

Provided these group differences are statistically significant, the average value for each group derived from the individual-level predictor gets assigned to the individuals within their respective groups. After centering the equation by

adjusting the independent and dependent measures, a second regression analysis assesses the unique contributions the individual, group, and interaction variables make in the explanation of the variation in the dependent measure.

EXPECTED CONTRIBUTIONS OF THE RESEARCH

This research is designed to further our understanding of the relationship between parent and child perceptions. Suprisingly few studies make such comparisons in the area of desegregation research. Furthermore, this study should extend our understanding of the influence a student's self-other evaluations have on his/her academic achievement.

The most significant contributions of this research stem from its substantive and methodological approach. Most importantly, this study builds on a sociological tradition that examines the individual within the social context. Barton (1968) maintains that most survey research is a "sociological meatgrinder" that tears the individual from his context, treating the individual as an isolate from everyone else. This is synonymous, according to Barton (1968:1) "with the biologist putting his experimental animals into a hamburger machine and looking at every hundredth cell, through a microscope; anatomy and physiology get lost, structure and function disappear, and one is left with cell biology". It is not difficult to concur with Barton (1968) that sociologists must avoid these reductionist tendencies by studying individuals within their family, neighborhood, and work clusters, if we are to understand the influence of the social setting on attitudes and behaviors.

The present study responds to Barton's challenge on a limited scale. Certainly, it lacks the precision and specificity of a sociometric study which directly measures, rather than approximates, the influence of the social setting. However, it offers methodological advancements by using secondary data to test a previously untested contextual analysis model, designed to identify the unique

effects of individual- and group-level variables. A comparison of its results to the standard regression techniques or ANCOVA model should prove particularly enlightening.

LIMITATIONS OF THE RESEARCH

Weaknesses of this investigation stem from several sources. From a methodological standpoint, the nonparticipation of six of the eleven original school districts and the low response rates of households within the participating districts jeopardizes random sampling assumptions underlying multiple regresssion analysis. Similar concerns must be expressed about the generalizability of this sample to other settings. The cross-sectional design of the present study requires it to remain primarily descriptive.

Perhaps the major weakness of this study comes from the post hoc nature and somewhat arbitrary definition, specification, and estimation of community contexts. No direct measures, either perceived or physical, of the community boundaries were available for study. Such estimation naturally introduces measurement error and biased representations of community influence. Future studies in contextual analysis must include more precise measures of community boundaries.

SUMMARY

In this chapter an innovative approach to examining the effects of the social milieu on individual-level perceptions and behavior has been presented. This contextual analysis technique, rooted in sociological tradition, explores the community and school influence on parents and students during the racial desegregation of their county school system.

Four research objectives and a theoretical sketch were presented with a discussion of the relevant individual-level variables and contextual parameters used for investigation. These sections preceded an analytic prospectus. Finally, the expected contributions and limitations of this research were given.

CHAPTER II

THEORETICAL FRAMEWORK AND RELEVANT LITERATURE

INTRODUCTION

The assumption that primary and secondary groups through socialization processes dramatically shape an individual's thoughts and behaviors, squarely rests as a cornerstone in the sociological tradition. Although sociologists differ in their interpretations of the socialization process (e.g., is it primarily an imposed, structural "top-down", or a created, phenomenological "bottom-up" process?), they conclude it is this process that provides individuals with their social nature.

The first section of this chapter develops a general theoretical sketch on family, school, and community socialization, borrowing from both the structural and symbolic perspectives. This approach treats socialization as a dynamic process in which individuals learn and behave according to their interpretations of the role expectations attached to the positions they occupy in group structures.

It is this socialization process that forms the backdrop to the present investigation. This process links school desegregation research to the studies of contextual analysis in that both investigative lines focus on demonstrating the effects of group norms and values on individual attitudes and behaviors.

School desegregation, like many social reform movements in the 1960's (e.g., urban renewal, compensatory education), operated from the premise that minority group members lacked the adequate socialization experiences (norms, values, skills, knowledge, etc.) for preparing them to equally compete with white majority students. This model attributes minority student failure to family background and environmental characteristics, rather than innate or hereditary deficiencies (see Persell, 1977 for her discussion of educational assumptions underlying student

performance differences). Reform programs were designed explicitly or implicitly on this assumption with the intention of compensating for this inadequate socialization, supposedly putting all students on an equal status in the schooling process. This model treats equal opportunity education as equal inputs (Brookover and Lezotte, 1981) and attributes schooling outcome differences to differences in student ability or merit (Persell, 1977).

Most school desegregation programs operated from this model with the additional assumption that interracial contact would motivate minority students to improve their achievement, racial attitudes, and self-esteem, by internalizing the white majority student achievement values. Through equal status contact (Allport, 1954), the white student majority would laterally transmit their norms, beliefs, values, and achievement attitudes to the minority student (Deutsch and Gerard, 1955; Gerard, 1983; Maruyama, 1984). Sociologically speaking, black students were expected to accept the student role definitions offered by the white student majority, acting as a reference group for the blacks.

The present investigation briefly reviews the racial desegregation literature on academic achievement, racial attitudes, and self-esteem with respect to these assumptions, concluding that: 1) most of the research evidence is inconclusive, and 2) most of the school and classroom conditions necessary for narrowing the achievement gap and reducing racial prejudice are seldom met in the majority of desegregation programs.

The second section of this literature review uses the socialization perspective to examine the literature on contextual effects. Peter Blau (1960, 1974) and other modern structural sociologists and political scientists (e.g., Huckfeldt, 1984) contend that groups maintain certain dominant common values, social norms, and social status patterns, which constrain their members' social conduct and affect their socialization experiences. This normative social structure exerts an

independent effect on group member attitudes and behaviors beyond their individual-level attitudes and behaviors.

Demonstrating group effects on individual behavior historically traces to Durkheim's work on suicide (1951), and lies central to a variety of modern sociological investigations identified as "structural effects" (e.g., Blau, 1957, 1960; Kendall and Lazarsfeld, 1950; Tannenbaum and Bachman, 1964), group "compositional" effects (e.g., Davis et al., 1961), and "contextual" effects (e.g., Alwin, 1976; Barton, 1970; Boyd and Iverson, 1979; Farkas, 1974; Hauser, 1970a, 1970b, 1974; Huckfeldt, 1984; Riley, 1964; Sewell and Armer, 1966). This chapter provides a discussion of the theoretical significance and methodological contributions these studies provide for the present investigation. Despite the on-again, off-again treatment this topic receives in the literature, the present review identifies a progression in its development, particularly in its methodological sophistication.

THEORETICAL FRAMEWORK

Individuals acquire their social nature through a variety of sociocultural sources including the family, neighborhood/community, school, church, and mass media, which share the responsibility for the socialization of the young. Lippitt (1981) describes these influential sources as the "socialization community"; a configuration of interconnected social systems that acculturate and constrain individuals to adopt and behave according to local and societal sociocultural conventions and standards. According to Blau (1960), individuals conform to these standards to avoid the punishments and secure the rewards of sanctioning others, yet more importantly, to avoid feeling guilty for violating their personally internalized standards. Socialization ensures then that individuals conform to group norms and values and that conformity itself is intrinsically rewarding.

The starting point for understanding the socialization process begins with the family. Within this unit, children acquire their basic self-other conceptions (perceptions, beliefs, attitudes, values, expectations and motivations) which affect their orientation, interpretation, and behavior in social situations. The family socialization experience establishes the link between parent and child racial and schooling perceptions and, in part, the link between the child's self-image and academic achievement, both paramount issues in the first part of this investigation.

The second part of this framework focuses on the additional impact the school and community contexts, with their particular normative structures, exert on these individual-level relationships. This approach assumes that the normative pressures or commitments, held by fellow group members (e.g., peers) within these contexts, constrain and, thereby, produce an additional socializing influence on their members' personal attitudes and behaviors. In other words, this approach examines the joint effects of the individual and the group on the individual's perceptions and behaviors.

The Family

The child's dependent status on the caregiver for need gratification creates a bond and a channel of communication fundamental to childhood socialization. The primary and secondary reinforcement mechanisms between the child and caregiver foster the child's language acquisition and, subsequently (and most importantly), the child's ability to refer, respond and evaluate the self as an object (Kerckoff, 1972). These mechanisms further motivate the child to learn, internalize, and conform to the caregiver's standards of evaluation, fostering the child's development of motives and values.

The child makes attributions toward the self as an object, developing a self-image from the perceptions of how others perceive and respond to this object. Cooley (1902) describes the self-development process as the "looking-glass self", likening influential "significant others" (Mead, 1934) to a set of mirrors reflecting their responses to the child's behavior, which the child interprets in making self-attributions. Mead (1934) later described this process as "taking the role of the other", i.e., seeing oneself from others' perspectives.

As part of their self-development, children acquire two social skills known as role-playing and role-taking (Turner, 1974). In the former, the child simply acts out the expected behaviors attached to a specific role (e.g., playing fireman or soldier), whereas in role-taking, the child learns to anticipate and imagine others' reactions (based on their expectations) to his/her behavior. Through this process, the child learns to guide his/her behavior to elicit the desired response from others (Kerckoff, 1972).

In sum, family socialization provides the foundation the child uses to perceive and evaluate future socialization experiences. The most significant development of family socialization is the child's acquisition of motives and values (Kerckoff, 1972). These components guide the child's choices of associations and the degree of significance the child attributes to each of these associations. The child develops an array of self-other conceptions strongly influenced by parental standards. At a very early age, the child learns these basic expectations and skills which will prove essential to future role behaviors and social interaction within a variety of group settings.

Parents teach the value of education and attempt to instill a level of achievement motivation in their children. Demonstrating the effects of family origin (SES) and parental encouragement on their youngsters' educational aspirations and (status) attainment, constitutes a major sociological enterprise

(e.g., Campbell, 1983; Duncan, Featherman, Duncan, 1972; Sewell and Hauser, 1975).

A branch of this research, investigating the social and psychological components of this parent-child relationship, discovered that parent rather than peer expectations better predicted adolescent educational aspirations (Kandel and Lesser, 1969), and that such parent expectations, consistent over time, strongly and positively predicted college attendance patterns (Conklin and Dailey, 1981). These findings testify to the powerful effects of parent expectations; effects that remain throughout their children's lives. At a very early age, the child learns these basic expectations and skills which will prove essential to future role behaviors and social interaction within a variety of group settings.

The School

The school has been described elsewhere (Boocock, 1980; Brookover et al., 1979) as a social system built around a formal and informal social organization, distinguishable in its learning climate or learning culture (Anderson, 1982), i.e., the attitudes, beliefs, norms, expectations, and values held by school members, that serve to enhance or impede student learning. This perspective contends that children entering this social system quickly learn and conform to the expectations conveyed by its members, particularly to those conveyed by such significant others as teachers and staff.

This contention rests on an expanding body of literature demonstrating that the expectations the school staff communicate to their students, regarding their academic abilities, strongly affects student performance (e.g., Anderson, 1982; Bloom, 1976; Brookover et al., 1979; Edmonds, 1979; McDill et al., 1967, 1973; Persell, 1977; Rosenthal and Jacobson, 1968) and, in turn, establish the classroom group structures (status, communication, friendship) based on student learning

characteristics (Boocock, 1980; Cohen, 1982, Johnson, 1980; Slavin, 1983). Many of these studies demonstrate the reciprocal nature of these expectations in their self-fulfilling effects on student ability conceptions and academic achievement.

These findings run consistent with two interrelated sociological concepts: the "self-fulfilling prophecy" (Cooley, 1902; Merton, 1968) and the "definition of the situation" (Thomas, 1931). Both maintain that people behave according to their social definitions of reality such that they make these definitions become reality through their actions. In the school situation, students learn their role definitions from significant others, act out these expectations in their behavior, and receive reinforcement from significant others for behaving "appropriately".

Kerckoff (1972) maintains that the school can dramatically alter the child's self-image and value commitments because, like the family, it controls the essential sources of rewards and punishments and offers few alternatives for acceptable behavior. Several of the school climate and teacher expectation studies support this contention, demonstrating both the beneficial and deleterious effects of the school norms and reward structures on the socialization of minority students (for a contrast of these effects see Brookover et al., 1979 and Persell, 1977).

A second theme flowing from the school climate research contends that schools differ in their learning climates and that these between-school climate differences account for the between-school differences in academic achievement. Most of these studies conclude that school climate measures provide a more direct assessment of school effects than student family background characteristics and/or school social and racial composition variables, used in an extensive number of studies (e.g., Alexander et al., 1979; Coleman et al., 1966; Hauser, 1971; Hauser, Sewell, and Alwin, 1976; Jencks et al., 1972; Wilson, 1967) examining between-school achievement differences. A discussion of these and other studies testing school effects appears below.

An even more important issue for the present investigation comes from Hauser's (1970a, 1970b, 1971, 1974) adamant contention that studies have not demonstrated that school characteristics, over and above the aggregate characteristics of their individual students, explain these between-school achievement differences. In other words, Hauser says that the processes affecting the outcomes of schooling occur in relatively uniform fashion within schools, making these outcomes between schools indistinguishable (Alwin, 1976). Hauser (1970a) contends that researchers commit a "contextual fallacy", a cousin to the ecological fallacy (Robinson, 1950), by interpreting residual differences among a set of groups on a dependent measure (e.g., adjusted differences in achievement between schools) that correlate with a group composition predictor variable (e.g., school mean SES) as evidence that unmeasured social and psychological mechanisms are operating.

Hauser (1970a) argues that unless one can conclude that the set of individual-level variables used in this analysis is correct or complete (e.g., a theory of interrelationships), making such attributions about group effects from aggregate measures are purely arbitrary. Convinced that most of the contextual effects demonstrated by other studies appear "uninteresting" and "trivial", Hauser recommends that such analysis remain at the individual level and to use an analysis of covariance technique, which treats groups as nominal categories, to detect group membership effects.

Hauser's arguments generated considerable controversy. Barton (1970) rebutted Hauser's (1970a) criticisms claiming that Hauser's techniques jeopardized theoretical generalizations to which Hauser (1970b) in response argued that Barton's efforts using Bowers' (1968) data failed to discount "contextual fallacies", and that the use of further individual-level variables would eliminate the contextual effects both Bowers and Barton demonstrated.

Farkas' (1974) attempt to clarify issues of contextual analysis, suggesting that the work of Rigsby and McDill (1972) in directly identifying normative climates offers considerable promise to this approach, led to another Hauser (1974) rebuttal. A discussion of this rebuttal and other contextual analysis issues that appear below acts as the springboard to the present investigation using the model developed by Boyd and Iverson (1979).

The present investigation sides with the school climate studies demonstrating that schools, like other organizations, (see Blau, 1957, 1960; Bachman et al., 1966) differ in their normative structures and climates which produce different effects on student attitudes and behaviors from school-to-school. Following Hauser's (1970a) suggestion, we first test for between-school effects using indicator variables with a covariate approach. We then substitute aggregate measures for the nominal group categories to analyze these between-school achievement differences. In the last stage of this analysis, we use the Boyd and Iverson (1979) technique to remove the correlation between individual- and group-level variables to identify their separate effects on student achievement.

The reader should note that this study does not directly measure these normative structures and climates, rather it relies on a mathematical approximation of them. Such direct measures might include sociometric data that trace the flow of interpersonal influence within the school. A model presented by Boocock (1980:215) suggests that classroom and peer group structures, which communicate and enforce student role expectations, act as the social and psychological mechanisms through which the school SES context and value climate mediate their effects on individual-level student performance. Working from this model, we assume then that school contextual effects reflect these interpersonal processes which place normative constraints on student performance.

The Neighborhood/Community

Few sociologists would contest that the child's neighborhood/community provides the context for many socialization experiences and that these local environments differ in the kinds of experiences they provide. Yet most research on education ignores contributions the community environment makes on the individual's attitudes, behaviors, and life chances (Rossell, 1978). Even fewer studies examine the mechanisms of community influence, although a number of political science papers, examining community political partisan tradition, indicate that its mediated through the social interaction found in primary and secondary groups, particularly through friendship relations (Huckfeldt, 1979; Putnam, 1966).

The most relevant discussion of the different types of neighborhoods/communities and their possible socialization effects on the child appears in the work of Parelius and Parelius (1978). The authors loosely define a community or neighborhood as "a socially meaningful territory" in that the residents generally agree about its boundaries, and that it contains a variety of interdependent institutions and social groups (Parelius and Parelius, 1978:330). Rossell (1978), using a similar definition, chooses the school district unit to delineate community boundaries.

The present investigation operates from the Parelius' definition as an assumption to testing community contextual effects. The (former) school district, neighborhood racial composition, and (former) school code, used as community identifiers in this study, constitute what Blau describes as "nominal parameters", structural categories for the explicit purpose of dividing a population (sample) into subgroups, with no inherent rank among these groups (1975:223).

Parelius and Parelius (1978) identify three analytic dimensions of communities. According to the authors, communities vary in their social

composition, social cohesion, and self-sufficiency. Their discussion of the black-ghetto and the affluent suburb on these dimensions provides some insight, at least indirectly, into the socialization of poor, minority students, and affluent (mostly) white majority students, respectively. To surmise from their discussion, the black child's socialization in the community is not pathological as Moynihan (1965) suggests, yet the child experiences first-hand the effects of poverty and discrimination which generally create a disparity in the values (idealistic) versus the expectations (realistic) black youngsters hold. The black community might convey a sense of disillusionment, frustration, apathy and anger. Like their parents, black youngsters generally hold high aspirations yet low expectations for educational, occupational and residential mobility, which develop from numerous unpleasant experiences with public and private agencies. Ghetto schools, marked by high rates of delinquency, drop-out, and turnover, are described as "centers of failure" (Parelius and Parelius, 1978).

Black youngsters, confronted with this disparity, might acquire a high sense of futility (Brookover et al., 1979) or a low sense of control (Coleman et al., 1966) in the student role, yet have a strong self-image based on racial pride and other status characteristics important to the roles in the community normative structure (see Lightfoot, 1978 for a valuable insight into black ghetto life). The discussion Parelius and Parelius (1978) present suggests that the black student's neighborhood/community may exert an additional strong influence on the black youngster's racial and schooling perceptions, over and above, the individual-level influence of their parents' attitudes.

In contrast to the black ghetto community, the affluent suburbs composed of high SES citizens generally provide rich home environments for their children. These communities select their residents on income-related factors, establishing and reinforcing a pervasive and rather homogenous climate that values in their

young, such characteristics as individual development, self-expression, and an optimism regarding their ability to control the future (Parelius and Parelius, 1978). With a strong tax base, schools in these communities acquire superior teachers and learning resources that foster and reinforce these values.

Youngsters socialized in these affluent communities benefit immensely from such social advantages, yet it is not clear if these communities add any contribution to their children's attitudes about race and schooling, beyond the influence of the attitudes held by the parents in these communities.

Research literature testing these community contextual effects is slight. A number of studies in the 1960s, reviewed by Boocock (1980) relating community demographic characteristics to school outputs, only very indirectly assesses community contextual effects. Boocock (1980) concluded that the school context (measured by SES and racial composition) more directly affects student performance than community or local neighborhood characteristics. These studies suggest that the school context best serves as the unit for examining group effects on student achievement, and that the community provides a meaningful context to examine its influence on parent-child attitudes.

Studies have demonstrated that community norms and values constrain their residents' attitudes and behaviors. Flinn (1970), for example, found that the farming community social norms and values independently affected truck farm growers' innovation attitudes. Bowers (1968) found that individual student misconduct varied with the proportion of students on campus strongly disapproving of this form of misconduct, with the contextual effect most evident as the proportion of disapproving students approached a majority. (This study sparked considerable controversy in the contextual analysis literature a la Barton, 1970; Farkas, 1974; Hauser, 1970, 1974). Huckfeldt (1979) discovered that high status neighborhoods encourage political participation among their higher status

residents, while they discourage political participation among their lower status residents. A more recent paper by Huckfeldt (1984) showed that an individual residing in a neighborhood where a particular class is dominant is more likely to have a friend from that social class, regardless of the person's own class membership; indicating the effects of associational opportunities and constraints imposed by the neighborhood social context. These studies differ in methodology and content areas found in the present investigation, yet they suggest that the community/neighborhood potentially exerts an independent effect on individual attitudes and behaviors, a theoretically pertinent assertion to this study.

We return to this point in discussing the contextual analysis literature. This discussion follows a brief review of the desegregation studies which inform much of the individual-level analysis portion of this investigation.

RELEVANT LITERATURE

School Desegregation

The extent of research on school desegregation is staggering. The current direction of the field emphasizes meta-analysis (e.g., Cook, 1983; Crain and Mahard, 1983) and reviews of reviews (e.g., Cook, 1984; Gerard, 1983). The review below addresses three outcomes typically measured in most school desegregation literature, namely, academic achievement, racial attitudes, and self-esteem. The present investigation does not focus on the effects of desegregation; rather it uses the variables from a desegregation study to examine individual-level relationships and the community and school contextual effects on these relationships. This discussion aquaints the reader with these outcomes most relevant to this investigation.

1. Academic Achievement

The educational and sociological literature well documents the gap between black and white student academic achievement. School desegregation efforts to narrow this gap by raising black achievement levels show mixed to positive results. Reviews of numerous desegregation studies by Bradley and Bradley (1977), St. John (1975), and Stephan (1978) led these authors to conclude that school desegregation has not proven either successful or unsuccessful in improving black achievement. On the other hand, meta-analysis and critiques of methodologically rigorous studies conclude that the majority show black achievement improvement (Cook, 1983; Crain and Mahard, 1982a; Krol, 1978). Cook (1984), like Crain and Mahard (1978), St. John (1975), and Weinberg (1977), concludes that achievement in desegregated schools exceeds that in segregated schools more frequently for children in the earliest school grades. Cook (1984:827), in a contrasting conclusion with Gerard (1983), argues that "desegregation, particularly when begun early and viewed cumulatively, accelerates black achievement gain".

In reviewing these studies, it seems reasonable to conclude that school desegregation probably improves black achievement and not at the expense of white achievement, yet the gap between the two remains. These results suggest that black and white students in the present study will show achievement differences. More important than documenting these differences is the relationship of the black and white student race and schooling perceptions with their academic achievement. Most desegregation studies focusing on achievement and attitudinal change neglect examination of this relationship.

2. Racial Attitudes

The majority of the desegregation reviews on changing racial attitudes judge the research as inconclusive (Cook, 1984). Only one (Weinberg, 1977) out of the seven major reviewers (Carithers, 1970; Cohen, 1975; McConahay, 1978; St. John,

1975; Schofield, 1978; Stephan, 1978) concludes that school desegregation improves the racial attitudes of blacks (and particularly) whites; the remaining six reviewers generally claiming that the bulk of the studies lack sufficient methodological rigor to reach unequivocal conclusions.

In contrast to these studies, experimental classroom research, based on laboratory findings that manipulate the reward structures and work conditions (e.g., team competition, heterogeneous ability grouping) of interracial learning teams, report marked improvement in student interracial attitudes (Cohen, 1975, 1982; Johnson, Johnson, & Maruyama, 1984; Slavin, 1983). These reviewers contend that these experimental conditions generally satisfy the scope conditions specified by Allport's (1954) equal status contact hypothesis, a set of constraints believed essential to effective school desegregation results (e.g., McConahay, 1978; St. John, 1975).

Given the aims of the present investigation, it is particularly important to examine studies that describe parent and children (student) racial perceptions and attitudes toward school desegregation. Although racial intolerance has declined with school desegregation (Rossell, 1978) and both blacks and whites favor racial mixing (Gerard, 1983; St. John, 1975), whites and a significant proportion of blacks, oppose busing, particularly two-way busing, to achieve racial balance (Altevogt and Nusbaumer, 1978; Gerard, 1983; Orfield, 1978; Rossell, 1978; St. John, 1975). Much of the white resistance centers on their desire for their children to attend neighborhood schools. Black parents on the other hand view desegregation as a way of improving their children's education (Beck and Sobol, 1978; St. John, 1975).

Several studies have demonstrated that parent and child racial attitudes are strongly and positively related (Bird, Monachesi, and Burdick, 1952; Bullock, 1977; Epstein and Komarita, 1966), particularly among whites, although the evidence conflicts about the strength of this relationship with student maturity (Bullock,

1977; Erbe, 1977; Rossell, 1978). Children show more racial tolerance than their parents (Bullock and Stewart, 1977), reflected, in part, by their more positive attitudes toward school desegregation (Erbe, 1977; The Milwaukee Journal, 1976).

Racial attitudes often differ across communities (Rossell, 1978). The research has not demonstrated that communities exert an influence on their residents' racial attitudes, although Rossell (1978) suggests that environmental cross-pressures produced the mismatch in the pro and con busing attitudes between parents and their children in a Louisville desegregation study. Rossell concludes (1978) that most desegregation studies treat the parents and their children in isolation, failing to examine community influences on their relationship.

City dwellers, particularly those in all black areas, show the most support for desegregation while the affluent white suburb residents most oppose it (The Milwaukee Journal, 1976; Rossell, 1978). For both older black and white students, racial tolerance correlated significantly with their perceptions of their community's tolerance levels, a finding Bullock (1977) says supports the claim that these students use the community as part of their reference group.

In sum, the desegregation research on racial attitude change presents an inconclusive picture. Parents and their children share similar racial attitudes especially for young children. Communities and neighborhoods differ in their racial attitudes, but it is not clear if they exert an influence on parent-child racial attitudes or schooling perceptions for that matter. These questions provide part of the focus to the present investigation.

3. Self-Esteem

The earliest research tapping black self-esteem using projective techniques suggested that young blacks held an inferior self-image, interpreted by some social scientists (e.g., Clark and Clark, 1939) as evidence of black self-hatred. A

condition considered to be a function of societal segregation, and potentially reversible through school desegregation, it became a key issue in the Brown decision (Gerard, 1983). Recent studies, using these techniques and self-report questionnaires indicating that blacks in segregated schools show higher self-esteem than blacks in desegregated schools (St. John, 1975; Stephan, 1978), have stimulated considerable controversy around such issues as historical trends (i.e., an increase in black racial pride) and methodological techniques (see Cook, 1984 for a discussion of this controversy). Part of this controversy stems from efforts to distinguish between personal and racial self-esteem. Other reviews report inconclusive, (Christmas, 1973; Epps, 1978; Wylie, 1979; Zirkel, 1971) or mixed (Weinberg, 1977) results.

Perhaps the most promising insights into resolving these controversies flows from the symbolic interactionist perspective which suggests that self-esteem and self-concept should not be measured as global constructs, rather as role or situation specific (see Reitzes and Mutran, 1980). For example, Brookover and Schneider (1975) demonstrate that the self-concept divides into ability components which are time, situational, experiential and role specific. The present investigation, in examining the student's self-other perceptions of academic ability, draws from this tradition, tapping the student's perception of teacher, parent, and self expectations of academic ability and performance. Akin to the Brookover et al. (1979) academic self-concept measure, this variable should show a strong, positive correlation with the academic achievement measure. In a sense, this construct represents a composite set of expectations for learning, with a particular history which the child references in making efforts to achieve. The Brookover et al. (1979) studies suggest that this reference acts as a powerful determinant in student academic achievement.

Having reviewed some of the basic findings from desegregation research pertinent to the examination of the individual-level relationships in this investigation, the second part of this discussion turns to a review of the contextual analysis literature. This review traces the methodological developments and some of this particular research examining school contextual effects.

Contextual Analysis

Methodological Considerations

Social scientists have often applauded contextual analysis as a method for demonstrating the influence of the social environment on individual attitudes and behaviors (e.g., Coleman, 1961; Eulau, 1979; Riley, 1964), some touting it as a multilevel approach that weds micro- and macro-sociological thought (Barton, 1968). Most credit Durkheim (1950) for its conceptualization and method (Davis et al., 1961; Farkas, 1974; Selvin, 1958) and Lazarsfeld and colleagues (including Blau, Coleman, Kendall, Lipset, and Merton) at Columbia University for its postwar revival (Barton, 1968).

The Columbia group and protégés produced numerous studies on organizational units including union workshops, academic departments, offices, schools, and military companies, using a contingency table technique developed by Kendall and Lazarsfeld (1950), to demonstrate that an individual member's behavior in a group varied with the frequency of a given attitude held by group members within an identifiable context. The general idea of these studies was to demonstrate that similar individuals behave differently when they are members of different kinds of groups (Davis et al., 1961). Blau's identification of "structural effects" (1957, 1960) nearly elevated this technique, which categorized individual-

and group-level variables into tabular form, to a paradigmatic status in the sociological literature.

A number of studies following Blau's work used, refined, and improved this technique (e.g., Bachman et al., 1966; Bowers, 1968; Campbell and Alexander, 1965; Davis et al., 1961; Levin, 1961; Michaels, 1961; Tannenbaum and Bachman, 1964). Particularly, the Davis et al. (1961) method retained the information from the continuous group-level variable (rather than collapsing and arbitrarily categorizing observations, as in the Blau method) permitting a graphic presentation of the combinations of individual, group, and interaction effects. Davis, like Blau, however, used techniques that did not adequately control for spurious individual- or group-level effects (Tannenbaum and Bachman, 1964), nor did the procedures permit multivariate analysis essential to separating the variation in the individual-level behavior variable into individual (within-group) and group (between-group) effects (Boyd and Iverson, 1979).

The advancement in multivariate techniques spurred subsequent development in contextual analysis procedures. Hauser (1970a) argued for the analysis of covariance technique (ANCOVA) in detecting contextual effects following his attempt to illustrate that the traditional contingency table method lures contextual analysts into fallaciously concluding that the observed between-group differences, in some individual-level dependent measure, demonstrate the presence of a group-level effect. Hauser (1970a) used a sex-ratio variable and the contingency table technique with the purpose of showing that such (bogus) group effects stem from the inadequate specification or omission of relevant within-group variables, that if introduced into the analysis, would eliminate contextual effects. Claiming that previous studies (e.g., Blau, 1957, 1960) committed a "contextual fallacy", Hauser (1970a) considered their conclusions arbitrary in identifying residual group effects with unmeasured social or psychological

mechanisms (which may be correlated with levels of one of the individual-level variables omitted from the analysis).

The ANCOVA alternative, Hauser suggests, codes contextual units (e.g., schools, communities) into nominal "treatment categories" and uses the theoretically relevant individual-level variables as covariates (Alwin, 1976). This model specifies group- and individual-level effects by partitioning the covariation between the independent (X) and dependent variable (Y) into between-group and within-group level effects. This method reduces the likelihood of spurious group-level effects by controlling with individual-level (within-group or compositional) variables (Boyd and Iverson, 1979). In this sense, the ANCOVA model controls for the spurious effects of group composition and represents the effects of unmeasured noncompositional factors (e.g., contextual effects).

Specifically, this ANCOVA procedure detects the composite of all undifferentiated group effects, representing the maximum contribution group membership provides to the explanation of variation in an individual-level dependent measure, above and beyond individual-level predictors (Alwin, 1976; Firebaugh, 1978). Contextual variables (e.g., group scores on some variable) may only measure a part of this total residual between-group effects, such that a reliance upon them as aggregate influences may result in an underestimation of this effect (Alexander and Eckland, 1975). An example using the ANCOVA technique appears in Mueller's (1974) work that estimated the independent influence of city contextual effects on an individual's occupational status attainment and income.

This method suffers some major limitations. Primarily group-level effects are not linked or identified with specific values of group variables (e.g., mean SES) that would inform theory development. Also, technical problems arise when the number of groups in the analysis is large (Boyd and Iverson, 1979). This procedure

does not preclude the risk of committing the "contextual fallacy" since it is "indifferent to the particular manner in which the group-level process is represented" (Alwin, 1976:294). In cases where the individual- and group-level variables are correlated, it is difficult to establish the order and relative importance of each.

Naturally, Hauser (1970a) created a stir with his criticisms of previous contextual studies and his conclusion that it (contextual analysis) should be abandoned for studies directly making operational individual and aggregate variables. Barton (1970), a staunch advocate of contextual analysis, reacting strongly to Hauser's negativism, attempted to largely discredit Hauser's argument's by the data he used. Barton offered as an exemplar Bower's (1968) work which demonstrated that individual student misconduct varied with the proportion of students disapproving of this drinking behavior. Hauser (1970b) then used Bowers' data to largely discredit Barton (1970) by showing, with the dummy variable technique, that the college contextual effect only contributed one-percent additional explanation to individual student misconduct. Hauser (1970b) dismissed this contextual effect as "trivial" and "uninteresting", and considered Barton's criticisms unfounded.

Farkas' (1974) paper rekindled the debate on contextual effects, raising issues directly pertinent to the present study. Farkas argued that theoretical specification (e.g., causal modeling and direct measures of group processes) and statistical explorations (e.g., examining residuals for goodness-of-fit) would help circumvent falling into the contextual fallacy trap (making social and psychological attributions about unmeasured group mechanisms) and, in general, demonstrate the viability of contextual effects. Farkas cites the works of Bowers (1968) and Rigsby and McDill (1972) as exemplary attempts to specify group processes.

Farkas admits contextual effects are generally weak, yet contends they should not be dismissed on this criterion since the contextual-level variable generally has an independent, conceptual meaning. Farkas (1974:341) also concedes that individual-level and contextual predictor variables are usually correlated ("nature does not usually create orthogonal designs"), but considers this correlation a "sociological fact of life", particularly if one believes in normative climates. Farkas suggests this correlation is likely to arise in studying the sexual activity in coeducational dormitories or juvenile delinquency in low-income areas. Farkas (1974:341) contends that how the correlation arose ("such as selection, recruitment, and the effect on personal beliefs of exposure to the normative climate") must be left to causal testing.

Hauser (1974) organized his response to Farkas (1974) around five threats to validity in contextual analysis, namely: 1) the meaning and 2) the size of the effect, 3) omitted variables, 4) measurement error, and 5) explicit selection on the dependent variable. Hauser (1974) concluded that the first and last sources present such severe threats that the contextual analysis procedure is "useless", although all five must be considered if the analysis is to be taken seriously. Hauser (1974) again criticized contextual analysis for identifying residual group effects with normative environments, chastising its proponents for failing to include additional individual-level variables to eliminate rival explanations for these effects.

The present investigation should wrestle with these rival explanations for contextual effects when detected. Certainly, we should confront the "contextual fallacy" issue directly, at least in part, through introducing variables that plausibly serve as social or psychological mechanisms operating at the aggregate level (school, community), producing contextual effects on individual student perceptions and behavior (achievement). These aggregate-level measures, suggested from the

individual-level multivariate analysis, will first be assessed as covariates in an ANCOVA model as Hauser suggests, then incorporated into a contextual analysis model of the kind discussed next.

Concurrent with this debate, researchers formulated a multiple regression model, containing continuous individual, group, and interaction variables, capable of estimating the effects of each on an individual-level dependent measure. Originally formulated in the political science (Boyd, 1971) and educational research (Werts and Linn, 1971) literature, sociologists began adapting this structural equation in the mid-1970's (Alexander and Eckland, 1975). Alwin (1976) brought this model to the sociology of education literature proper in a demonstration of its equivalence to the ANCOVA model with respect to the identification and interpretation of school context effects.

This model's multilevel treatment of individual and group variables mathematically approximates social structures assumed to be operating on individuals (group members) within a contextual unit (e.g., a particular school). The aggregate measure used to estimate these structural effects consists of the group's average score (mean) computed from some individual-level predictor variable, which then gets assigned to each group member belonging to a particular contextual unit. This model assumes that the average score represents the group members' attitude within the contextual unit. It tests whether the group attitude exerts an independent effect, over and beyond the individual's position, on attitudes and behaviors held by its members within this unit. Additionally, it tests if this independent group effect varies uniformily between contextual units (i.e., does the between-group effect interact or depend upon the within-group effect?).

In total, this model tests for individual, group, and interaction effects and any combination of all three effects (Boyd and Iverson, 1979). In the case of an "individual-level effect only", two people with the same X value, on the average,

have the same Y value whether they belong to the same or different groups (i.e., all groups basically share common intercept and slope terms). In the case of a "group effect only" the X and Y values are unrelated (slope = 0) within the group, yet the groups differ in their intercept terms, a function of the group means ($\bar{X}$), and a residual term. In the case of an "interaction effect only", the groups share a common intercept (no pure group effect), but the within-group slopes are not constant, indicating that the within-group effect of X on Y depends on the level of the group ($\bar{X}$) value, referred to as a "cross-level interaction" (Boyd and Iverson, 1979).

The primary virtue of this contextual analysis model lies in its ability to identify and account for some of the composite, residual between-group differences detected by the ANCOVA technique. That is, this model introduces and tests aggregate-level variables that plausibly approximate social structures, with the intention of demonstrating the source of the group's "main effects" on individual-level attitudes and behaviors. It shares with the ANCOVA model the capability of detecting interaction effects (e.g., unequal individual-level effects between groups), but yields more potentially meaningful results through the specification of the variables actually accounting for these nonadditive effects.

This technique shares some limitations with the ANCOVA model. Primarily, both use individual and group variables (unspecified at the group-level in the ANCOVA model) that are intercorrelated, making the interpretation of their separate and unique effects on a dependent measure problemmatic. For this reason, Boyd and Iverson (1979) developed the model described next. The present investigation uses both the ANCOVA model and the single-equation model just described primarily for comparative purposes. In turn, these results will be compared to those of the Boyd and Iverson model (1979) which adjusts both the

independent and dependent variables for the purpose of isolating the separate effects of individual, group, and interaction variables.

Boyd and Iverson (1979) developed a "centering" procedure designed to make the independent variables orthogonal by removing the correlation between the individual, group, and interaction variables. Removing this correlation makes it possible to evaluate the unique contribution of each explanatory variable through the decomposition of the variance in the dependent measure. Notice the principle underlying this procedure is comparable to the rationale of having equal cell sizes in an experimental design, crucial to the unconfounded partitioning of the sums of squares components in the criterion variable.

Removing the correlation between the variables requires two steps. In the first stage, the within-group intercept and slope values are obtained by regressing the individual-level Y values on the X values within each group. For example, an analysis of four groups would respectively produce four intercept and four regression coefficients, terms indicating the point of intersection through the ordinate and the pitch of the regression line within each group. In the second stage, without disturbing the values of the group intercept and slope, this procedure "centers" each group's regression line and its respective set of data points (X,Y coordinates) on the Y axis, such that the group mean ($\bar{X}$) of each regression line equals zero (obtained by subtracting it from the grand mean of the predictor variable X), and its counterpart (Y) is expressed as a deviation from the product of the within-group slope (b_{yx}) and the within-group mean ($\bar{X}$). The individual-level observations around each group regression line are similarly adjusted, expressing the X value of the X, Y coordinate as a deviation from the within-group mean and the Y value as a deviation from the product of the within-group regression coefficient and the within-group mean. In a sense, this method shifts each group line and its data points "down and to the left" to a common point

on the Y axis by adjusting the individual and group variables such that they represent deviations from within-group and between group variables.

To illustrate these transformations made in the group regression line and its respective scatterpoints, Figure 1, partly adapted from Boyd and Iverson (1979:66 69), graphically depict the "before" and "after" locations of two regression lines. The regression lines represent the relationship between (for our purposes) teacher expectations (X) and student achievement Y within Schools 1 and 2. These graphs indicate that there is a positive relationship between these two variables within each school (nonzero slopes), that School 1 has a higher average score on teacher expectations ($\bar{X}_1$) and student achievement ($\bar{Y}_1$) than School 2 (note the different intercepts of the two lines as a function of these higher $\bar{X}$, $\bar{Y}$ values). However, the effect of teacher expectations is the same for both schools (note the parallel slopes).

To digress a bit, in the case of school contextual effects on student achievement, two students having the same score on teacher expectations, but attending two different schools (e.g., Schools 1 and 2) would, on the average, have different scores on achievement. We might speculate that these achievement differences result from differences in the average teacher expectations, pervasive to the school learning milieu, with higher average expectations associated with higher student achievement. We can test this assertion using the single equation centering model by including these group-level scores as approximations of the contextual effects. To separate the individual- from the group-level effects, we need to remove the correlation between the two levels, thus the following transformations.

The objective of these transformations in Figure 1 involves shifting or moving each regression line and its respective swarm of data points "down and to the left" a distance, such that Point A (A = $\bar{X}$, $\bar{Y}$) falls on the Y axis at Point B,

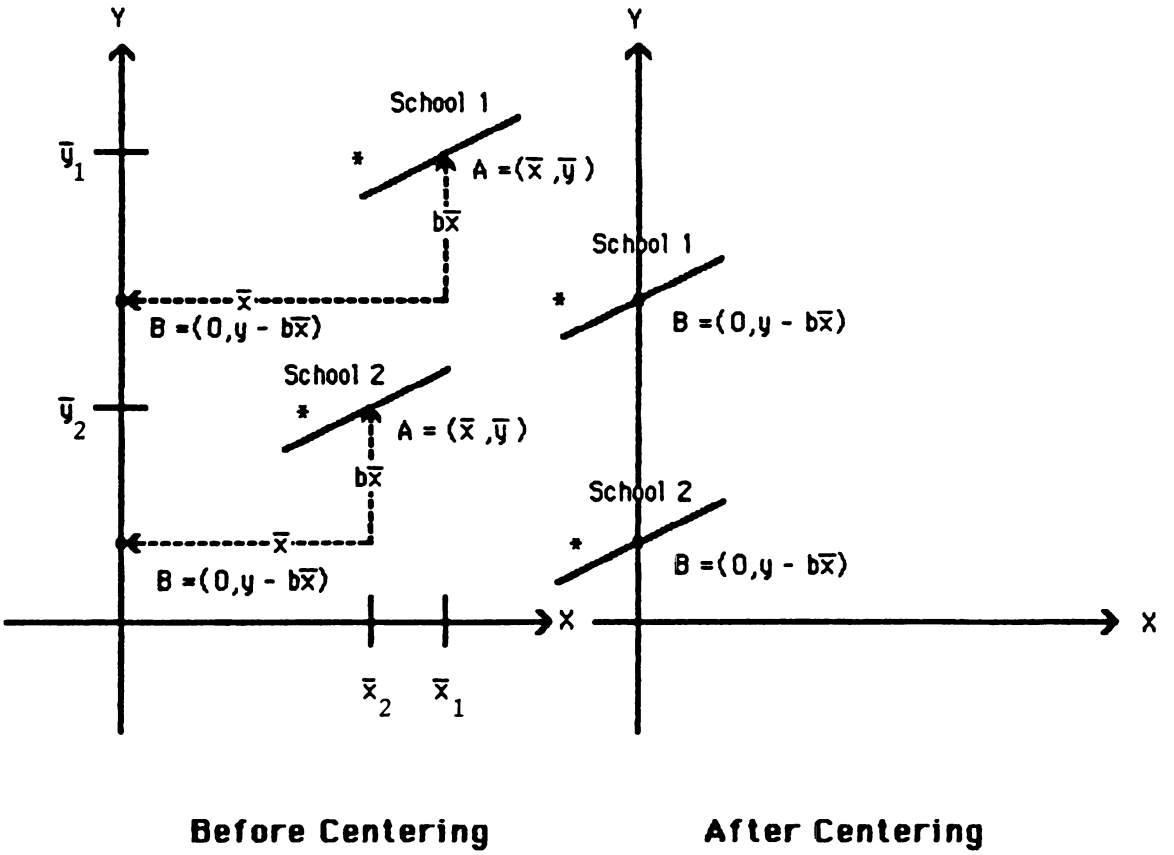

Figure 1
A "Before" and "After" Depiction of Centering Two Group Regression Lines Designed to Make the Mean of the Explanatory Variable Equal Zero for the Groups while Preserving the Same Slope and Intercept Values

(B = O, Y - $b\bar{X}$) without disturbing the intercept and slope values of these two lines. To change the Y value, the product of the within-group slope and mean ($b\bar{X}$) is subtracted from Y. This transformation moves the Y value down this distance depicted by the vertical dotted line in Figure 1. In turn, the line is shifted to the left by $\bar{X}$, producing the desired coordinate values of Point B.

The last step requires moving all observations in the group scatter plot to their new locations. The asterisks (*) in Figure 1 represent two such coordinates (X, Y) located near their respective group regression lines. These coordinates get moved by subtracting the unadjusted group mean from the X value ($X-\bar{X}$), and the product term ($b\bar{X}$) from the Y score ($Y-b\bar{X}$). Figure 1 depicts the repositioning of these two data points.

The graphs depict the transformations made in the group regression lines and the observations surrounding them. Actually, the regression lines do not "move" as these graphs depict, rather the observations around them shift as a function of their deviations from within-and between-group values, generating new values for the independent and dependent variables.

Using this centering procedure each subject in the analysis receives the following adjusted values: 1) an X', that individual's X score deviation from the within-group mean ($\bar{X}$) score, 2) an $\bar{X}'$, the deviation score of the within-group from the overall mean of X, representing the unique "effect" of belonging to that particular group, 3) an $X'\bar{X}'$, the interaction term of the adjusted individual and group variables, and 4) a Y', that individual's Y score deviation from the within-group unstandardized regression coefficient times the within-group mean (i.e., $Y' = Y - b\bar{X}$).

The present investigation uses the centering procedure to further explore the community and school group effects detected (and unspecified) with the ANCOVA model, and specified (at least in part) by the single equation model. This procedure

potentially provides a methodological advancement over the single equation model in its ability to specify, through partitioning, the unique contributions of the individual, group, and interaction variables.

Representing somewhat of a departure from the procedures suggested by Boyd and Iverson (1979), the present investigation focuses on the results generated from adjusting both the independent and dependent measures. Specifically, it examines the results produced by first adjusting the independent variables only, regressing these predictors on the unadjusted dependent measure. This constitutes the first stage of the centering procedure as we compare these results to the ANCOVA and single equation model results. The rationale underlying this comparison stems from an interest in determining the effect of expressing the individual- and group-level variables as deviational scores which become essentially uncorrelated between levels with this adjustment procedure.

The next stage, of course, requires adjusting the dependent measure, designed to remove the shared effects of the previously adjusted independent individual- and group-level predictors. This adjustment then generates a fourth set of results that, in turn, can be compared to: 1) the adjusted independent variable only approach, 2) the single equation approach which specifies group-level variables, and 3) the ANCOVA approach which does not specify group-level variables.

The comparison of these analytic approaches to the study of contextual effects, in part, forms the methodological thrust to this investigation. The analysis first uses the ANCOVA model to identify group effects, then the single equation model (which estimates group effects from group means) to specify the contextual sources of these residual between-group effects, and finally the single equation centering procedure using adjusted independent then dependent measures to assess the unique contributions of the multilevel variables. Involved in this comparison is an evaluation of the results produced with each procedure.

An examination of the contextual analysis literature reveals that the Boyd and Iverson model remains untested. Importantly then, this study provides an opportunity to test, compare, and evaluate this model with the other two analytic techniques. These models will determine if the community and school contexts contribute any additional explanation to the individual-level student variables. We have examined the small body of existing relevant literature on community effects. The following section examines this literature on school effects.

School Effects

An extensive number of research studies examining school effects, on a variety of student outcomes, appears in the literature. This research teems with theoretical and methodological controversies surrounding the presence, variability, and sources of school effects. The emphasis, in the present review, is to briefly trace the development of the school contextual analysis literature to provide background to this investigation.

The earliest studies typically treated the average socioeconomic composition of the school (and neighborhood) as the measure of normative context examining its independent influence on educational and occupational aspirations (Michael, 1961; Rogoff, 1961; Turner, 1964; Wilson, 1959). Sewell and Armer's (1966) demonstration that neighborhood SES provided only a negligible contribution (1.8%) to college plans beyond the individual-level effects of sex, socioeconomic status, and intelligence stimulated rebuttals from Turner, Michael, and Boyle (1966). In general, they commonly contested the formulation and analyses used, with the contention that these procedures minimized contextual effects, which Sewell and Armer then defended (1966b).

Sewell and Armer's (1966a:168) suggestion, at the conclusion of their article that more direct measures of neighborhood and school climates (rater than SES

composition) might demonstrate a closer relationship with educational aspirations, marked an important turning point in the school effects literature. The following year McDill, Meyers, and Rigsby (1967) demonstrated that direct measures of the school normative climate explained much of the differences in math achievement between high schools, after controlling for the effects of socioeconomic composition and individual-level variables. They concluded that student achievement was not attributable to the social class context of the school and that the contextual SES variable provided a poor indication (particularly for middle class schools) of school climate. Most importantly, this study provided a strong departure from the traditional school effects literature in attempting to measure school climate directly and through the use of specific outcome measures rather than general outcomes (e.g., general achievement tests) (Brookover et al., 1979).

A follow-up study by McDill and Rigsby (1973) essentially duplicated these results. Their six climate measures showed stronger effects on achievement than SES composition as its (SES) effect on achievement became negligible, after controlling for individual SES, IQ scores, and other individual-level variables. Their regression analysis demonstrated that individual ability explained the greatest percentage of variation in math achievement, followed by father's education and personal academic values. The school climate dimensions contributed some additional explanation to the variation in achievement beyond the joint effects of these three variables. The "academic emulation" dimension proved itself as the strongest predictor of achievement.

This position, advocating the use of direct measures of school normative climates, coupled with strong negative reactions to the conclusions that schools do not separately influence student achievement beyond the effects of student family background characteristics (a conclusion of many input-output type research studies, e.g., Coleman et al., 1966; Jencks et al., 1972; Mayeske et al., 1972; I-O

studies summarized in Glasman and Biniaminov, 1981), stimulated a flourish of school climate research studies (see Anderson, 1982 for an excellent review). Subsequent developments from this literature appear in much of the current research on effective schools (see MacKenzie, 1983 for a review of this school and classroom research).

Brookover and associates were responsible for a significant number of these school climate studies as they produced several studies (1975; 1977; 1979; 1983) demonstrating that the differences in the average school climate and social structure explained between school differences, in average mean achievement, equally as well the racial or socioeconomic composition of the schools. As part of the configuration of variables measuring school climate, the important student variables explaining student achievement included student academic self-concept and sense of futility (Brookover et al., 1979). The reader will recognize the influence of the Brookover study on variables selected for this investigation which include adaptations of school climate, self-concept (self-other perceptions of academic ability), and sense of futility (sense of control - essentially the inverse of futility).

In addition to their substantive importance, these school climate studies raise important methodological issues relevant here. In particular, these studies often attempted to explain differences in achievement using aggregate-level (mean) predictor and criterion measures. In contrast, this investigation uses individual-level variables to estimate within-school effects and aggregate-level measures to approximate between-school effects. In other words, this study first examines "compositional effects" on individual-student achievement using individual-level predictors (e.g., social status) then uses group-level variables to assess school-to-school "contextual" effects on the residual individual achievement scores (Alexander et al., 1979).

This approach to assessing school effects touches on issues of variability in the criterion measure, effect size, and the interpretation of these effects. This study examines the total variation in individual student achievement, i.e., the within-and between-school variation in student achievement. Studies of the total variation in student future aspirations indicate that the between-school effects are minimal after controlling for within-school compositional effects (e.g., Alexander et al., 1979; Alexander and Eckland, 1975; Nelson, 1972). In contrast, a study by Lezotte and Passalaqua (1978) found that the particular school a student attended contributed additional explanation (an average of 16%) to individual student academic achievement beyond the effect of their previous achievement. This study did not, however, directly control for compositional effects but assumed that a student's previous achievement reflected socioeconomic background effects (p. 287). Some might contend (particularly Hauser) that the inclusion of additional variables would largely reduce the undifferentiated school building effect demonstrated in the Lezotte and Passalaqua (1978) study. The current study uses a social status measure to control for socioeconomic compositional effects.

Rowan et al. (1983) introduce an important caveat to the interpretation of school effects. They argue that although differences between schools in average achievement may be very striking, particularly when comparing schools with large negative and positive residuals (adjusted achievement scores for school demographic composition effects), part of these differences result from random error variance. Further, they contend that studies estimating between-school effects on individual-level student achievement should not conclude that these effects account for the same percentage (e.g., 30%) in the total variance in student achievement. Rather this percentage, attributible to school-level properties, should be multiplied by 15% (i.e., .30 x .15 = 4.5%) because only 15% of this total variance in student achievement lies between schools (Jencks et al., 1972). Such small

effects researchers have deemed trivial (e.g., Jencks et al., 1972), particularly in comparison to the effects of the compositional "hard to change" variables (Rowan et al., 1983), yet many other researchers, including Rowan et al. (1983:27), consider these school-to-school achievement differences important and "worthy of both study and action".

These studies suggest that the school effects assessed in the current study may be small after adjusting for individual-level variables. This study follows the conventional contextual analysis approach, first assessing individual-level variable effects then group-level effects on the total variation in the criterion measure. Some researchers might strongly contest the order of the model, yet it represents a conservative and generally acceptable procedure. Furthermore, it follows the literature which suggests first testing the individual- and group-level SES effects before assessing perceptual variable effects. In this manner, it controls for SES effects then provides the opportunity to test more direct measures of school effect variables.

This study follows a multilevel approach toward explaining the variation in individual-level outcomes. It fits the second of four equations, described by Anderson (1983) used to model different sets of analysis units. This second equation depicts an individual outcome as a function (f) of group perceptions and individual background characteristics (e.g., ability, SES, race, etc.), formulated by Anderson (1982:386) as: individual outcome = f (average perception of context + individual's background variables). This model matches the ANCOVA procedure by controlling for individual-level variables then testing for group-level (undifferentiated) effects. The second model used in this study directly tests for contextual effects using aggregate-level (mean) perception variables. The third model developed by Boyd and Iverson (1979), discussed above, considers not only the separate effects of individual characteristics and group average characteristics, but tests the

individual in relation to the group, known as "the frog pond effect" (Anderson, 1982:386). Like Burnstein's (1980) procedure, this model expresses an individual's score as the deviation from the group mean. In addition, it tests group effects by expressing each group mean as the deviation from the overall mean of the predictor.

We return to this discussion in Chapter III which provides a detailed description of the methods used in this investigation, including the particular research questions of interest. We turn to this discussion following a summary of the themes presented in this chapter.

SUMMARY

This chapter presented a theoretical sketch of the family, school and community influences on childhood socialization. This socialization perspective linked the school desegregation and contextual analysis literature in that both investigative lines, either implicitly or directly, seek to demonstrate the effects of group norms and values on individual attitudes and behaviors.

The school desegregation literature review examined three major outcomes, namely, academic achievement, racial attitudes, and self-esteem with an emphasis on the relationship of these outcomes with parent and student perceptions of race and schooling.

The review of the contextual analysis literature traced the methodological developments and controversies, pointing to the Boyd and Iverson model as a technique for specifying multilevel effects on individual-level outcomes. An accompanying section briefly reviewed some of these issues surrounding school contextual effects.

CHAPTER III

METHODOLOGY

In this chapter, we provide a description of the data set used for this secondary analysis, and the specific variables and the research questions are presented in conjunction with a discussion of the analysis techniques. This final analysis section specifies the individual-level and contextual analysis procedures with an explication of the centering technique developed by Boyd and Iverson (1979).

DATA DESCRIPTION

As mentioned, the College of Urban Development (CUD) provided the 1979 cohort of respondents from a four year (1978-1981) study of school desegregation in New Castle County, Delaware. The CUD project focused on the racial and school attitude changes of teachers, students, and parents over this four-year period (Green et al., 1982). The 1979 group was selected for the present analysis. It was expected that this first year of school desegregation would make parent and student race and schooling perceptions particularly salient.

Five of the original eleven school districts participated in the study. The sampling frame in 1978 consisted of a complete list of student names, addresses, and the student number of every student enrolled in a public school in the Mt. Pleasant, De La Warr, Marshallton-McKeon, Newark, and Wilmington school districts.

The students within the districts were randomly assigned to 20 systematic subsamples, each containing 1/20th of the total number of students. Ten subsamples were then randomly selected and questionnaires were sent to the households of parents and students living within these areas.

Teachers were not identifiable by residence or school building. Although the CUD project collected data from them, the lack of this identification to a social context made them unusable for the present study.

The original response rate in 1978 was low. Fourteen percent (14%) or 2,333 matched parent-student pairs returned questionnaires identifiable by residence. After adjusting this sample for graduates and families that moved, the CUD project sent a second set of questionnaires in 1979 to this revised set. Forty-two percent (42%) or 1,027 parent and/or student respondents returned questionnaires. From this set, 848 parent-child pairs were selected for this study on the criteria that both parent and child's race was identified (either black or white) and identical.

The data set contains 848 matched parent-student pairs, approximately twenty percent black (N = 172) and eighty percent (N = 676) white in racial composition. Of the total number of students, 709 had complete achievement data (blacks N = 133; whites N = 576). The sample consists of 22% elementary (grades 2-6), 25% junior high (grades 7-8), and 55% senior high (9-12) students with nearly an equal proportion of males and females.

Contextual Parameters

The community and school contexts comprise the two major divisions planned for the contextual analysis. The community identifiers include neighborhood racial composition, former school district, and former school (i.e., school previously attended). The school identifiers include schools and attendance areas. These identifiers are reintroduced below, complete with numerical data.

Due to the limited number of students reporting in some schools, selecting these schools as identifying units required making a decision rule. Considering that regression analysis usually requires a minimum of 10 subjects per variable as a rule

of thumb (Wesolowsky, 1976), we decided to exclude from the analysis those schools reporting less than 10 cases. This restriction greatly reduced the number of available schools from 75 to 20. The classification of these schools (both former and current) into educational levels appear below.

Community Identifiers

1. Neighborhood Racial Composition - Parent perceptions of the black/white racial mix within their neighborhood. The following presents the five categories of this variable and the number of black and white respondents within each neighborhood type.

		Blacks	Whites
1.	All White	1	170
2.	Mostly White	17	463
3.	Half Black / Half White	60	24
4.	Mostly Black	70	7
5.	All Black	17	0

2. Former School District - The school district where parents reside. Subjects from five of the original eleven districts particpated. Each of these districts are described in terms of their racial composition, and socioeconomic status ranking in conjunction with the actual number of black and white respondents available in this study.

   District I. 56% white, lowest SES rank, actual - 12% (22) white, 82% (113) black.

   District II. 66% white, ranked tenth in SES, actual - 49% (19) white, 51% (20) black.

   District III. 97% white, ranked fifth in SES, actual - 93% (143) white, 7% (11) black.

   District IV. 97% white, ranked fourth in SES, actual - 95% (360) white, 5% (17) black.

   District V. 95% white, ranked sixth in SES, actual - 95% white (120), 5% (6) black.

3. Former School Code - Identifies students with the school they attended the previous year, prior to desegregation. Includes nine elementary (N = 182), six junior high (N = 194), and five senior high (N = 239) schools.

School Identifiers

1. School Code - Identifies students with the school they currently attend. Includes seven elementary (N = 148), five junior high (N = 146), and five (N = 231) senior high schools.

2. Attendance Areas - These boundaries divide the New Castle County into four attendance areas. Schools are identified within these zones. An insufficient number of schools responded from Area IV and it is excluded from the analysis. The following provides a description of the number of students by educational level within each attendance area.

    1. Area I. includes 41 elementary, 39 junior high, and 72 senior high students.

    2. Area II. includes 39 elementary, 35 junior high, and 57 senior high students.

    3. Area III. includes 117 elementary, 84 junior high, and 143 senior high students.

RELEVANT VARIABLES

The following section presents the six student and six parent race and schooling perception scales. The CUD project developed these scales, in part, from the racial desegregation studies of Forehand and Rogosta (1976), and from the school climate research of Brookover and associates (1979). The CUD project factor analyzed parent and student questionnaire items (Appendix A) to create these scales. The specific items for each scale appear in Appendix B. In addition, the CUD project conducted a reliability analysis of the scale items, generating a reliability coefficient (alpha) based on all possible split-half combinations of the scale items. These coefficient values accompany the scales presented below.

The scales are grouped according to the race and schooling categories following the suggested format of the CUD study. The labels used in the CUD study to identify each parent and student scale are used throughout the analysis. These labels appear after the scale in parentheses. All parent scales begin with the letter "p" and student scales start with the letter "s". For example, "PRA" stands

for "parent racial attitudes", and "SRA" represents "student racial attitudes". Note that the student list contains a description of the achievement measure, used as the criterion measure for examining the effects of the student race and schooling perception measures. Likewise, the parent list contains a perceived social status measure. As in the CUD study, the present investigation treats this measure as the indicator of socioeconomic status, and uses it extensively as a control variable in examining individual- and group-level effects. A description of these variables and the reliability coefficient for each follows:

STUDENTS

Racial Perceptions	**Reliability Coefficient**
1. Racial Attitudes (SRA) - assesses student beliefs about interracial schooling, housing, dating, marriage, and socializing (social clubs, guests).	.85
Schooling Perceptions	
2. Self-Other Perceptions of Academic Ability (SOPA) - assesses student perceptions of academic ability from the perspectives of self, teachers, and parents.	.86
3. Future Aspirations (SFA) - assesses student perceptions of educational attainment from the perspectives of self, teachers, and parents.	.86
4. Importance of Education (SIE) - assesses the value a student places on education and the perceived parental support for educational efforts.	.67
5. School Academic Climate (SSAC) - assesses student perceptions of teacher and student support for academic effort.	.66
6. Sense of Control (SSC) - assesses student perceptions linking personal effort to successful educational outcomes.	.44

Achievement

7. Student Academic Achievement - All students in the Spring of 1979 took the California Achievement Test (CAT). The correlation between the math and reading subtests were .85 or greater with the total battery score (CUD Final Report, 1982). The total battery raw scores are standardized into national percentile ranks to permit comparisons among grade levels within and between schools.

PARENTS

	Reliability Coefficient
Racial Perceptions	
1. Racial Attitudes (PRA) - assesses parent beliefs about interracial schooling, housing, entertaining, dating, marriage, and socializing (social clubs, guests).	.82
2. Attitudes Toward School Desegregation (PATSD) - assesses parent beliefs and expectations about interracial schooling and the perceived support for desegregation among neighborhood parents and students, and teachers in their child's school.	.82
Schooling Perceptions	
3. Perceived School Quality (PPSQ) - assesses parent perceptions of the academic orientation of their child's school and staff encouragement of their child's achievement and attainment.	.76
4. Evaluation and Expectations of Child's Performance (PEECP) - parent assessment of their child's academic ability and educational potential.	.66
5. Importance of Education (PIE) - assesses the value a parent places on education and their perceived support of the child's educational efforts.	.55
Social Status Perceptions	
6. Social Status (PSTAT) - assesses parent perceptions of their educational, occupational, and income standing relative to other residents in New Castle County.	.85

Before turning to the research questions, a few comments deserve mention regarding the scale reliability coefficient estimates. Two of these scales, student sense of control, and parent importance of education show, on the average, less internal consistency among their items than the other scales. The instability of these two scales makes interpretation of their relationships with other variables tenuous because their error variances may produce bogus effects or mask true effects. Although the analysis includes these scales, some caution should surround their usage and interpretation.

RESEARCH QUESTIONS

In Chapter II of this text, we explored relevant literature which suggested plausible relationships between parent and child (student) perceptions, and in student perceptions relative to academic achievement. With respect to the first relationship, this literature suggested that parent and child racial attitudes should show a rather strong, positive association. This literature emphasized the importance of parent expectations in shaping the child's self-perceptions of ability, future aspirations, and sense of control over the environment. Intuitively, we might expect that the importance parents place on education and their perceptions of school quality affect the child's values surrounding education.

These speculations, consistent with the exploratory nature of this investigation, form part of the research questions stated below addressing the parent-child relationships. These questions do not exhaust the possible combinations between the parent and student variables; they merely identify some of the relationships suggested as salient.

This literature also suggested that several of the student perception measures positively relate to student achievement, particularly the self-other perceptions of academic ability, sense of control, future aspirations, school climate, and the

importance of education variables. How racial attitudes affect achievement remains uncertain. The task of developing research questions about these relationships appears less formidable than in the former set given the sole criterion measure and the utility of a multivariate regression approach which identifies order, direction, and magnitude of contribution these variables make in accounting for the variation in achievement.

To prepare for this analysis, we relate each measure to the achievement variable, stated formally into a research question, with the recognition that the priority established in the multivariate analysis may reveal the inconsequential nature of several of these variables. Again, we must emphasize the exploratory, rather than hypothesis testing, intent underlying the investigation of these individual-level relationships.

Specifically, these explorations seek to determine the best predictor of each criterion measure with the secondary purpose of using this predictor variable in the contextual analysis portion of this investigation. The small number of subjects in some groups available for this second analysis forces us to rely on a best predictor strategy. Although some of the group analysis contains sufficient subjects to permit additional predictors, we adhere to this decision rule for purposes of consistency across the contextual analyses.

Two other caveats, stemming from the literature review and pertinent to the research questions and design strategy, require introduction into this discussion at this point. Repeatedly, studies have demonstrated the importance of race and socioeconomic status (SES) as two family background variables predictive of a variety of attitudes and behaviors. Of course, these results partly derive from their ease in measurement and their use as proxy measures for more direct indicators of social and psychological influences. Nevertheless, their pervasiveness and history in the literature strongly suggest that the present analysis include them

as "first-order" control variables in examining individual- and group-level relationships. Furthermore, this literature suggests examining these relationships separately for blacks and whites, while controlling for SES effects, to determine whether these two racial groups "behave" similarly in their attitudes and behaviors.

Working from the rationale of this literature, the present investigation first controls for the effects of race and SES in the total sample before testing other predictor variables. Secondly, with group size permitting, blacks and whites receive separate analyses to detect differences in the order, direction, and magnitude of the individual- and group-level relationships. Importantly then, each research question presented below should be prefaced with the statement "after controlling for effects of race and SES". Similarly, we might create a subset for each research question asking, "does this relationship hold true for both blacks and whites?". With these considerations in mind, we now turn to the research questions posed for study.

Individual-Level Relationships

I. What is the relationship between parent perceptions of race and schooling and their children's perceptions of race and schooling?

   A. Racial Perceptions

      1. What is the relationship between parents' and their children's racial attitudes?

      2. What is the relationship between parent attitudes toward school desegregation and their children's racial attitudes?

   B. Schooling Perceptions

      1. What is the relationship between parents' and their children's perceptions of the importance of education?

      2. What is the relationship between parent perceptions of school quality and their children's perceptions of the importance of education?

3. What is the relationship between parent expectations and evaluations of child performance and their children's self-other expectations of academic ability?

4. What is the relationship between parent expectations and evaluations of child performance and their children's future aspirations?

5. What is the relationship between parent expectations and evaluations of child performance and their children's sense of control?

6. What is the relationship between parent expectations and evaluations of child performance and their children's perceptions of the school academic climate?

II. What is the relationship between student race and schooling perceptions and their academic achievement?

A. Racial Perceptions

1. What is the relationship between student racial attitudes and their academic achievement?

B. Schooling Perceptions

1. What is the relationship between student perceptions of the importance of education and their academic achievement?

2. What is the relationship between student self-other perceptions of academic ability and their academic achievement?

3. What is the relationship between student future aspirations and their academic achievement?

4. What is the relationship between student sense of control and their academic achievement?

5. What is the relationship between student perceptions of the school academic climate and their academic achievement?

Contextual-Level Relationships

III. Does the community perceptual climate affect the individual-level relationship between parent perceptions of race and schooling and their children's perceptions of race and schooling?

A. Racial Perceptions

1. Do community racial attitudes affect the individual-level relationship between parent racial attitudes and their children's racial attitudes?

2. Do community attitudes toward school desegregation affect the individual-level relationship between parent attitudes toward school desegregation and their children's racial attitudes?

B. Schooling Perceptions

1. Do community perceptions of the importance of education affect the individual-level relationship between parent perceptions on the importance of education and their children's perceptions on the importance of education?

2. Do community perceptions of school quality affect the individual-level relationship between parent perceptions of school quality and their children's perceptions on the importance of education?

3. Do community expectations and evaluations of child performance affect the individual-level relationship between parent expectations and evaluations of child performance and their children's self-other perceptions of academic ability?

4. Do community expectations and evaluations of child performance affect the individual-level relationship between parent expectations and evaluations of child performance and their children's educational future aspirations?

5. Do community expectations and evaluations of child performance affect the individual-level relationship between parent expectations and evaluations of child performance and their children's sense of control?

6. Do community expectations and evaluations of child performance affect the individual-level relationship between parent expectations and evaluations and their children's perceptions of the school academic climate?

IV. Does the school-level perceptual climate affect the individual-level relationship between student perceptions of race and schooling and their academic achievement?

A. Racial Perceptions

1. Do school-level racial attitudes affect the individual-level relationship between student racial attitudes and their academic achievement?

B. Schooling Perceptions

1. Do school-level perceptions of the importance of education affect the individual-level relationship between student perceptions on the importance of education and their academic achievement?

2. Do school-level self-other perceptions of academic ability affect the individual-level relationship between student self-other perceptions of academic ability and their academic ability?

3. Do school-level future aspirations affect the individual-level relationship between student future aspirations and their academic ability?

4. Do school-level perceptions of student sense of control affect the individual-level relationship between student sense of control and their academic achievement?

5. Do school-level perceptions of academic climate affect the individual-level relationship between student perceptions of the school academic climate and their academic achievement?

DATA ANALYSIS

The analysis consists of three major stages. The first stage provides a descriptive analysis of the parent and student variables, followed by a bivariate then a multivariate examination of the relationships between parent and student perceptions, and between student perceptions and academic achievement. Each of these analyses first examines blacks and whites combined, then separately.

In the bivariate analysis, correlation matrices will reveal the statistical association between parent and student variables. This analysis answers, in part, some of the basic questions asked concerning the nature of these relationships. The magnitude and the size of the simple correlation coefficients indicate the presence, strength, and the direction of these relationships. We are particularly interested in those coefficients with an associated probability of less than or equal to the .05 level ($p \leq .05$), although, we recognize that very weak (perhaps meaningless) associations will show statistical significance given the large number of subjects in the data set. On the other hand, this sample size should produce stable, unbiased correlation coefficients (Kerlinger and Pedhazur, 1973), and considerable statistical power in detecting even the smallest effects between variables, greatly reducing the chance of committing a Type II error (Cohen, 1977).

With this recognition, we use significance testing and Cohen's (1977) criteria for evaluating the magnitude of correlation coefficients, in making preliminary assessments of these bivariate relationships. A coefficient with an "effect size" less than .30 is considered "small", between .30 and .50 "medium", and greater than .50 "large" (Cohen, 1977:79). For this study, we alter these descriptions defining "small" as weak, "medium" as moderate, and "large" as strong in the evaluation of the bivariate relationships.

The final step in this first stage of analysis involves the multivariate analysis of the parent and student variables. Specifically, each student (perception) criterion variable will be regressed on the parent perception variables. Similarly, the student achievement measure gets regressed on the student perception variables. In both analyses, the race and social status variables are forced into the regression equation (for the total sample) prior to the other predictors to statistically control for their effects. Separate analysis for blacks and whites which eliminates race as a variable, controls for social status effects prior to other predictors.

A stepwise regression procedure will sequentially assess the order of predictors according to their respective statistical contributions in accounting for the variance in the criterion measure. This procedure reevaluates predictors at each stage of analysis, such that before a variable gets added into the overall equation, the variable already in the equation with the lowest partial F value is dropped if it is less than the predetermined F ratio value (Wesolowsky, 1976), in this case, the default value of 3.84, set by a statistical program (Nie et al., 1975).

As an example, we are interested in determining the order and effect of the parent perception variables on student racial attitudes (SRA) for the total sample. We first regress the SRA variable on the race and social status measures, then allow the statistical program to "step" each parent predictor into the equation,

according to the size of its partial correlation coefficient, with priority given to the variable showing the largest coefficient at each step. This procedure recalculates the partial coefficients after each step, sequentially stepping all parent variables into the equation, unless specifically excluded on a set criterion, such as a minimum F value or a particular tolerance level (a measure of collinearity between predictors).

From this analysis, we determine the effects of race and social status on student racial attitudes plus the order, direction, and magnitude of the parent perception variables on these attitudes. We are particularly interested in the first parent predictor. It will be incorporated as an individual-level "covariate" along with the race and social status variables in the exploratory contextual analysis.

In sum, this first stage addresses the first and second research objectives. It establishes the order, direction, and magnitude of the associations between the parent and student variables, and likewise, for the associations between student perceptions and their academic achievement. In examining these research questions, we identify the best "predictor" of each criterion measure used in the second stage, the exploratory contextual analysis.

In this second stage, we treat the community and school identifiers as indicator variables, incorporating them into regression equations with the pertinent individual-level predictors to determine if group membership adds significant statistical explanation to the variation in a criterion measure, over and above the effects of the individual-level predictors. To facilitate a discussion of this technique, we provide the following example.

To simplify, we will assume that the multivariate analysis used in the first stage determined that parent racial attitudes best predicted student racial attitudes, for the total sample and for blacks and whites. In addition, we include in our analysis the race and social status measures as control variables. In this case,

our interest centers on determining if the neighborhood racial composition (i.e., racial mix of the neighborhood), where parents and their children reside, contribute "explanation" to the variation in student racial attitudes, beyond the individual-level effects of race, social status, and parent racial attitudes.

Testing for these group-level effects requires coding the racial composition categories (i.e., all white, mostly white, half black/half white, etc.) into dummy or indicator variables, arbitrarily designating one category (e.g., respondents in all white neighborhoods) as the reference group (0) and assigning a nonzero value (1) to each remaining category. We then step these indicator variables as a block (set of vectors) into the regression equation after statistically removing the individual-level effects of race, social status, and parent racial attitudes from the student racial attitudes variable, in that order. The final equation produces a regression weight, and R^2 contribution value, and an associated probability for each nonzero category. This procedure essentially produces a regression line for each racial composition category, indicating (along with the individual-level variables) the effect on racial attitudes of belonging to a particular group compared to belonging in the reference group.

The next step requires determining if the R^2 contribution provided by the set of indicators shows statistical significance. This study adopts a method presented by Kerlinger and Pedhazur (1973) designed to detect differences between two R^2 values. This method allows comparison between the R^2 produced by the individual-level variables, and the R^2 produced by the combined (added) effects of the indicator variables.

The following formula calculates this difference in contribution expressing this difference in an F ratio value, with a known associated probability. We express this formula in the following expression:

$$F_{n_1 n_2} = \frac{(R^2_f - R^2_i) / (k_1 - k_2)}{(1 - R^2_f) / (N - k_1 - 1)}$$

where R_i^2 is the R^2 for the incomplete or reduced model (individual-level variables R^2only) and R^2_f represents the full model (includes the R^2 contribution of the indicator variables). The k_1 represents the number of independent variables used in the full model while the k_2 equals the number of predictors in the reduced model. The degrees of freedom (n_1, n_2) associated with the F value are calculated as $(n_1 = k_1 - k_2)$ $(n_2 = N - k_1 - 1)$ where N represents the total number of subjects in the analysis. For this study, an F ratio value with an associated probability of .05 or less is considered a statistically significant result indicating that group membership contributes some explanation to the criterion measure (racial attitudes in our present example).

These procedures for testing group-level effects and the R^2 model for evaluating the statistical significance of these effects are identical for both the community and school analysis. The contextual identifiers are dummy coded and introduced into the regression equation after removing the individual-level effects of race, social status, and the "best" predictor variable, from the criterion measure.

The reader should note that we use this exploratory model for detecting "main effects" only, and not for interaction effects. With the recognition that this model may miss important interaction effects, the priority here centers on exploration for group effects. This model permits the use of interaction terms, yet the interpretation of their effects using dummy variables may prove difficult.

Practically speaking, the number of calculations involved in creating these interaction terms and the limited number of subjects available in some groups for analyzing two- and three-way interaction effects, plus the problem of identifying

the sources of these interaction effects, strongly detract from their usage here. Rather, we have chosen to incorporate interaction terms in the single equation model discussed next. This model takes the results identified by the dummy variable technique as statistically significant, and tests for individual- and specific group-level effects. Also this model includes interaction terms associated with specific variables to identify sources of nonadditive effects. The introduction of this model constitutes the third major stage of analysis.

Contextual Analysis

This model is used to identify the source(s) of the significant, yet undifferentiated group effects detected with the dummy variable-covariate procedure. Without strong theoretical guidance, the best empirical guess as to the source of these effects must come from the individual predictors, based on the fact they accounted for a significant proportion of variance (presumably) in the individual-level criterion measure.

Boyd and Iverson (1979) suggest that mathematical approximations of the group-level variables, calculated from these individual-level predictors, suffice in the absence of direct group measures. The average or mean score of each group on this predictor provides a feasible approximation of a group-level measure in this case. The responses of individuals within a group are averaged. This average score then gets assigned "back" to each respondent within this group. In an analysis of four groups, the group variable consists of four group means on some predictors. Entered into the regression equation, after removing the effects of the individual-level predictors, this group variable attempts to match the fit of the group-level effect, identified by the dummy variable technique. This fit may not be exact, particularly if the dummy variable technique identifies a residual disturbance term (see Alwin, 1976 for a discussion of this mismatch).

To illustrate the use of this technique, we return to the example above which identified neighborhood racial composition group-level effects on student racial attitudes. For simplicity purposes, we eliminate race as a variable by stating that this group-level effect held only for blacks living in the racially mixed, mostly black, and all black neighborhoods. The two individual-level predictors consists of parent social status and parent racial attitudes.

From these variables, we compute the average social status and the average parent racial attitudes from respondents' scores within each racial composition group, then assign this group score to the within-group respondents. These computations result in a group variable consisting of three group means, with each mean identifiable to the respondents within a neighborhood racial category. The next stage involves regressing the student racial attitudes variable on the parent social status and parent racial attitudes predictors, followed by the group-level social status and parent racial attitudes variables. The individual-level predictors should show results identical to the previous dummy variable-covariate model, while the group-level results may or may not capture the group effects detected by the dummy variable and covariate model. Both group-level predictors produce regression weights, coefficients of determination (R^2 contributions), and associated probability levels for comparison to the dummy variable-covariate model.

In the analysis, we particularly focus on the fit of these two models by comparing the R^2 contributions of each. Regardless, this model attempts to tap, through mathematical approximations, the sources of the group-level effects. This model provides the second approach to examining group effects and the first attempt to identify the sources of community and school <u>contextual</u> effects.

At this point in the analysis, we introduce the interaction terms previously omitted from the dummy variable-covariate approach. We restrict their usage to two-way levels due to the limited number of subjects available in some groups and

the difficulty inherent in interpreting complex interactions using continuous-level variables (Kerlinger and Pedhazur, 1976). In the neighborhood example above, using two individual and two group variables provides six two-way interaction terms. These interaction terms are stepped into the equation following the removal of the group variable effects.

The use of this model presents a drawback. Calculating the group score from the individual-level scores on a predictor makes the two correlated. The centering technique developed by Boyd and Iverson (1979) specifically tries to eliminate this correlation between predictor levels. It does not have, however, the capability of removing correlations between predictors at the same level.

Chapter II presented the fundamental procedures of the centering model. To review, this model adjusts both the independent and dependent measures by expressing them as deviations from some quantity. The individual-level variables are expressed as deviations from their respective within-group means. This score represents the individual's deviational score from the group measure. The sum of these deviations within a group equal zero. Similarly, each group variable ($\bar{X}$) is expressed as a deviation from the overall (grand) mean of the specific predictor. This transformed variable represents the departure from the overall attitude attributable to belonging to a particular group.

At this juncture, before transforming the dependent measure that completes the centering process, we examine the effects of adjusting the independent individual- and group-level predictors on the unadjusted criterion measure. Exploration at this point departs from the intended purpose of the Boyd and Iverson model, yet the regression results may prove interesting. The correlation between levels will have been effectively removed, though not in the covariation of the dependent measure, of course. We examine the R^2 contribution of the predictors at this point and compare these results to the previous "unadjusted" predictor

model and to the dummy variable technique. In this manner, this technique provides the third model for exploring group-level effects and the second model for examining specific contextual-level effects.

To illustrate the procedures used in this model, we continue the example with neighborhood racial composition that demonstrated a group-level effect on the student racial attitudes held by black students living in racially mixed, mostly black, and all black neighborhoods. As before, we calculate each neighborhood's average social status and average score on parent racial attitudes, then assign these group means to the specific neighborhood respondents.

Also we must calculate the grand mean or overall average score on social status and parent racial attitudes from all parent respondents in this particular analysis. To adjust the individual-level social status and racial attitude measures, subtract the within-group mean from the individual's score on the respective scale. This procedure expresses the respondent's score as the deviation from the within-group (neighborhood) mean. To adjust this group score, subtract the scale grand mean from each of three group means on that scale, thereby expressing each neighborhood group score as a deviation from the overall score of the respondents. Finally, we compute the two-way interaction terms using the adjusted individual- and group-level variables. With these transformations made in the social status and parent racial attitudes measures, they are ready for the analysis.

As before, the individual-level predictors (adjusted in this case) are first entered, followed by the two group-level predictors, then the interaction terms. Again, we focus on the overall fit of this model and compare the individual- and group-level variable R^2 contributions to those produced by the single equation "unadjusted" independent variables model just described, and the dummy variable-covariate model.

The adjusted predictor model parallel's Burnstein's (1980) "frog pond effect" approach, which adjusts the individual's score relative to the group score with the

intention of partitioning the unique individual and group effects. In another sense, this adjusted predictor model also seeks to separate the specific group-level effects from the overall group effects, expressing these specific effects as departures from the grand mean.

The fourth model in the analyses comparison involves adjusting both the independent and dependent measures. We detailed the procedures for adjusting the independent variables. The procedure for altering the dependent measure entails subtracting the product of the within-group unstandardized regression coefficient of the individual-level variable and its respective within-group mean from the individual respondent's scale score on the criterion measure; a procedure symbolized as $(Y - b\bar{X})$.

When using two individual-level predictors, such as social status and parent racial attitudes, we use the partial within-group regression coefficients and the two respective within-group means for creating the two product terms for subtracting from the respondent's criterion scale score, symbolized as $(Y - b_1\bar{X}_1 - b_2\bar{X}_2)$. Obtaining these partial coefficients requires regressing the criterion measure (student racial attitudes) on the two predictors (social status and parent racial attitudes) within each neighborhood racial composition group (mixed, mostly black, and all black). Each within-group regression produces the two partial regression coefficients needed for adjusting the group member's criterion score.

Continuing with this example, we multiply the partial regression coefficient for social status (b_1) by the within-group unadjusted mean ($\bar{X}_1$), and the partial coefficient for parent racial attitudes (b_2) by the within-group unadjusted mean ($\bar{X}_2$), then subtract these two quantities from the group member's student racial attitudes (Y), resulting in $(Y - b_1\bar{X}_1 - b_2\bar{X}_2)$. This procedure creates a new racial attitude score (Y') for each respondent and a new distribution of criterion scores for the following analysis.

The same procedural steps used in the previous analysis are followed. We first regress the individual-level adjusted predictors on the adjusted criterion measure, followed by the adjusted group-level predictors, then the interaction terms. In this fourth model, we examine (as before) the overall R^2 fit (which should change due to the adjustments in the criterion measure), and the R^2 contributions of the individual, group, and interaction variables. We compare these results to those of the previous three models.

From these analyses, we address the community and school contextual-level research questions, assessing whether these contexts provided any additional statistical explanation to student race and schooling perceptions, and student academic achievement, respectively.

In the final section of the analysis, we evaluate the four models designed to detect and specify contextual-level effects. Although somewhat a methodological sidelight to this investigation, this comparison may prove particularly useful for assessing the viability and future use of these models in contextual analysis research.

SUMMARY

In this chapter, we presented a discussion of the data collection procedures, a description of the data set, a specification of the variables used, the particular research questions posed for investigation and finally, a detailed description of the analytic techniques planned for investigating these individual- and group-level relationships. We presented four models designed to detect group-level effects, with three having the capability of specifying the source(s) of these contextual effects. Plans for an evaluation of these models on their comparability and utility for contextual research were introduced.

CHAPTER IV

ANALYSIS AND FINDINGS

INTRODUCTION

In this chapter, we examine the individual-level relationships among the parent and student perception variables, and the student perception variables in relation to student academic achievement. We then submit these parent and student variable relationships to an exploratory contextual analysis designed to detect the additional contributions the community and school make in the explanation of variance in student race and schooling perceptions and academic achievement, respectively. A contextual analysis, using Boyd and Iverson's (1979) single equation centering technique is reserved for those contexts demonstrating significant explanation to the variation in the individual-level relationships.

The data will be presented and analyzed followed by a discussion comparing these findings to the research questions selected for investigation. The following abbreviations are used to label the variables presented in the tables throughout this chapter.

Parent Variables

PRA	Parent Racial Attitudes
PSTAT	Parent Social Status
PATSD	Parent Attitudes Toward School Desegregation
PPSQ	Parent Perception of School Quality
PEECP	Parent Expectations and Evaluations of Child Performance
PIE	Parent Importance of Education

Student Variables

SRA	Student Racial Attitudes
SOPA	Student Self-Other Perceptions of Academic Ability
SFA	Student Future Aspirations
SIE	Student Importance of Education
SSAC	Student School Academic Climate
SSC	Student Sense of Control
SACH	Student Achievement

ANALYSIS OF RESULTS

INDIVIDUAL-LEVEL RELATIONSHIPS

Parent and Student Perceptions

Table 1 presents the means and standard deviations of the parent and student variables for the total number of family pairs, and for the pairs of black and white respondents. The maximum number of black family pairs was 172, and 676 white family pairs for a total of 848 respondent pairs. The totals vary in Table 1 by the available data on each variable.

Most noticeable in Table 1 are the markedly different scores between blacks and whites on a number of variables. Specifically, black parents on the average had more positive racial attitudes (PRA) and attitudes toward racial desegregation (PATSD) and more positive perceptions of school quality (PPSQ), while the white parents held higher expectations of their children's academic performance (PEECP) and rated their social status (PSTAT) higher than the black parents. Both groups held similar views on the importance of education (PIE).

Table 1

Means[1] and Standard Deviations of the Parent and Student Perception Variables for the Total Sample, Blacks, and Whites

	Total			Blacks			Whites		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
Students									
SRA	3.60	.817	841	4.09	.719	171	3.48	.795	670
SOPA	4.16	.609	846	3.98	.627	170	4.21	.596	676
SFA	3.95	.892	843	3.58	1.031	170	4.04	.828	673
SIE	4.51	.480	847	4.62	.549	172	4.48	.457	675
SSAC	4.04	.631	845	3.93	.791	170	4.07	.581	675
SSC	4.35	.663	842	4.24	.847	171	4.38	.605	671
	Total			**Blacks**			**Whites**		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
Parents									
PRA	3.42	.670	845	3.80	.577	172	3.33	.659	673
PSTAT	3.31	.555	835	2.93	.573	167	3.41	.506	668
PATSD	2.70	.905	840	3.40	.870	169	2.53	.825	671
PPSQ	3.38	.862	843	3.66	.813	169	3.30	.859	674
PEECP	4.11	.654	848	3.84	.709	172	4.18	.621	676
PIE	4.65	.398	848	4.64	.528	172	4.65	.359	676

[1]Scales range from "1" to "5" with higher scores indicating more positive attitudes or perceptions.

In comparing the student perceptions, the black students had more positive racial attitudes (SRA), but generally held less positive attitudes toward schooling than their white counterparts, including lower self-other perceptions of academic ability (SOPA), less ambitious future aspirations (SFA), and a lower sense of control (SSC). Compared to the white student perceptions, the black students felt that the academic climate (SSAC) of their schools was generally less positive. Black students did, however, place a slightly higher importance on education (SIE) than white students.

Table 2 presents the correlation coefficients that statistically represent the relationships between the parent and student perception variables. Table 3 presents these relationships for blacks and whites. The intercorrelation matrices for all the variables in this study appear in Appendix D.

The coefficients in Tables 2 and 3 showing the strongest associations between the parent and student variables appear in bold print. All coefficients presented have an associated probability of .05 or less.

Tables 2 and 3 reveal the direction and magnitude of the correlation coefficients between the parent variables (columns) with each of the student perception variables (rows). The most obvious conclusion drawn from examining this matrix is that the parent and children perceptions are positively related. These results suggest that the parents influence their children's perceptions (and vice versa) and that these perceptions are consistent, in direction at least, with their parents' attitudes, beliefs, and expectations.

The results in Table 2 show that parent racial attitudes are strongly associated with their children's racial attitudes ($r > .50$), based on Cohen's (1977) criterion of effect size. The parent attitudes toward school desegregation moderately relate with their children's racial attitudes.

Table 2

The Zero-Order Correlation Coefficients Between the Parent and Student Perception Variables[1]

	PRA	PEECP	PIE	PPSQ	PATSD	PSTAT
SRA	**.517**	.208		.140	.351	
SOPA	.090	**.645**	.125	.087		.256
SFA	.089	**.593**	.137			.298
SIE	.117	.180	**.385**	.090	.087	
SSAC	.138	.102	.157	**.178**	.094	.102
SSC	.101	**.307**	.185	.111		

[1]All coefficients presented have an associated probability (p) of .05 or less.

The strongest "predictor" of the student self-other perceptions of academic ability and the future aspiration variables is the parent expectations and evaluations of the child's performance. Clearly, the student self-other expectations for the present and future coincide with the parent expectations for the child. These results suggest that the students have internalized these parental expectations as part of their academic orientation.

Of the parent variables, the importance the parents place on education correlates the strongest with the student importance of education variable. No parent perception variable shows a particularly strong association with the school academic climate measure. The parent perceptions of the school quality variable shares a weak association with the climate variable. These findings suggest that the student perceptions of the school academic climate vary independently of parent perceptions.

The parent expectations and evaluations of the child's performance variable shows the strongest correlation among the parent variables with the student sense of control measure. Again, these associations suggest that parent expectations play a major role in the child's sense of efficacy and ability.

Table 3 displays these same relationships comparing the coefficients for blacks and whites. Again, notice that all of the parent and student variables are positively related. A comparison of those coefficients printed in bold type reveals that generally blacks and whites share a similar ordering in the parent and student variables.

The exceptions between blacks and whites in this ordering appear with the school climate and the sense of control measures. For blacks, the parent perceptions of school quality correlates most highly with the school climate measure, and the importance of education has the strongest association with black student sense of control. In contrast, the white parent expectations and

Table 3

The Zero-Order Correlation Coefficients for Blacks and Whites[1] Between the Parent and Student Perception Variables[2]

	PRA	PEECP	PIE	PPSQ	PATSD	PSTAT
SRA	**.382**	.343	.281	.138		.128
	.490	.277		.085	.305	.094
SOPA	.251	**.514**	.269	.166	.135	.197
	.116	**.671**	.069	.104	.071	.232
SFA	.168	**.554**	.264			.172
	.158	**.582**	.078	.083	.090	.277
SIE	.393	.386	**.517**	.171	.188	
		.149	**.334**			
SSAC	.233	.263	.301	**.308**	.171	
	.156	**.199**	.084	.160	.125	.091
SSC	.284	.382	**.407**	.139		
	.086	**.265**	.068	.123	.076	

[1]Within a cell, the first coefficient is for blacks and the second is for whites.

[2]All coefficients presented have an associated probability (p) of .05 or less.

evaluations were more likely to be associated with white student perceptions of the school climate and sense of control. From a speculative standpoint, these data suggest that black student perceptions of the school climate and their sense of control in the school situation may actually be more sensitive to parental values or ideals about education (i.e., importance of education, school quality) than the white students.

These relationships for the blacks, whites, and the total sample are further examined in the multivariate analysis of student perceptions. This analysis tests the order and relative importance of each variable while controlling for the other parent perception variables.

Multivariate Analysis of Student Perceptions

In this stage of the analysis, the intent is to determine the best individual-level parent predictor of each student variable for the total sample, and separately for blacks and whites. These variables will serve as the primary predictors in the exploratory contextual analysis.

As discussed in Chapters II and III of this study, the multivariate analysis includes the variables, race and parent social status, into the regression equation. Using a hierarchical inclusion method, the race and social status variables are forced into the equation prior to the other parent predictors, which get entered in a stepwise fashion.

The parent predictors are stepped into the equation according to the relative contribution each makes in the explanation of variance in the student criterion variable. The parent variable with the highest partial correlation coefficient with the dependent measure is entered first, followed by the variable with the next largest partial regression coefficient.

Table 4 presents the complete multivariate analysis of each student variable regressed on the race and parent social status variables, and the parent predictor variables. A summary table is presented consisting of the simple (zero-order) correlation coefficients, the multiple correlation (R), the R^2 value (a measure of the proportion or percentage of variance accounted for in the dependent variable), and the R^2 added (the unique percentage of explained variation a predictor contributes). The last column in this table, labelled "Prob.", indicates the probability level associated with entering a predictor into the regression equation, while controlling for the effects of variables already in the equation.

The race variable in Table 4 is coded as an indicator or dummy variable in which blacks receive a code of '1' and whites '0'. A positive correlation between race and a student variable would indicate that blacks have a higher average score than whites on that variable.

In examining the results in Table 4, we will systematically discuss each student measure separately. Four variables, race, parent status, parent racial attitudes, and parent expectations significantly account for slightly over a third (33.7%) of the variation in student racial attitudes. Parent racial attitudes is the strongest predictor, followed by race, parent expectations, and parent status. Adding the parent racial attitudes variable provides explanation to the child's racial perceptions, beyond the effects due to family background that is, race and social status.

Race, social status, and parent expectations (PEECP) are the three most important variables in predicting student academic ability perceptions (SOPA). Collectively, they account for 41 percent of the variance in SOPA. Blacks report lower self-other perceptions of ability than whites ($r = -.149$). Social status varies directly with SOPA. The major contributor, however, after the effects of race and

Table 4

Multiple Regression of the Student Racial and Schooling Perception Variables on the Parent Perception Variables

Dependent Variable: **Student Racial Attitudes**

Parent Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	.351	.351	.099	.099	.000
PSTAT	-.018	.330	.109	.010	.003
PRA	.524	.553	.305	.196	.000
PEECP	.202	.580	.337	.032	.000
PATSD	.357	.583	.339	.002	.082
PPSQ	.140	.583	.340	.001	.324
PIE	.057	.583	.340	.000	.651

Dependent Variable: **Student Self-Other Perceptions of Academic Ability**

Parent Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.149	.149	.022	.022	.000
PSTAT	.254	.262	.069	.047	.000
PEECP	.643	.643	.414	.345	.000
PPSQ	.094	.644	.415	.001	.214
PRA	.082	.644	.415	.000	.800

Dependent Variable: **Student Future Aspirations**

Parent Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.199	.199	.040	.040	.000
PSTAT	.300	.316	.100	.060	.000
PEECP	.587	.598	.358	.258	.000
PRA	.088	.599	.359	.001	.277
PIE	.110	.599	.359	.000	.366
PPSQ	.036	.599	.359	.000	.692

Dependent Variable: **Student Importance of Education**

Parent Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	.122	.122	.015	.015	.000
PSTAT	-.062	.123	.015	.000	.556
PIE	.362	.382	.146	.131	.000
PEECP	.165	.409	.169	.022	.000
PRA	.106	.411	.169	.001	.251
PATSD	.085	.411	.169	.000	.569
PPSQ	.087	.411	.169	.000	.885

Table 4 continued

Dependent Variable: **Student School Academic Climate**

Parent Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.066	.066	.004	.004	.060
PSTAT	.100	.105	.011	.007	.019
PPSQ	.181	.223	.050	.039	.000
PEECP	.214	.274	.075	.025	.000
PRA	.141	.291	.085	.010	.003
PIE	.143	.308	.095	.010	.003
PATSD	.095	.309	.096	.010	.424

Dependent Variable: **Student Sense of Control**

Parent Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.058	.058	.003	.003	.099
PSTAT	.047	.065	.004	.001	.409
PEECP	.288	.295	.087	.083	.000
PIE	.164	.317	.100	.013	.001
PRA	.109	.326	.106	.006	.020
PPSQ	.116	.332	.110	.004	.066

status are removed, is the parent expectations and evaluations of the child's performance.

These three variables are also the most important predictors of student future aspirations (SFA). These relationships are not surprising given the correlation between SOPA and SFA (r = .51, see Appendix D). An examination of the "R^2 added" column reveals that the race and parent status variables contributed more to SFA than to the SOPA variable.

The remaining three variables (SIE, SSAC, SSC) demonstrated weaker relationships with the parent variables. The parent importance of education variable proved to be the best predictor of SIE. Race and parent status contributed a marginal (1.5%) amount of explanation. After adding parent expectations, the four variables accounted for only 17 percent of the variance in student importance on education.

A similar pattern of weak relationships emerged with the student climate and sense of control variables. After including all or nearly all the parent predictors, neither equation accounted for scarcely more than 10 percent of the variation in SSAC or SSC. Obviously, these parent predictors provide little explanation, suggesting that for the total sample, these measures vary independently of parent perceptions.

A separate multivariate analysis of the student perception variables for blacks and whites was used to detect differences in the stepwise ordering of the parent predictors. The results of this analysis appear in Table 5. In general, blacks and whites used the same first-order predictor but often differed in the remaining ordering sequence. For both blacks and whites, the parent expectation and evaluation variable was the best predictor of the student academic ability perceptions and future aspiration measures. Parent racial attitudes best predicted

Table 5

Separate Multiple Regressions for Blacks and Whites of the Student Racial and Schooling Perception Variables on the Parent Perceptions Variables

Dependent Variable: **Student Racial Attitudes**

	Blacks					Whites			
P.Var.	**r**	**R^2**	**R^2 Add.**	**Prob.**	**P.Var.**	**r**	**R^2**	**R^2 Add.**	**Prob.**
PSTAT	.137	.019	.019	.083	PSTAT	.096	.009	.009	.015
PRA	.424	.186	.167	.000	**PRA**	.487	.238	.229	.000
PEECP	.308	.218	.032	.012	PEECP	.280	.275	.037	.000
PIE	.257	.222	.004	.367	PATSD	.309	.279	.004	.070
PPSQ	.160	.222	.000	.844	PPSQ	.082	.280	.002	.228

Dependent Variable: **Student Self-Other Perceptions of Academic Ability**

	Blacks					Whites			
P.Var.	**r**	**R^2**	**R^2 Add.**	**Prob.**	**P.Var.**	**r**	**R^2**	**R^2 Add.**	**Prob.**
PSTAT	.199	.040	.040	.011	PSTAT	.224	.050	.050	.000
PEECP	.504	.255	.216	.000	**PEECP**	.670	.450	.400	.000
PIE	.213	.261	.006	.272	PPSQ	.112	.451	.001	.365
PPSQ	.157	.264	.003	.432	PRA	.116	.451	.000	.543
PATSD	.120	.265	.001	.597	PIE	.063	.451	.000	.615
PRA	.205	.266	.001	.701	PATSD	.074	.451	.000	.874

Dependent Variable: **Student Future Aspirations**

	Blacks					Whites			
P.Var.	**r**	**R^2**	**R^2 Add.**	**Prob.**	**P.Var.**	**r**	**R^2**	**R^2 Add.**	**Prob.**
PSTAT	.172	.030	.030	.029	PSTAT	.279	.078	.078	.000
PEECP	.527	.278	.248	.000	**PEECP**	.586	.355	.277	.000
PPSQ	.026	.283	.005	.298	PRA	.158	.356	.001	.220
PIE	.218	.291	.008	.199	PPSQ	.084	.357	.000	.724
PRA	.150	.291	.000	.875	PIE	.068	.357	.000	.771
PATSD	.062	.291	.000	.874					

Table 5 continued

Dependent Variable: **Student Importance of Education**

	Blacks					Whites			
P.Var.	**r**	**R^2**	**R^2 Add.**	**Prob.**	**P.Var.**	**r**	**R^2**	**R^2 Add.**	**Prob.**
PSTAT	.003	.000	.000	.975	PSTAT	-.028	.001	.001	.470
PIE	.452	.204	.204	.000	PIE	.331	.110	.109	.000
PEECP	.355	.265	.061	.000	PEECP	.142	.124	.014	.001
PRA	.381	.300	.035	.006	PATSD	-.003	.124	.000	.750
PATSD	.182	.307	.007	.202					
PPSQ	.165	.309	.001	.565					

Dependent Variable: **Student School Academic Climate**

	Blacks					Whites			
P.Var.	**r**	**R^2**	**R^2 Add.**	**Prob.**	**P.Var.**	**r**	**R^2**	**R^2 Add.**	**Prob.**
PSTAT	.055	.003	.003	.489	PSTAT	.092	.009	.009	.018
PPSQ	.302	.094	.091	.000	PEECP	.195	.039	.031	.000
PIE	.274	.135	.041	.007	PPSQ	.164	.059	.020	.000
PEECP	.235	.151	.016	.092	PRA	.154	.069	.009	.012
PRA	.227	.154	.004	.419	PIE	.084	.073	.004	.082
PATSD	.162	.157	.003	.456	PATSD	.122	.074	.000	.681

Dependent Variable: **Student Sense of Control**

	Blacks					Whites			
P.Var.	**r**	**R^2**	**R^2 Add.**	**Prob.**	**P.Var.**	**r**	**R^2**	**R^2 Add.**	**Prob.**
PSTAT	.060	.004	.004	.451	PSTAT	.017	.000	.000	.656
PIE	.385	.153	.149	.000	PEECP	.260	.072	.072	.000
PEECP	.346	.209	.056	.001	PPSQ	.122	.079	.007	.028
PRA	.318	.228	.019	.052	PIE	.065	.080	.001	.455
					PRA	.080	.080	.000	.458
					PATSD	.074	.080	.000	.751

student racial attitudes, and parent importance of education predicted student importance of education for both blacks and whites.

Black and white respondents differed in the variable order in the equations predicting the academic climate and sense of control measures. For black parents, the perceptions of school quality (PPSQ) was the first predictor of the school climate variable, while the white parents' expectations (PEECP) showed the strongest association with this variable. In both groups, the R^2 value for their first-order predictor was small. The parent importance of education (PIE) variable was the most important predictor of the student sense of control (SSC) for blacks, while the parent expectations (PEECP) showed the strongest partial correlation with the SSC variable for whites. The PIE variable accounted for nearly twice the variation (R^2 = .149) in SSC for blacks than did the PEECP variable for whites (R^2 = .072). The parent variables collectively provided greater explanation of the sense of control measure for blacks (R^2 = .228) than for whites (R^2 = .080).

Multivariate Analysis of Student Achievement

The next set of analysis focused on determining the relationships between the student perception variables and student achievement. Table 6 presents the achievement data for the total sample, blacks, and whites, expressed as the mean percentile score on the California Achievement Test (CAT). A total of 133 black and 576 white students had achievement data available for this analysis.

Blacks and whites differed dramatically on achievement, an average difference of 40 points. Clearly, the achievement gap between blacks and whites widely discussed in the research literature is present in this data set.

A multivariate analysis tested the relationship between the student perception variables and student achievement. This analysis also includes the simple, bivariate correlations between these variables. To control for systematic

Table 6

Means and Standard Deviations of the Student Achievement Scores for the Total Sample and for the Black and White Students

	$\bar{X}$	SD	N
TOTAL	69.53	27.90	709
Blacks	37.17	26.84	133
Whites	77.00	22.25	576

differences by grade level, the student's grade in school as a variable was first forced into the equation. Race and parent social status were subsequently forced into the model. The student perception variables were then stepped into the equation according to the magnitude of their partial regression coefficients. The results of this analysis appear in Table 7.

Examining the results for the total sample in Table 7, student grade level contributes nothing toward student achievement. The major predictors of student achievement are race (R^2 = .31), family social status (R^2 = .04), student self-other perceptions of academic ability (R^2 = .175), and future aspirations (R^2 = .05). The remaining variables contribute an insignificant amount of explanation. Collectively, these variables account for nearly 60 percent (58.1%) of the variation in student achievement.

A separate analysis for black and white students showed similar results. The same major predictors held for both groups. The order of the variables contributing marginal explanation differed, however. For both groups, differences in parent social status provided some explanation in student achievement. The most significant predictors were the student self-other perceptions of academic ability and future aspiration variables. Interestingly, these predictors captured nearly twice the variation in white student achievement (R^2 = .438) compared to black student achievement (R^2 = .244). Apparently, these measures tap more systematically for whites than blacks the kinds of perceptions salient to their academic achievement. These results suggest that other, unmeasured factors play a more significant role influencing black achievement.

Having examined the individual-level relationships between the parent and student racial/schooling perceptions, and the relationships between student perceptions and student achievement, we address the specific research questions raised in Chapter III directed at these individual-level relationships. This

Table 7

A Multivariate Analysis of Student Achievement Using Student Grade Level, Race, Social Status and Student Racial/Schooling Perceptions as Predictors for the Total Students and Separately for Blacks and Whites

Total						Blacks						Whites					
Var.	r	R	R^2	R^2Add	Prob	Var.	r	R	R^2	R^2Add	Prob	Var.	r	R	R^2	R^2Add	Prob
Grade	-.013	.013	.000	.000	.751	Grade	.002	.002	.000	.000	.985	Grade	-.063	.063	.004	.004	.150
Race	-.555	.556	.310	.310	.000												
PSTAT	.400	.593	.351	.041	.000	PSTAT	.206	.207	.043	.043	.023	PSTAT	.256	.266	.071	.067	.000
SOPA	.529	.725	.526	.175	.000	SOPA	.440	.455	.207	.164	.000	SOPA	.577	.593	.352	.281	.000
SFA	.509	.759	.576	.050	.000	SFA	.348	.494	.244	.037	.018	SFA	.559	.663	.438	.086	.000
SSAC	.168	.760	.578	.002	.063	SSC	.240	.507	.257	.013	.156	SSAC	.171	.666	.444	.005	.032
SIE	.007	.761	.579	.001	.185	SRA	.056	.523	.274	.016	.111	SIE	.080	.669	.448	.004	.064
SSC	.223	.762	.580	.001	.197	SIE	.209	.526	.276	.002	.513	SRA	.235	.671	.451	.003	.099
SRA	-.027	.762	.581	.001	.365	SSAC	.145	.526	.277	.001	.758	SSC	.239	.671	.451	.000	.580

discussion follows. At the conclusion of this section we provide a brief discussion and some comments on the importance of these findings.

EXAMINATION OF RESEARCH QUESTIONS - PART I

Individual-Level Relationships

In Chapter III, several research questions were stated focusing on the relationships between the parent and student perceptions of race and schooling. In this section, we restate the general research objectives and specific research questions, then evaluate these research questions, drawing from the results presented above.

I. What is the relationship between parent perceptions of race and schooling and their children's perceptions of race and schooling?

A. Racial Perceptions

1. What is the relationship between parents' and their children's racial attitudes?

The zero-order correlation coefficients for this relationship in Tables 2 and 4 show a strong, positive association between the two ($r > .50$). After controlling for the effects of race and social status, the parent racial attitude variable was the best predictor of the child (student) racial attitudes in the multivariate analysis. This relationship held for both blacks and whites. However the association in racial perceptions between parent and child appeared stronger for whites than blacks.

2. What is the relationship between parent attitudes toward school desegregation and their children's racial attitudes?

At a bivariate level, the association between the two was moderate and positive ($r = .35$). Parent school desegregation attitudes contributed nothing

toward "explaining" student racial attitudes after taking into account the parent racial attitudes, race, social status, and parent expectations of child performance. These statements hold true for both blacks and whites.

B. Schooling Perceptions

1. What is the relationship between parents' and their children's perceptions of the importance of education?

This relationship between these two variables was positive and moderate ($r = .385$). Not surprisingly, the parent importance of the education variable proved to be the best predictor of student perceptions of the importance of education, after adjusting for the effects of race and social status. Table 5 shows this statement receives support in the analysis for blacks and whites also. However, this relationship was stronger for blacks than whites, again suggesting that black parents and their children have a greater mutual sensitivity about the value of education.

2. What is the relationship between parent perceptions of school quality and their children's perceptions of the importance of education?

In Cohen's (1977) terms, the relationship between these two variables constitutes a weak effect ($r = .090$). The multivariate analysis for the total sample (Table 5) showed this relationship to be negligible after considering other parent perception variables. The separate analysis for blacks and whites showed similar results.

3. What is the relationship between parent expectations and evaluations of child performance and their children's self-other perceptions of academic ability?

The relationship between these two variables was strongest of all the parent-student variable relationships. The zero-order correlation showed a positive, strong, effect size (r = .645) and in the multivariate analysis parent expectations (PEECP) accounted for over a third of the variation in self-other perceptions of academic ability, after removing the effects of race and social status. The results in Table 5 showing separate analysis for blacks and whites depict similar effects.

4. What is the relationship between parent expectations and evaluations of child performance and their children's future aspirations?

As with the perceived academic ability measure, the parent expectations measure showed a positive, strong association (r = .593) with the child's future aspirations. In the multivariate analysis, which first controlled for race and social status, the parent expectation variable uniquely accounted for over one-fourth of the variation in student future aspirations. Similar results for blacks and whites justifies the conclusion that parent expectations provide insight into estimating the child's future academic and vocational aspirations.

5. What is the relationship between parent expectations and evaluations of child performance and their children's sense of control?

The relationship between these two measures appears positive and moderate (r = .307). Although the best predictor (for the total sample) of student sense of control, parent expectations turned in a weak effect. In part, this weak result stemmed from racial differences. Black parent importance of education was a better predictor of their children's sense of control than their expectations and evaluations of child performance. White parents relied more on expectations to "influence" their child's sense of control. However, this relationship for whites was weak (r = .265).

6. What is the relationship between parent expectations and evaluations of child performance and their children's perceptions of the school academic climate?

The investigation of this relationship yielded an unexpected picture. Actually, for blacks the parent perceptions of school quality proved to be a better predictor than the parent expectation variable, while the reverse was true for whites. Secondly, the school quality variable showed a stronger relationship with school climate for blacks ($r = .302$) than did the parent expectations variable with school climate for whites ($r = .195$), after controlling for parental status effects. For both races, parent perceptions provided only marginal statistical explanation in their children's school climate perceptions.

The school climate variable is largely independent of parent perceptions which suggests that these perceptions are school dependent. In turn, to adequately explain the variation in school climate, we need within-school predictors such as teacher, principal, and student perceptions.

II. What is the relationship between student race and schooling perceptions and their academic achievement?

In Table 7, we presented the results of the multivariate analysis that regressed student achievement on a number of variables including grade level, race, social status, and the student perception variables. In Chapter III, we asked specific questions about the relationship of each student perception variable with the academic achievement variable. These questions are restated below and subsequently addressed using the results found in Table 7.

A. <u>Racial Perceptions</u>

1. What is the relationship between student perceptions of the importance of education and their academic achievement?

Student racial attitudes were not significantly related to student achievement (r = .027), particularly after removing the effects of other predictors. This statement holds true for both black and white students.

B. Schooling Perceptions

1. What is the relationship between student perceptions of the importance of education and their academic achievement?

The importance students place on education showed no significant relationship to student achievement. The association between the two variables was stronger for blacks (r = .209) than whites (r = .000). However, this association became negligible after removing the effects of the other student variables. These results suggest that the value of education plays a less critical role with student achievement than the student's experience with learning, reflected in part with the student's academic ability expectations.

2. What is the relationship between student self-other perceptions of academic ability and their academic achievement?

After adjusting for the effects of grade, race, and social status, the student's self-other perceptions of academic ability (SOPA) was the best predictor of academic achievement among the student perception measures. This strong, positive relationship held for both blacks and whites, although the effect was stronger for whites than blacks. Regardless of student race, it is clear that the student perceptions of ability strongly affects academic achievement.

3. What is the relationship between student future aspirations and their academic achievement?

Similar to the student ability variable, student future aspirations showed a strong positive correlation (r = .509) with student achievement. However, the two shared considerable common variance with student achievement, such that the former largely eclipsed the effect of aspirations in the multivariate equation. Future aspirations was the second best predictor of student achievement for both blacks and whites.

4. What is the relationship between student sense of control and their academic achievement?

The sense of control variable showed a rather weak, positive relationship with student achievement (r = .223). It was the third best predictor of black student achievement, yet it showed no effect on white achievement. It should be noted that this effect was particularly small and statistically nonsignificant for blacks.

5. What is the relationship between student perceptions of the school academic climate and their academic achievement?

The relationship between these two variables was positive and weak (r = .168). It was the third best predictor of student achievement for whites although its unique contribution was essentially zero after adjusting for other predictors. Overall the school climate variable provided no additional explanation in individual-level student achievement.

Race, Social Status, Student Perceptions, and Student Achievement

The race and social status variables generally provided some (generally weak) statistical explanation to the student perceptions of race and schooling. More importantly, they provided the statistical controls commonly used in the literature.

The following analyses examining "community effects" on these perceptions continue their use as control variables.

In the multivariate analysis of student achievement, the variables race and social status were forced into the equation prior to the student perception measures. This analysis revealed that student race accounted for nearly one-third (R^2 = .30) of the variation in achievement while social status contributed less than five percent (R^2 = .041) explanation. Clearly these variables as proxies are useful in "predicting" student achievement. Importantly, however, the student perception variables, particularly the student self-other perceptions of academic ability measure, added explanatory power beyond the effects of these demographic characteristics.

The inclusion of this student perception variable in conjunction with the race and social status predictors clearly seems warranted in the equation designed to detect school contextual effects.

DISCUSSION AND COMMENTS

Before turning to the exploratory contextual analysis, a brief discussion on some of these findings from a less statistical standpoint may be worthwhile. The descriptive analysis results concur rather consistently with the literature. Blacks show more positive attitudes about interracial situations, particularly on school desegregation, than whites. Parent and student racial attitudes are strongly and positively related for both racial groups, and parents and their children share similar values on the importance of education. Parent expectations and evaluations of child performance show a strong association with the child's self-other perceptions of academic ability, future aspirations, and sense of control.

An even more important issue emerging from these results surrounds the relationships between parent expectations, student expectations, and student

achievement. Parent expectations alone account for nearly 40 percent of the variance in student achievement (see the intercorrelation matrix in Appendix D-1) suggesting that these expectations significantly influence student performance, although it is not possible to establish a causal order here. That is, student performance probably affects parent expectations, too. Black parents apparently expect less from their children than white parents regarding their present and future academic accomplishments. Black students apparently share these expectations as they report lower self-other perceptions of academic ability (SOPA) and lower future aspirations (SFA) than white students. Importantly, these two student scales fail to distinguish student self-attributions of their ability from their perceptions of parent and teacher expectations. The research on student self-attributions of academic ability (Brookover, et al., 1979), indicating that black students report higher or more positive self-conceptions of academic ability than white students, suggests that these scales tap more student perceptions of significant other expectations rather than their personal beliefs about their academic ability.

The strong association between these student perception measures and their academic achievement reiterates the important role that expectations play in student performance. These expectations strongly varied with both black and white student achievement in this study. The literature emphasizes that performance reinforces these ability expectations, giving them a status of legitimacy that may mean continued poor performance or failure for students initially expected to fail. The strong disparity in black and white student achievement in this study suggests that these expectations trace along racial and social status lines with serious consequences for black students in particular. Clearly, studies concerned with improving student performance must focus on changing these expectations that play a central role in student achievement.

One final methodological note deserves mention. Apparently, the student self-other perceptions of academic ability (SOPA) and the future aspirations (SFA) measures, tapped most of the same systematic variation in student achievement attributable to the sense of control (SSC) and school climate (SSAC) measures at the bivariate level. The fact that all four measures include perceptions of school (particularly teacher) expectations for student learning, coupled with these results, suggest that the SOPA and SFA measures partly capture the school learning climate. Given this assumption, using the SOPA measure as the best indicator of school learning climate, seems logical and appropriate.

In a sense, this self-other perception of academic ability measure approximates the social and psychological mechanisms operating within the school that partly govern student learning. The use of this variable as a school-level measure provides some basis to refuting the contextual fallacy argument in a demonstration of school effects. On this rationale, we use the SOPA measure as an individual-level covariate for detecting school (as a dummy variable) effects, and further use it as an aggregate measure for specifying the source of these group-level effects on student achievement, given these effects occur.

With these thoughts in mind, we now turn the focus of this investigation over to an examination of these significant individual-level relationships within the community and school contexts. This approach assumes that the social setting provides an additional effect on these student "outcomes", over and beyond the effects of the individual-level parent and student variables.

EXPLORATORY CONTEXTUAL ANALYSIS

Community Effects

In this first stage of analysis, the objective is to use the selected community identifiers as indicator variables in a regression analysis with the parent predictor variables to detect community contextual effects on student perceptions. The community identifiers include former school district, neighborhood racial composition, and former school, the school the student attended the previous year, prior to school desegregation.

The contribution a particular contextual identifier provides is evaluated using a formula, introduced in Chapter III, for testing the difference between two coefficients of determination (R^2); the first produced by regressing the criterion measure on the individual-level predictors only, the second by including into this equation a set of indicator variables representing the contextual units. This second R^2 coefficient determines the additional effect, group membership in these units, contributes to the statistical explanation of the variation in the criterion measure, over and above, the individual-level variable effects.

This formula yields a F ratio value with a known associated probability. An identifier's R^2 contribution is considered statistically significant if this F statistic has an associated likelihood level of .05 or less.

A. Former School District

The first context analyzed for community effects is former school district. Table 8 presents the means and standard deviations of the parent predictor variables, selected from the individual-level analysis, for each of the five former districts. These values provide an indication of the mean differences on the

Table 8

The Means and Standard Deviations of the Parent Perception Variables for Blacks and Whites by Former School District

	PRA			PEECP			PIE			PPSQ			PSTAT		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
District I	**3.77**	.663	133	**3.82**	.654	133	**4.68**	.416	138	**3.70**	.796	131	**2.93**	.625	135
Blacks	3.78	.552	112	3.79	.652	111	4.66	.437	113	3.71	.798	109	2.87	.593	113
Whites	3.72	1.100	21	3.98	.655	22	4.81	.250	22	3.66	.804	22	3.23	.710	22
District II	**3.78**	.586	38	**3.78**	.762	39	**4.64**	.372	39	**3.63**	.747	39	**3.03**	.532	39
Blacks	3.98	.528	20	3.88	.720	20	4.68	.343	20	3.57	.790	20	3.08	.571	20
Whites	3.55	.579	18	3.67	.809	19	4.59	.405	19	3.70	.715	19	2.98	.500	19
District III	**3.44**	.552	152	**4.16**	.671	154	**4.61**	.377	154	**3.33**	.846	153	**3.44**	.496	154
Blacks	3.82	.408	11	4.15	.835	11	4.68	.415	11	3.39	.728	11	2.85	.345	11
Whites	3.41	.551	141	4.16	.661	143	4.60	.375	143	3.32	.857	142	3.48	.478	143
District IV	**3.31**	.686	377	**4.23**	.593	380	**4.66**	.397	377	**3.27**	.878	377	**3.40**	.504	378
Blacks	3.76	.846	17	4.08	.939	17	4.64	.956	17	3.40	.902	17	3.14	.572	17
Whites	3.28	.671	360	4.24	.573	359	4.66	.352	360	3.26	.878	360	3.41	.498	361
District V	**3.27**	.614	125	**4.16**	.630	127	**4.66**	.335	126	**3.33**	.862	126	**3.39**	.491	126
Blacks	4.02	.515	6	4.11	.502	6	4.74	.292	6	4.25	1.049	6	2.97	.414	6
Whites	3.23	.596	119	4.16	.637	120	4.66	.337	120	3.28	.830	120	3.41	.487	120

predictors among the districts. The value in bold type is the mean for the district. The means for blacks and whites within each district appear under this number.

This table shows that the parent perception scores differed across districts. Parents living in Districts I and II, for example, had more positive racial attitudes and more favorable perceptions of school quality than parents in Districts III, IV, and V. Parents in this latter group of districts held higher expectations of their child's performance (PEECP), and rated their social status higher than did the parents in Districts I and II. Parents did not differ by district or their perceptions of the importance of education. It is difficult to determine whether district differences in parent perceptions are actually due to racial effects. The average score on a variable appears to be strongly influenced by the proportion of blacks and whites living within a district.

The results of the contextual analysis appear in Table 9. The results for student racial attitudes is the first entry in this table. Note that race and parent social status were the first two variables forced into the equation. These two variables accounted for about 10 percent of the variation in student racial attitudes. The parent racial attitudes variable when subsequently forced uniquely contributed 19 percent (18.9) of the statistical explanation in these racial attitudes.

The school former district indicators were then stepped into the equation as a variable block. Note that the vector D1 (District 1) is missing from this equation. It was designated the reference category to which the remaining districts (D2 - D5) were compared. Recall that the selection of a particular group as the reference category does not change the overall R^2 fit of the model or the overall R^2 contributions of the dummy variables.

Further recall that a regression line, which is a function of race, social status, and a parent racial attitudes predictor is fitted for each district, and coded as an indicator variable to the student racial attitude data points.

Table 9

An Exploration for Community Contextual Effects Using Former School District in a Multiple Regression Analysis of the Student Racial and Schooling Perception Variables

Dependent Variable: **Student Racial Attitudes**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	.308	.308	.095	.095	.000
PSTAT	-.016	.324	.105	.010	.003
PRA	.516	.542	.294	.189	.000
D3	-.030	.542	.294	.000	.235
D2	.064	.543	.295	.001	.264
D5	-.040	.543	.295	.000	.656
D4	-.162	.545	.297	.002	.167

$$F_{4,817} = \frac{(.297-.294) / (7-3)}{(1-.297) / (825-7-1)} = .872 \text{ NS}$$

Dependent Variable: **Student Self-Other Perceptions of Academic Ability**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.139	.139	.019	.019	.000
PSTAT	.256	.262	.069	.049	.000
PEECP	.638	.639	.409	.340	.000
D5	.025	.639	.409	.000	.532
D2	.105	.640	.410	.001	.177
D3	-.004	.641	.410	.000	.216
D4	.117	.641	.410	.000	.483

$$F_{4,825} = \frac{(.410-.409) / (7-3)}{(1-.410) / (833-7-1)} = .350 \text{ NS}$$

Dependent Variable: **Student Future Aspirations**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.197	.197	.039	.039	.000
PSTAT	.298	.314	.098	.060	.000
PEECP	.588	.599	.359	.260	.000
D5	.024	.599	.359	.000	.036
D2	-.130	.601	.361	.002	.784
D3	.093	.604	.364	.003	.001
D4	.130	.608	.369	.005	.010

$$F_{4,822} = \frac{(.369-.359) / (7-3)}{(1-.369) / (830-7-1)} = 3.257 \quad p<.05$$

Table 9 continued

Dependent Variable: **Student Importance of Education**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	.130	.130	.017	.017	.000
PSTAT	-.064	.132	.017	.000	.565
PIE	.365	.387	.150	.132	.000
D5	.024	.389	.152	.002	.671
D2	.015	.389	.152	.000	.799
D3	-.051	.389	.152	.000	.702
D4	-.065	.389	.152	.000	.625

$$F_{4,826} = \frac{(.152-.150) / (7-3)}{(1-.152) / (834-7-1)} = .487 \text{ NS}$$

Dependent Variable: **Student School Academic Climate**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.065	.065	.004	.004	.060
PSTAT	.099	.104	.011	.007	.019
PPSQ	.180	.223	.050	.039	.000
D5	-.063	.236	.056	.006	.060
D2	-.034	.238	.057	.001	.284
D3	.014	.239	.057	.000	.454
D4	.061	.239	.057	.000	.607

$$F_{4,820} = \frac{(.057-.050) / (7-3)}{(1-.057) / (828-7-1)} = 1.522 \text{ NS}$$

Dependent Variable: **Student Sense of Control**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.063	.063	.004	.004	.070
PSTAT	.054	.071	.005	.001	.330
PEECP	.296	.302	.091	.086	.000
D5	.042	.304	.092	.001	.060
D2	.023	.310	.096	.004	.024
D3	-.022	.310	.096	.000	.331
D4	.059	.315	.099	.003	.111

$$F_{4,821} = \frac{(.099-.091) / (7-3)}{(1-.099) / (829-7-1)} = 1.822 \text{ NS}$$

An examination of the "R^2" and the "R^2 added" columns in Table 9 for the district dummy variables (D2 -D5) reveals that former district provided relatively no additional explanation (R^2 = .003) to the student individual-level racial attitudes. This model assumes a common slope (no interaction) for these groups and shows that, in a sense, these group regression coefficients do not differ statistically from the intercept term of the reference (D1) category.

The R^2 contribution of former district on SRA was tested using the F ratio formula presented above. This test yielded an F value of .872, a statistically nonsignificant value, indicating that the R^2 =.003 contribution was not a statistically significant addition to the individual-level covariate model.

In more simplified terms, this analysis demonstrated that the school former district provided no group effect on student racial attitudes. This residential identifier adds no explanation of student racial attitudes, beyond those individual-level effects of race, social status, and parent racial attitudes.

A similar analysis was conducted on each of the remaining student perception variables (i.e., SOPA, SFA, SIE, SSAC, and SSC) using the former district indicator variables. These results appear in Table 9. One significant result emerged. The school former district contributed a small additional amount (1%) of explanation to student future aspirations ($F = 3.257$, $p < .05$). Three of the four districts showed a significant effect, that is their regression coefficients significantly differed from the coefficient (intercept term) of the reference category.

A separate analysis for blacks and whites by former district was also conducted. In contrast to these analyses of the total sample, and in keeping with the "best predictor" rule, the PEECP measure was used to predict white student school climate (SSAC) perceptions, and the PIE measure was used to predict the black students' sense of control (SSC). Recall, the multivariate analysis in Table 5 established that these measures best predicted these particular student

perceptions, along racial lines. The results of this analysis revealed no significant district effects for blacks. However for whites, the district effects on student future aspirations reappeared, showing a stronger effect than in the previous analysis. Again, the contribution was small (2.6%), yet nearly tripled in size. The results of this specific analysis appear in Table 10.

In examining Table 10, first note the simple correlation coefficients for District II to V (D2 - D5). The size and magnitude represent differences between levels of student future aspirations associated with residing in a particular school district, versus residing in District I, the reference category. These correlations indicate that, on the average, students in Districts II and V held lower future aspirations (symbolized with a negative sign) than students in District I, and that students in Districts III and IV held higher aspirations than students in District I. Comparing these coefficients to the coefficients in the "R^2 added" column, we see that District II provided the most contribution (R^2 = .021) in explaining differences in student aspirations, followed by District III.

This analysis demonstrates that the school district where these white students reside affects their aspiration levels beyond the effects of family social status and parent expectations of child performance. Note this procedure does not specify the source(s) of these group-level district effects, only that they occur. The forthcoming contextual analysis attempts to identify these sources using aggregate-level measures (means) of the social status and parent expectation variables.

In sum, these explorations for community contextual effects, using former districts as indicators of community units, provided one set of relationships to be analyzed with the contextual analysis technique. A separate analysis revealed that this technique be reserved for the white respondents by former district in that this same relationship did not hold for blacks.

Table 10

An Exploration for Community Contextual Effects Using Former School District in a Multiple Regression Analysis of White Students' Future Aspirations

Dependent Variable: **Student Future Aspirations**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
PSTAT	.279	.279	.078	.078	.000
PEECP	.589	.599	.359	.281	.000
D5	-.019	.599	.359	.000	.421
D2	-.237	.617	.380	.021	.006
D3	.075	.620	.384	.004	.078
D4	.057	.620	.385	.001	.319

$$F_{4,658} = \frac{(.385-.359) / (6-2)}{(1-.385) / (663-6-1)} = 6.993 \quad p<.01$$

The examination of this relationship using the single equation centering technique follows the conclusion of this section devoted to the exploration of contextual effects.

B. Neighborhood Racial Composition

Table 11 presents the means and standard deviations of the parent perception variables for blacks and whites according to the racial composition of their neighborhoods. Although neighborhood racial mix is a perceptual variable, the distribution of blacks and whites within these racial categories appears relatively consistent with these perceptions.

Table 11 reveals that parents living in racially mixed or mostly black neighborhoods had the most positive racial attitudes. Parents living in all black or all white neighborhoods generally had the least positive attitudes. Interestingly, black parents living in predominately white areas had the most positive attitudes while whites in these areas generally held the most negative racial attitudes.

Parents living in mostly white and all white neighborhoods held higher expectations for their children and had higher perceptions of their social status than parents in racially mixed and all black residential areas. These groups also differed in their perceptions of school quality and the importance they placed on education. Parents residing in all white and mostly white areas held lower opinions of the quality of their schools than did those in racially mixed and black neighborhoods. Blacks in all black neighborhoods placed less emphasis on the importance of education, although there was less agreement (more variability) in their responses compared to the other neighborhood groups on this measure.

An exploratory analysis, using the neighborhood racial composition categories as indicator variables, was conducted on the student perception measures. The "all

Table 11

The Means and Standard Deviations of the Parent Perception Variables for Blacks and Whites by Neighborhood Racial Composition

Racial Composition	PRA			PEECP			PIE			PPSQ			PSTAT		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
All White	**3.24**	.609	171	**4.18**	.641	172	**4.63**	.362	171	**3.37**	.889	171	**3.40**	.198	171
Blacks	4.50	0	1	4.67	0	1	5.00	0	1	4.75	0	1	3.83	0	1
Whites	3.23	.603	170	4.17	.642	171	4.63	.362	170	3.37	.885	170	3.40	.198	170
Mostly White	**3.35**	.663	475	**4.20**	.608	480	**4.66**	.353	480	**3.26**	.842	478	**3.41**	.266	480
Blacks	4.04	.453	17	4.25	.584	17	4.77	.295	17	3.54	.639	17	2.96	.144	17
Whites	3.33	.656	458	4.20	.609	463	4.66	.355	463	3.25	.848	461	3.43	.263	463
Half W/B	**3.77**	.518	84	**3.93**	.657	84	**4.63**	.423	84	**3.69**	.764	84	**3.04**	.281	84
Blacks	3.82	.481	60	3.90	.645	60	4.59	.460	60	3.69	.723	60	2.99	.272	60
Whites	3.67	.601	24	4.00	.695	24	4.71	.305	24	3.69	.876	24	3.15	.270	24
Mostly Black	**3.84**	.650	75	**3.79**	.703	77	**4.76**	.314	77	**3.63**	.891	74	**2.88**	.384	77
Blacks	3.85	.559	69	3.78	.697	70	477	.308	70	3.60	.914	67	2.86	.365	70
Whites	3.75	1.412	6	3.86	.813	7	4.74	.399	7	3.89	.627	7	3.02	.643	7
All Black	**3.47**	.842	19	**3.65**	.904	19	**4.38**	.976	17	**3.79**	.925	18	2.88	.528	19
Blacks	3.47	.842	19	3.65	.904	19	4.38	.976	19	3.79	.925	18	2.88	.528	19
Whites		0			0			0			0			0	

white" category was arbitrarily selected as the reference group. The results of this analysis appear in Table 12.

One significant result emerged from this analysis, although the R^2 contribution was less than one-percent (.009). This group-level effect occurred with the student self-other perceptions of academic ability. The simple correlation coefficients reveal that black students report lower perceptions of ability ($r = -.139$) than whites and that students living in racially mixed or mostly black neighborhoods report lower perceptions than those in mostly white neighborhoods, not controlling for student race. After controlling for the individual-level covariates (race, PSTAT, PEECP) the neighborhood racial composition categories provided a weak, yet statistically significant contribution to these ability perceptions, with the "strongest" effect occurring between the mostly white- and all-white neighborhoods (the reference category).

A separate analysis of blacks and whites by the neighborhood racial composition was also conducted. Due to their small number of white subjects, the neighborhood racial categories of "mostly black" and "all black" were excluded from the analysis for whites. Likewise, the "all white" category was excluded from the analysis for blacks. The "all white" category served as a comparison group for whites, and the "mostly white" category acted as the reference group in the analysis for blacks.

This analysis showed no overall significant neighborhood racial composition effects for blacks. For whites, however, the neighborhood effect on student perceptions of academic ability recurred. The results of this analysis for whites appear in Table 13.

Note in Table 13, eliminating blacks from the analysis improved the R^2 contribution of the individual-level PSTAT and PEECP measures, and slightly reduced the strength of association partly attributable to the neighborhood units.

Table 12

An Exploration for Community Contextual Effects Using Neighborhood Racial Composition in a Multiple Regression Analysis of the Student Racial and Schooling Perception Variables

Dependent Variable: **Student Racial Attitudes (SRA)**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	.308	.308	.095	.095	.000
PSTAT	-.016	.324	.105	.010	.003
PRA	.515	.542	.294	.189	.000
All Black	.078	.543	.295	.001	.215
Half W/B	.166	.543	.295	.000	.271
M. White	-.138	.543	.295	.000	.715
M. Black	.192	.544	.296	.001	.299

$$F_{4,817} = \frac{(.296-.294) / (7-3)}{(1-.296) / (825-7-1)} = .580 \text{ NS}$$

Dependent Variable: **Student Self-Other Perceptions of Academic Ability (SOPA)**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.139	.139	.019	.019	.000
PSTAT	.256	.262	.069	.050	.000
PEECP	.638	.639	.409	.340	.000
All Black	-.068	.639	.409	.000	.393
Half W/B	-.124	.642	.412	.003	.894
M. White	.162	.645	.416	.004	.008
M. Black	-.069	.647	.418	.002	.053

$$F_{4,825} = \frac{(.418-.409) / (7-3)}{(1-.418) / (833-7-1)} = 3.189 \quad p<.05$$

Dependent Variable: **Student Future Aspirations (SFA)**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.197	.197	.039	.039	.000
PSTAT	.298	.314	.098	.059	.000
PEECP	.588	.599	.359	.260	.000
All Black	-.056	.500	.360	.001	.807
Half W/B	-.149	.602	.363	.003	.043
M. White	.136	.602	.363	.000	.746
M. Black	-.139	.602	.363	.000	.443

$$F_{4,822} = \frac{(.363-.359) / (7-3)}{(1-.363) / (830-7-1)} = 1.29 \text{ NS}$$

Table 12 continued

Dependent Variable: **Student Importance of Education (SIE)**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	.130	.130	.017	.017	.000
PSTAT	-.064	.132	.017	.000	.565
PIE	.366	.387	.150	.132	.000
All Black	-.045	3.90	.152	.002	.525
Half W/B	.070	.390	.152	.000	.289
M. White	-.052	.390	.152	.000	.581
M. Black	.125	.391	.153	.001	.332

$$F_{4,826} = \frac{(.153-.150) / (7-3)}{(1-.153) / (834-7-1)} = .731 \text{ NS}$$

Dependent Variable: **Student School Academic Climate (SSAC)**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.065	.065	.004	.004	.060
PSTAT	.099	.104	.011	.007	.019
PPSQ	.180	.223	.049	.038	.000
All Black	-.072	.230	.053	.004	.304
Half W/B	.047	.239	.057	.004	.121
M. White	.011	.239	.057	.000	.877
M. Black	-.053	.239	.057	.000	.849

$$F_{4,820} = \frac{(.057-.049) / (7-3)}{(1-.057) / (828-7-1)} = 1.739 \text{ NS}$$

Dependent Variable: **Student Sense of Control (SSC)**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
Race	-.062	.063	.004	.004	.070
PSTAT	.054	.071	.005	.001	.330
PEECP	.296	.302	.091	.086	.000
All Black	-.103	.310	.096	.005	.042
Half W/B	-.025	.311	.097	.001	.641
M. White	.035	.311	.097	.000	.582
M. Black	-.027	.311	.097	.000	.833

$$F_{4,821} = \frac{(.097-.091) / (7-3)}{(1-.097) / (829-7-1)} = 1.304 \text{ NS}$$

Table 13

An Exploration for Community Contextual Effects Using Neighborhood Racial Composition in a Multiple Regression Analysis of White Students' Self-Other Perceptions of Academic Ability

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Dependent Variable: **Student Self-Other Perceptions of Academic Ability**

Variables	Simple r	Multiple R	R^2	R^2 Added	Prob.
PSTAT	.220	.220	.048	.048	.000
PEECP	.669	.670	.448	.400	.000
M. White	.109	.675	.456	.008	.006
Half W/B	-.070	.675	.456	.000	.884

$$F_{4,653} = \frac{(.456-.448) / (4-2)}{(1-.456) / (658-4-1)} = 4.801 \quad p<.01$$

This separate analysis shows that differences in neighborhood racial mix, specifically white vs. mostly white units, adds a small (R^2 = .008) contribution to a student's academic ability perceptions. Despite this extremely weak effect, it was significant at the .01 level; a testimony to the fact that a large sample size can detect very small effects.

In sum, the context of neighborhood racial composition only demonstrated one statistically significant, yet very weak effect. This effect on student self-other perceptions of academic ability held only for whites, not blacks. We reintroduce this relationship into the contextual analysis portion of this investigation.

C. Former District and Neighborhood Racial Composition

In further exploring community effects on the individual-level student perception variables and as a sidelight to this analysis, the former district and neighborhood racial composition categories were cross-classified to create a new set of contextual identifiers. We thought these classifications might add specificity to the community identifiers by dividing districts into neighborhood racial groups. These groupings appear in Table 14. The black respondents were predominately grouped in District I and most were living in racially mixed or predominately black neighborhoods (these numbers appear in bold type). In contrast, most of the whites lived in Districts III, IV, and V, in all white or mostly white neighborhoods (numbers in bold).

These two major groupings were used to separately test for blacks and whites, the combined effects of district and neighborhood racial composition on each of the student perception measures. Neither analysis showed any significant group-level effects. Adding further specification to the community parameters, in

Table 14

The Distribution of Blacks and Whites Within Former School District by Their Neighborhood Racial Composition

		Neighborhood Racial Composition				
		All White	Mostly White	Half White/Black	Mostly Black	All Black
District I	B	0	4	**41**	**57**	**14**
	W	1	9	6	5	1
District II	B	0	1	7	9	2
	W	2	9	7	1	0
District III	B	1	2	6	2	1
	W	**40**	**104**	0	0	0
District IV	B	1	9	4	2	1
	W	**67**	**285**	10	1	5
District V	B	0	1	2	2	1
	W	**63**	**55**	1	0	2

this case, did not provide any additional contribution to the individual-level student perceptions.

D. Former School

The final exploratory analysis used the student's former school as a community identifier. The CUD project identified and coded the school a student attended the previous year, prior to desegregation. In using this code as a community identifier, we assumed that students previously attended neighborhood schools, and that these schools provided an approximation of neighborhood or community boundaries. Importantly, the neighborhood school often serves as a forum for community involvement and neighborhood participation.

To control for age and grade level effects, the schools were grouped into elementary (4-6), junior high (7-8), and senior high (9-12) levels. Eight elementary, six junior high, and five senior high schools had a sufficient student sample size (n>10)for this analysis. The first school at each level was used as the reference category in the dummy coding of the schools. The results of this analysis appear in Table 15.

Overall, using the former school as a community identifier failed to provide any statistically significant group-level effects on student race and schooling perceptions, although in some cases, the group-level contributions were stronger than the former district and neighborhood racial composition effects. In particular, note the high school contributions on student racial attitudes and the school academic climate measures. These results failed to reach significance, largely due to the group size. Complying with probability criterion level of .05, we must conclude that this identifier insufficiently tapped community effects on student perceptions. We should note that, even in those cases where the effects

Table 15

An Exploration for Community Contextual Effects Using Former School Code in a Multiple Regression Analysis of the Student Racial/Schooling Perception Variables

Grades 4-6

Dependent Variable: Student Racial Attitudes

Var.	r	R^2	R^2Add	Prob.
Race	.026	.026	.026	.029
PSTAT	.009	.035	.009	.202
PRA	.184	.219	.184	.000
S7	.023	.241	.023	.072
S4	.001	.243	.001	.791
S3	.007	.250	.007	.101
S6	.009	.259	.009	.101
S2	.002	.261	.002	.913
S8	.001	.262	.001	.389
S5	.004	.266	.004	.321

$F_{7,171} = \frac{(.266-.219)/(10-3)}{(1-.266)/(182-10-1)} = 1.56$ NS

Dependent Variable: Student Self-Other Perceptions of Academic Ability

Var.	r	R^2	R^2Add	Prob.
Race	-.223	.050	.050	.002
PSTAT	.328	.119	.069	.000
PEECP	.638	.427	.307	.000
S8	-.048	.430	.004	.853
S2	.028	.433	.003	.194
S3	.018	.433	.000	.462
S6	.031.	434	.001	.544
S7	.102	.435	.002	.340
S4	-.085	.435	.000	.895
S5	.017	.439	.004	.295

$F_{7,173} = \frac{(.439-.430)/(10-3)}{(1-.439)/(184-10-1)} = .396$ NS

Grades 7-8

Var.	r	R^2	R^2Add	Prob.
Race	.338	.114	.114	.000
PSTAT	-.124	.115	.001	.683
PRA	.538	.323	.208	.000
S2	-.046	.326	.003	.737
S4	-.017	.326	.000	.354
S6	-.014	.327	.001	.826
S3	.018	.327	.000	.677
S5	.070	.340	.013	.056

$F_{5,185} = \frac{(.340-.323)/(8-3)}{(1-.340)/(194-8-1)} = .953$ NS

Var.	r	R^2	R^2Add	Prob.
Race	-.056	.003	.003	.435
PSTAT	.244	.063	.060	.001
PEECP	.586	.344	.281	.000
S6	.035	.346	.002	.463
S2	-.040	.352	.006	.368
S4	-.083	.353	.001	.580
S3	.160	.353	.000	.577
S5	-.016	.354	.001	.655

$F_{5,186} = \frac{(.354-.344)/(8-3)}{(1-.354)/(195-8-1)} = .576$ NS

Grades 9-12

Var.	r	R^2	R^2Add	Prob.
Race	.275	.076	.076	.000
PSTAT	.032	.091	.015	.048
PRA	.496	.271	.180	.000
S2	.010	.271	.000	.329
S4	-.012	.271	.000	.394
S5	.103	.274	.003	.598
S3	-.239	.297	.022	.007

$F_{4,231} = \frac{(.297-.271)/(7-3)}{(1-.297)/(239-7-1)} = 2.14$ NS

Var.	r	R^2	R^2Add	Prob.
Race	-.052	.003	.003	.425
PSTAT	.232	.054	.051	.000
PEECP	.717	.515	.461	.000
S2	.027	.517	.002	.553
S4	.018	.520	.003	.461
S5	.060	.520	.000	.696
S3	-.133	.520	.000	.666

$F_{4,233} = \frac{(.520-.515)/(7-3)}{(1-.520)/(241-7-1)} = .607$ NS

Table 15 continued

Grades 4-6					Grades 7-8					Grades 9-12				
Dependent Variable: Student Future Aspirations														
Var.	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**
Race	-.341	.117	.117	.000	Race	-.122	.015	.015	.090	Race	-.064	.004	.004	.325
PSTAT	.290	.147	.030	.012	PSTAT	.311	.097	.082	.000	PSTAT	.315	.010	.097	.000
PEECP	.495	.298	.151	.000	PEECP	.583	.349	.252	.000	PEECP	.699	.498	.397	.000
S8	-.068	.305	.007	.098	S6	-.081	.355	.006	.064	S2	-.037	.398	.000	.278
S2	-.004	.305	.000	.658	S2	.045	.355	.000	.415	S4	.032	.499	.001	.418
S3	.040	.305	.000	.655	S3	-.198	.366	.011	.050	S3	-.226	.514	.015	.030
S6	-.052	.307	.002	.265	S4	.246	.371	.004	.483	S5	.186	.514	.000	.796
S7	-.013	.315	.008	.110	S5	.121	.383	.012	.064					
S4	.020	.316	.001	.990										
S5	-.029	.322	.006	.264										
$F_{7,172} = \frac{(.322-.298)/(10-3)}{(1-.322)/(183-10-1)} = .869$ NS					$F_{5,184} = \frac{(.383-.349)/(8-3)}{(1-.383)/(193-8-1)} = 2.138$ NS					$F_{4,232} = \frac{(.514-.498)/(7-3)}{(1-.514)/(240-7-1)} = 1.909$ NS				
Dependent Variable: Student Importance of Education														
Var.	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**
Race	-.007	.000	.000	.928	Race	.255	.065	.065	.000	Race	.228	.052	.052	.000
PSTAT	.090	.009	.009	.203	PSTAT	-.064	.068	.003	.435	PSTAT	-.040	.053	.001	.612
PIE	.114	.024	.015	.094	PIE	.321	.151	.083	.000	PIE	.268	.111	.058	.000
S7	-.053	.027	.003	.246	S2	-.076	.152	.001	.343	S4	.098	.117	.006	.082
S4	-.132	.048	.021	.049	S6	.074	.152	.000	.582	S2	.145	.136	.019	.032
S2	.098	.051	.010	.795	S4	-.007	.153	.001	.443	S5	-.029	.143	.007	.287
S3	.052	.054	.003	.869	S3	-.074	.154	.001	.444	S3	-.065	.143	.000	.872
S6	.032	.054	.000	.687	S5	.118	.157	.003	.456					
S8	-.075	.063	.009	.166										
S5	-.012	.065	.002	.567										
$F_{7,173} = \frac{(.065-.024)/(10-3)}{(1-.065)/(184-10-1)} = 1.08$ NS					$F_{5,188} = \frac{(.157-.151)/(8-3)}{(1-.157)/(196-8-1)} = .268$ NS					$F_{4,233} = \frac{(.143-.111)/(7-3)}{(1-.143)/(241-7-1)} = 2.175$ NS				

Table 15 continued

Grades 4-6					Grades 7-8					Grades 9-12				
Dependent Variable: Student School Academic Climate														
Var.	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**
Race	-.121	.015	.015	.105	Race	.038	.001	.001	.497	Race	.006	.000	.000	.926
PSTAT	.144	.026	.011	.151	PSTAT	.160	.039	.038	.007	PSTAT	.100	.012	.012	.098
PPSQ	.063	.033	.007	.248	PPSQ	.088	.040	.011	.147	PPSQ	.230	.067	.055	.000
S2	.010	.033	.000	.662	S2	.042	.052	.002	.150	S2	-.022	.068	.001	.905
S4	-.111	.045	.011	.471	S6	.001	.052	.000	.454	S4	-.097	.073	.005	.523
S8	.076	.048	.003	.304	S4	.056	.064	.012	.040	S3	-.119	.089	.016	.434
S7	-.100	.056	.008	.406	S3	.099	.080	.016	.064	S5	.184	.101	.012	.075
S6	.106	.065	.009	.141	S5	.010	.082	.002	.535					
S3	.108	.074	.009	.193										
S5	-.023	.074	.000	.767										
$F_{7,171} = \frac{(.074-.033)/(10-3)}{(1-.074)/(182-10-1)} = 1.08$ NS					$F_{5,183} = \frac{(.082-.050)/(8-3)}{(1-.082)/(192-8-1)} = 1.276$ NS					$F_{4,232} = \frac{(.101-.067)/(7-3)}{(1-.101)/(240-7-1)} = 2.194$ NS				
Dependent Variable: Student Sense of Control														
Var.	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**
Race	-.025	.000	.000	.742	Race	-.081	.007	.007	.261	Race	-.062	.000	.000	.974
PSTAT	.116	.014	.014	.122	PSTAT	.064	.008	.001	.664	PSTAT	.020	.000	.000	.756
PEECP	.245	.066	.052	.002	PEECP	.301	.099	.098	.000	PEECP	.323	.112	.112	.000
S8	.026	.066	.000	.268	S6	.149	.123	.024	.107	S2	.121	.129	.007	.241
S2	.055	.072	.006	.126	S2	-.073	.129	.006	.297	S4	-.109	.135	.006	.186
S3	.161	.106	.034	.008	S4	-.027	.129	.000	.884	S5	.031	.135	.000	.926
S6	.026	.108	.002	.442	S3	.065	.130	.001	.949	S3	-.089	.138	.003	.394
S7	-.015	.108	.000	.760	S5	-.177	.133	.002	.390					
S4	-.099	.109	.001	.999										
S5	-.007	.115	.006	.293										
$F_{7,172} = \frac{(.115-.066)/(10-3)}{(1-.115)/(183-10-1)} = 1.36$ NS					$F_{5,185} = \frac{(.133-.099)/(8-3)}{(1-.133)/(194-8-1)} = 1.451$ NS					$F_{4,233} = \frac{(.138-.112)/(7-3)}{(1-.138)/(241-7-1)} = 1.757$ NS				

nearly reached statistical significance, the community-level effects remained relatively weak, particularly in comparison to the individual-level perceptions.

A separate analysis for whites, using the school as the community identifier, also failed to identify significant group-level effects on these student race and schooling perceptions. An insufficient number of black students within these schools made it infeasible to analyze their data separately.

DISCUSSION AND COMMENTS

Before turning to the exploratory analysis for school effects on student achievement, a few points emerging from the community analysis deserve comment. In general, the community identifiers failed to detect group-level effects on student race and schooling perceptions. The contributions of those identifiers demonstrating statistically significant effects were exceptionally small, between one- and three-percent. In sum, these community identifiers added essentially no additional explanation to the child's perceptions, over and above the individual-level effects of parent perceptions.

These results suggest, in part, that the parameters used to identify communities lacked specificity and precision. Census tract information or the resident's perceptions of these boundaries might dramatically improve the estimates of these community parameters. Such specific identifiers might produce more variability between communities on the parent and student perception measures than evidenced here.

A number of methodological issues appear in these analyses. Adding interaction terms possibly would have detected additional, nonadditive group-level effects, although the "main effects" approach used suggests that these effects would be small. Recall that the procedure followed here assumed a common slope

for all groups and that group differences reflected differences in the intercept terms of the group regression lines.

A second issue concerns the model for evaluating group-level effects. Although we followed the recommended procedure that compares the R^2 values of the reduced and complete models, this procedure treats the groups comprising the treatment levels of the dummy variable as separate variables. This procedure may tend to show significant group effects for models using a small number of groups that demonstrate weak effects, and tend to diminish these effects in models using several groups, when indeed some of the groups show rather "strong" effects. In the latter case, this procedure tempts the researcher to exclude the "no effect" groups from the calculation of the R^2 differences between the models. Such post hoc manipulation of the results, though tempting, slant the analysis toward demonstrating group-level effects.

A further comment about significance testing deserves mention. We should recognize that the sheer number of tests conducted probably maximized the chances of finding significant, group-level effects. In a sense, we used the community parameters in several iterations sufficient to detect such effects. Although we must reemphasize the exploratory nature of this analysis, chance alone suggests we might expect to find at least two significant community effects.

In examining these community-level effects further in the contextual analysis, we retain these original groupings with the recognition that some of these groups will not contribute significant group-level effects. Excluding these groups would change the fit of the dummy-covariate model and preclude a comparison among the analytic techniques, a comparison essential to this investigation.

Having explored the various community identifiers for their potential group-level effects, the final part of this exploratory analysis turns to the investigation of the school-level effects on student academic achievement. At the conclusion of

this school analysis, we will return for a closer examination of the significant community and school effects detected in the exploratory component. A reanalysis using the Boyd and Iverson single equation technique will then be conducted on these community and school variables to possibly identify the source(s) of these contextual effects. The final section of this chapter uses the results of these analyses to evaluate the research questions focusing on the additional effects of the community and school contexts on individual-level attitudes, and to evaluate the analytic techniques used to detect and specify the sources of these contextual effects.

School Effects

This stage of the analysis seeks to detect the additional contribution the school as a context provides in the explanation of variation in student achievement, beyond the effects of the individual-level relationship between student perceptions and student achievement. In the case of school effects, two students having the same score on the perception variable but attending different schools, would on the average, have different scores on achievement. The differences observed by schools would suggest the presence of some undifferentiated school effect on individual achievement. This exploratory analysis tests for school effects by regressing the student achievement scores on the individual-level predictors (race, social status, SOPA), followed by the school variables coded as a set of dummy vectors.

This analysis separately tests two school identifiers, school code, and attendance area. The first analysis codes the school identification numbers into a set of dummy variables and systematically checks for school effects at the elementary, junior high, and senior high school levels. Attendance area groups the

schools into three regions. The group-level effects of these regions on student achievement are tested at these three grade divisions (4-6, 7-8, 9 and 12).

A. Schools

Seven elementary, five junior high, and five senior high schools had a sufficient sample size (N > 10) to be included in this investigation. The means on achievement and the predictors (PSTAT, SOPA) by race for each school appears in Table 16.

A comparison of the schools within the grade divisions shows that these schools differ in their average achievement percentiles; a difference of nearly 18 points for the highest and lowest achieving elementary schools, 21 percentile points for junior high schools, and for senior high, an average 27 point spread. Blacks and whites differ dramatically in their academic achievement within schools. The limited number of black students per school makes a separate analysis for them impractical.

The schools also show variability in the PSTAT and SOPA measures. A comparison of the averages on these variables with the averages on achievement does not provide a clear relational pattern upon simple inspection.

The results of the exploratory analysis for school contextual effects appear in Table 17. This table divides the schools into three grade level classifications. The schools presented in Table 17 appear as indicator variables (S1, S2, S3, etc.). The school with the highest average achievement score within a grade level classification (see Table 17) served as the reference group, i.e., schools, 158, 370, and 196, in dummy coding.

Table 17 reveals that the school context showed a significant effect for students at the senior high school (9-12) only. Collectively, these high schools contributed an additional 4.8 percent statistical explanation to the student's

Table 16

Black and White Students' Mean Scores on Achievement, Social Status and Self-Other Perceptions of Academic Ability for the Selected Elementary, Junior High and Senior High Schools

School		Grades 4-6 ACH	PSTAT	SOPA	N	School		Grades 7-8 ACH	PSTAT	SOPA	N	School		Grades 9-12 ACH	PSTAT	SOPA	N
	T	83.12	3.48	4.30	26		T	74.89	3.41	4.12	54		T	80.11	3.44	4.07	45
158	B	43.67	2.89	3.94	3	176	B	48.20	3.08	4.05	5	196	B	67.00	2.58	4.33	2
	W	88.26	3.55	4.35	23		W	77.61	3.44	4.13	49		W	80.72	3.48	4.05	43
	T	65.60	3.16	4.19	15		T	79.43	3.51	4.24	28		T	74.26	3.43	4.07	43
256	B	39.00	2.25	3.67	2	270	B	21.00	2.42	3.17	2	294	B	69.00	3.33	4.83	1
	W	69.69	3.30	4.27	13		W	83.92	3.60	4.32	26		W	74.38	3.44	4.06	42
	T	73.65	3.29	4.33	17		T	83.34	3.60	4.47	32		T	65.26	3.06	4.01	50
258	B				0	370	B	25.00	2.83	3.42	2	390	B	44.46	2.78	3.83	13
	W	73.65	3.29	4.33	17		W	87.23	3.65	4.54	30		W	72.57	3.16	4.07	37
	T	74.32	3.54	4.18	22		T	62.83	3.03	4.12	18		T	53.15	3.26	3.99	34
350	B	11.33	2.83	3.56	3	372	B	31.33	2.61	3.78	3	392	B	25.14	2.89	4.19	7
	W	84.26	3.62	4.29	19		W	69.13	3.12	4.19	15		W	60.41	3.35	3.94	27
	T	73.52	3.15	4.48	29		T	68.18	3.14	4.10	22		T	77.77	3.53	4.28	63
352	B	34.00	2.83	4.08	4	376	B	42.50	2.65	3.7	4	394	B	33.50	3.08	4.50	2
	W	79.84	3.21	4.54	25		W	73.89	3.25	4.17	18		W	79.21	3.55	4.27	61
	T	75.50	3.19	4.38	18												
362	B	71.50	3.04	4.13	4												
	W	76.64	3.24	4.45	14												
	T	78.48	3.51	4.41	25												
364	B	55.67	2.83	4.33	3												
	W	81.59	3.62	4.42	22												

Table 17

An Exploration for School Contextual Effects Using School Code in a Multiple Regression Analysis of Student Academic Achievement for Blacks and Whites, and for White Students Only

Dependent Variable: Student Academic Achievement

Grades 4-6					Grades 7-8					Grades 9-12				
Var.	r	R^2	R^2Add	Prob.	Var.	r	R^2	R^2Add	Prob.	Var.	r	R^2	R^2Add	Prob.
Race	-.426	.181	.181	.000	Race	-.560	.328	.328	.000	Race	-.411	.169	.169	.000
PSTAT	.374	.241	.060	.001	PSTAT	.464	.394	.066	.000	PSTAT	.338	.212	.043	.002
SOPA	.550	.431	.190	.000	SOPA	.497	.487	.093	.000	SOPA	.481	.498	.286	.000
S2	-.130	.435	.004	.043	S1	.018	.487	.000	.702	S2	.040	.498	.000	.096
S6	-.002	.436	.001	.355	S4	-.194	.495	.008	.146	S4	-.277	.532	.034	.000
S3	-.028	.439	.003	.051	S5	-.080	.495	.000	.960	S5	.145	.540	.008	.012
S4	.015	.439	.000	.266	S2	-.116	.496	.001	.632	S3	-.132	.546	.006	.112
S7	.022	.441	.002	.093										
S5	-.040	.457	.016	.035										

$$F_{6,138} = \frac{(.457-.431)/(9-3)}{(1-.457)/(148-9-1)} = 1.101 \text{ NS}$$

$$F_{4,138} = \frac{(.496-.487)/(7-3)}{(1-.496)/(146-7-1)} = .6161 \text{ NS}$$

$$F_{4,223} = \frac{(.546-.498)/(7-3)}{(1-.546)/(231-7-1)} = 5.894 \quad p<.01$$

White Students

Var.	r	R^2	R^2Add	Prob.	Var.	r	R^2	R^2Add	Prob.	Var.	r	R^2	R^2Add	Prob.
PSTAT	.232	.054	.054	.008	PSTAT	.317	.100	.100	.000	PSTAT	.189	.036	.036	.006
SOPA	.551	.319	.265	.000	SOPA	.478	.263	.162	.000	SOPA	.619	.388	.352	.000
S2	-.106	.324	.005	.002	S1	.098	.265	.002	.953	S2	-.017	.388	.000	.089
S6	-.151	.337	.003	.012	S4	-.115	.266	.001	.358	S4	-.240	.417	.028	.000
S3	-.048	.344	.007	.037	S5	-.196	.384	.018	.105	S3	-.046	.420	.004	.040
S4	.006	.350	.006	.069	S2	-.027	.384	.000	.797	S5	.113	.433	.013	.030
S7	.069	.351	.001	.510										
S5	.003	.376	.025	.030										

$$F_{6,121} = \frac{(.376-.319)/(8-2)}{(1-.376)/(130-8-1)} = 1.842 \text{ NS}$$

$$F_{4,124} = \frac{(.284-.263)/(6-2)}{(1-.284)/(131-6-1)} = .909 \text{ NS}$$

$$F_{4,200} = \frac{(.433-.388)/(6-2)}{(1-.433)/(207-6-1)} = 3.968 \quad p<.01$$

academic achievement beyond the individual-level effects of race, social status, self-other perceptions of academic ability. School 392 provided most of this group-level effect (3.4%). According to Table 16, this school compared to the other high schools, on the average, had the lowest scores on academic achievement (both blacks and whites) and academic ability perceptions, and ranked second to the lowest in student social status among the five high schools.

At this point, it remains uncertain whether the differences just observed among these high schools are attributable at an aggregate level to race, social status, ability perceptions or a combination of these factors. This is an example of measuring undifferentiated group effects for which the Boyd and Iverson model should demonstrate its utility in identifying these effects. This analysis returns to this point with the completion of the remaining exploration for contextual effects.

A separate analysis for whites on these same schools appears in the bottom half of Table 17. These results essentially duplicate the previous analyses for blacks and whites. The elementary and junior high schools showed no significant school effects on individual-level student achievement. The effect between schools reappeared at the senior high level. The R^2 contribution of these schools remained relatively unchanged. The SOPA variable showed a 10 percent improvement in the R^2 coefficient at the individual level. This latter effect is attributable to the stronger relationship between the SOPA measure and student achievement for whites compared to blacks.

A closer examination of these high school level effects for blacks and whites, and separately for whites, follows the conclusion of this exploration section. The final component of this section tests for school effects, using school attendance area.

B. School Attendance Area

This identifier groups schools into four major areas according to the lines of demarcation established with the school desegregation of New Castle County. The fourth attendance area was not included in this analysis due to an insufficient number of cases. Attendance Areas 1 through 3 include all students with complete achievement, social status, and ability perceptions data.

Schools within an attendance area were classified into three major grade divisions: elementary (4-6), junior high (7-8), and senior high (9-12). This classification yielded 197 elementary, 158 junior high, and 272 senior high school students with complete data for this analysis.

Table 18 presents the mean scores of black and white students on achievement, social status , and academic ability perceptions for these attendance areas by grade division. Examining across attendance areas and grade levels, AAI, in general, shows the highest average achievement and social status scores. This group was treated as the reference category in the dummy coding of attendance areas.

The results of the exploratory analysis using attendance area as the contextual identifier appear in Table 19. This analysis yielded results similar to the findings for school effects. Specifically, attendance area failed to demonstrate statistically significant group-level effects on elementary and junior high student academic achievement. This identifier did, however, detect a small effect on student achievement at the senior high level. The additional R^2 contribution only amounted to 1.2 percent. The large number of cases for this analysis improved the likelihood of detecting this small effect, particularly noticeable when comparing this effect to the elementary and junior high results.

Table 18

The Means and Standard Deviations of Blacks and Whites on Achievement, Social Status, and Self-Other Perceptions of Academic Ability by School Attendance Area

	AAI			AAII			AAIII		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
Attendance Area: **Elementary (Grades 4-6)**									
ACH	**75.88**	25.95	41	**69.97**	26.50	39	**76.08**	25.26	117
B	50.83	27.47	12	31.75	12.84	4	48.41	31.23	17
W	86.24	16.89	29	74.34	24.06	35	80.78	20.89	100
PSTAT	**3.67**	.506	41	**3.26**	.578	39	**3.34**	.570	117
B	3.06	.468	12	2.73	.755	4	2.92	.553	17
W	3.50	.470	29	3.32	.534	35	3.41	.544	100
SOPA	**4.38**	.624	41	**4.33**	.517	39	**4.39**	.477	117
B	4.29	.591	12	4.21	.750	4	4.16	.297	17
W	4.41	.643	29	4.34	.497	35	4.43	.491	100
Attendance Area: **Junior High (Grades 7-8)**									
ACH	**73.31**	23.67	39	**70.20**	30.35	35	**69.63**	27.26	84
B	52.00	21.54	9	32.50	25.26	8	34.54	24.23	13
W	79.70	20.57	30	81.37	21.61	27	76.06	22.58	71
PSTAT	**3.35**	.432	39	**3.32**	.655	35	**3.29**	.544	84
B	3.11	.546	9	2.66	.249	8	2.64	.490	13
W	3.42	.373	30	3.52	.609	27	3.41	.464	71
SOPA	**4.12**	.578	39	**4.22**	.624	35	**4.23**	.578	84
B	4.15	.466	9	3.93	.675	8	3.81	.466	13
W	4.12	.565	30	4.31	.593	27	4.31	.565	71

Table 18 continued

	AAI			AAII			AAIII		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
Attendance Area: **Senior High (Grades 9-12)**									
ACH	**72.57**	26.96	72	**62.86**	29.92	57	68.26	25.88	143
B	39.69	25.55	13	23.42	21.27	12	38.19	25.52	21
W	79.81	21.42	59	73.38	22.11	45	73.43	22.23	122
PSTAT	**3.36**	.543	72	**3.34**	.505	57	**3.31**	.526	143
B	2.79	.491	13	2.94	.516	12	2.84	.528	21
W	3.48	.473	59	3.45	.450	45	3.39	.483	122
SOPA	**4.09**	.630	72	**4.03**	.540	57	**4.13**	.551	143
B	4.01	.738	13	4.00	.599	12	3.99	.579	21
W	4.11	.598	59	4.03	.530	45	4.16	.545	122

Table 19

An Exploration for School Contextual Effects Using Attendance Areas in a Multiple Regression Analysis of Student Academic Achievement for Blacks and Whites, and for White Students Only

Dependent Variable: **Student Academic Achievement**

Grades 4-6					Grades 7-8					Grades 9-12				
Var.	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**
Race	-.483	.234	.234	.000	Race	-.565	.319	.319	.000	Race	-.558	.311	.311	.000
PSTAT	.349	.278	.044	.001	PSTAT	.493	.385	.066	.000	PSTAT	.404	.348	.037	.000
SOPA	.480	.422	.144	.000	SOPA	.512	.502	.117	.000	SOPA	.533	.558	.210	.000
AA3	.059	.422	.000	.262	AA2	-.009	.502	.000	.299	AA2	.103	.560	.002	.026
AA2	.094	.436	.014	.030	AA3	-.041	.514	.012	.055	AA3	-.000	.570	.010	.017

$$F_{2,191} = \frac{(.436-.422)/(5-3)}{(1-.436)/(197-5-1)} = 2.37 \text{ NS}$$

$$F_{2,152} = \frac{(.514-.502)/(5-3)}{(1-.514)/(158-5-1)} = 1.877 \text{ NS}$$

$$F_{2,266} = \frac{(.570-.558)/(5-3)}{(1-.570)/(272-5-1)} = 3.71 \quad p<.05$$

White Students

Var.	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**	**Var.**	**r**	**R^2**	**R^2Add**	**Prob.**
PSTAT	.236	.056	.056	.002	PSTAT	.316	.100	.100		PSTAT	.213	.045	.045	.001
SOPA	.538	.306	.250	.000	SOPA	.519	.300	.200		SOPA	.616	.386	.340	.000
AA3	.024	.306	.000	.147	AA2	.079	.302	.002		AA2	.039	.386	.000	.184
AA2	.149	.326	.020	.032	AA3	-.101	.320	.018		AA3	-.018	.405	.019	.008

$$F_{2,159} = \frac{(.326-.306)/(4-2)}{(1-.326)/(164-4-1)} = 2.359 \text{ NS}$$

$$F_{2,123} = \frac{(.320-.300)/(4-2)}{(1-.320)/(128-4-1)} = 1.809 \text{ NS}$$

$$F_{2,221} = \frac{(.405-.386)/(4-2)}{(1-.405)/(226-4-1)} = 3.529 \quad p<.05$$

A separate analysis for whites, the results of which appear in the bottom half of Table 19, showed similar findings. No attendance area effects resulted from the analysis of elementary and junior high white students. The overall R^2 was significantly reduced with the removal of the race variable for students at the senior high school level, yet the attendance area identifier maintained its contribution to the explanation of individual-level achievement. Again, the effect was quite small (R^2 = .019).

The above results showed that attendance area provided a small group-level effect on student achievement, and only at the senior high level. We speculate that this effect is actually attributable to the school effect detected earlier, in that this identifier includes the effect of these schools and the additional number of schools having less than 10 student respondents. Unfortunately, it is not possible to disentangle the school effect from the attendance area effect to address this speculation. Given that these identifiers are not independent and that the school effect showed a stronger R^2 contribution than attendance area, further contextual analyses use the school as the identifying unit.

In summary, this analysis demonstrated that the elementary and junior high schools provided no significant group-level effects on student achievement, either at the school or attendance area level. For senior high students, however, the particular school they attended affected their achievement beyond the effects of their individual-level perceptions and demographic characteristics (i.e., race and social status). Adding more schools (students) to this analysis to test for school attendance area effects reduced this school effect. Further school analyses use the school as the contextual unit in differentiating group and individual effects on student achievement.

DISCUSSION AND COMMENTS

Again, we observed that the social context provided only a small contribution to an individual-level criterion measure, in this case, student achievement. Primarily this group-level effect resulted from a comparison between a high vs. a low achieving school, relatively speaking. These results suggest, in part, that comparing several high achieving schools with several low achieving schools might intensify this school-level effect. These results further suggest that the school adequately provides a social context for identifying group-level effects on student achievement, particularly when we compare these results to those produced by school attendance area as the contextual unit.

Realistically, the attendance areas covered broad geographical regions that included many schools represented by an extremely small number of students per school. Both exploratory analyses would have benefited from a larger number of students within each school. Such limited numbers increase the likelihood of producing unstable estimates of individual- and particularly group-level effects.

MULTILEVEL CONTEXTUAL ANALYSIS

Introduction

In this final stage of analysis, the Boyd and Iverson (1979) contextual analysis technique is used to identify and differentiate the individual- and group-level effects among the variables found significantly related in the exploratory analysis. This technique assigns group-level scores, derived from individual-level data, to the respective contextual identifiers. With a series of independent and dependent variable transformations designed to remove the correlation between the group-and individual-level variables, we assess the unique contribution each level contributes

toward the statistical explanation of the variation in the criterion measure of interest.

We compare four analytic techniques in this contextual analysis. First, the results of the dummy variable analysis are reintroduced. These results are compared to the R^2 fit of a regression model in which the group means of the predictors, assigned to the individuals within each contextual unit (e.g., a district) replace the dummy variables. This model uses these group means to identify the source(s) of the undifferentiated group-level effects detected with the dummy variable technique. The individual- and group-level variables are correlated in this model because the group means are derived from individual scores within a group.

In the third model, we adjust the individual and group <u>independent</u> variables, expressing the individual-level scores as deviations from the specific within- group means, and the group-level scores as deviations of these group means from the overall mean of the predictor variable. This procedure removes the shared variation between the individual and group predictors, such that the deviations represent the unique portions attributable to the individual- and group-level variables of the regression analysis using these adjusted independent variables. The results are compared to the respective dummy variable and the "unadjusted" independent variable analyses.

The fourth and final analysis compares these results to the R^2 fit of the model developed by Boyd and Iverson (1979). In addition to adjusting the independent variables as just described, the <u>dependent</u> variable is transformed as a function of its deviation from the product of the within-group regression coefficient and within-group mean of each predictor ($Y' = Y - b\bar{X}$). Boyd and Iverson contend that this procedure preserves the within-group intercepts and slopes, enabling the researcher to partition the total explained regression sums of squares into the three unique parts, individual, group, and interaction effects. The

particular interest of this study focuses on comparing the R^2 contribution of each predictor using this model, to those provided by the other three models.

The exploratory contextual analysis yielded three contextual effects, two in the community and one in the school analysis. In the community study, the (former) school district where the parents resided, added a small amount of explanation to the students' future aspirations beyond the effects attributable to the race, social status, and academic expectations of their parents.

Neighborhood racial composition furnished the second community contextual effect. This identifier showed that the racial mix of a neighborhood affected the self-other perceptions of the students' academic abilities. As was the case for former district, this additional contribution was small.

When the blacks and whites were analyzed separately by former district, the contextual effect on student future aspirations held for the whites only and showed a significant R^2 improvement over the whole group analysis. A separate analysis for blacks and whites by neighborhood racial composition was complicated by the lack of white respondents living in mostly black and all black areas and blacks living in mostly white and all white areas. The neighborhood effect held only for the whites with no appreciable decrease in the R^2 contribution. In light of these results, it was decided to test these two community effects on the white respondents only. These analyses appear below.

The exploratory school contextual analysis revealed that the school the senior high student attended affected his/her academic achievement. This same relationship held for the white students with no significant decrease in the school R^2 attributable to school membership. A separate analysis for blacks was not possible. The school contextual analyses below first tests for whites separately, then for the whole group.

Community Effects

A. Former School District

The starting point for conducting this analysis involves determining the within-group means and regression coefficients of the predictors, and the grand means for the predictors. These values are necessary for adjusting the independent and dependent variables. Recall that the variables, parent social status (PSTAT) and parent expectations of the child's performance (PEECP), showed significant individual-level effects on student future aspirations (SFA). The first step in this analysis then is to regress each former district white students' future aspiration scores on these two predictors. These within-group regressions yield the within-group partial correlation coefficients and the means on these predictors.

The results of this within-group analysis appears in Table 20. This table presents the intercepts, means, and partial regression coefficients for each district, then the overall mean for the PSTAT and PEECP variables. This table contains the values required for assigning individual- and group-level scores. The intercept terms are provided largely for discussion.

Several aspects of Table 20 are noteworthy. Whites living in District II reported the lowest social status and parent expectation scores of the former districts. Consistent with the exploratory contextual analysis, the within-group partial regression coefficients show that the PEECP variable produces more unit change or effect in student future aspirations than PSTAT. Interestingly, however, the PSTAT measure shows a nearly equal effect with the PEECP variable for whites residing in District II. Such an effect suggests that the following contextual analysis of former district include interaction terms to test for unequal regression coefficients between districts. An examination of the intercept terms suggests that District II students differ the most in their level of future aspirations.

Table 20

The Within-Group Means and Partial Regression Coefficients (b) of the Parent Social Status, and Expectation Variables for Each Former School District[1]

		PSTAT			PEECP			
	a	$\bar{X}$	SD	b	$\bar{X}$	SD	b	N
District I	.854	3.23	.710	.053	3.98	.655	1.085	22
District II	1.005	2.98	.500	.627	3.67	.809	.703	19
District III	.818	3.48	.478	.157	4.16	.661	.820	143
District IV	.770	3.41	.498	.174	4.24	.573	.570	359
District V	.828	3.41	.487	.007	4.16	.637	.909	120
Grand $\bar{X}$		3.41	.535		4.18	.667		663

[1]Dependent measure is white Student Future Aspirations (SFA)

To begin this comparative analysis of the four models, refer to the entry labelled "Dummy Var." under the heading entitled "Technique" in Table 21. Reading across the row for this entry note that the dummy variable method accounted for nearly 39 percent (38.5%) of the variation in white students' future aspirations, with 2.6 percent of this effect attributable to the group-level effects of school district, and the remaining 36 percent divided between the individual-level predictors, social status (7.8%) and parent expectations (28.1%).

The next row entry in Table 21, labelled "unadjusted I.V.s", shows the effects of replacing the former district indicator variables with each district's average social status ($\overline{\text{PSTAT}}$) and parent expectation ($\overline{\text{PEECP}}$) values in the regression analysis of student future aspirations. Referring to these group values in Table 20, note that the PSTAT and PEECP variables each consist of five values, representing the district-level scores of these measures. Each variable is produced by assigning the group score of a given district to all members within that district. For example, the 22 individuals in District I received a $\overline{\text{PSTAT}}$ score of 3.23 and a $\overline{\text{PEECP}}$ score of 3.98 on these two group-level variables.

The regression analysis introduces these two group measures into the equation, after removing the individual-level effects of social status and parent expectations, to specify the source(s) of the group-level effects identified with the preceding dummy variable analysis. The label, "unadjusted I.V.s", denotes that this analysis did not attempt to remove the correlation between the individual- and group-level variables by adjusting them with the procedures used in the next analysis.

Reading across the row, note that this model produced an overall R^2 fit essentially identical to the dummy variable technique. Furthermore, the group-level variables largely reproduced the R^2 attributable to the district effects ($R^2 = .025$). This analysis included six two-way interaction terms, consisting of all

Table 21

A Comparison of Four Analytic Techniques Detecting the Contextual Effects of Former School District on White Student Future Aspirations

Technique	R^2	R^2+Interact.	R^2Context.	R^2Interact.	R^2Added				
					PSTAT	PEECP	$\overline{\text{PSTAT}}$	$\overline{\text{PEECP}}$	Interact.
Dummy Var.	.385		.026		.078	.281			
Unadjusted I.V.s	.384	.394	.025	.010	.078	.281	.025	.000	.010
Adjusted I.V.s	.384	.395	.063	.012	.058	.262	.061	.002	.012
Adjusted I.V.s-D.V.	.567	.593	.353	.025	.039	.176	.112	.241	.025

possible two-way combinations of the individual and group variables. These terms produced a combined one-percent R^2 contribution, a statistically nonsignificant effect ($F_{6, 652} = 1.793$ $p > .05$), indicating that the districts basically shared a common slope in their effects on student future aspirations.

Examining the respective R^2 contributions of the variables used in this model, note that the individual-level PSTAT and PEECP measures produced the identical effects seen in Table 10. Importantly, this model identified the group-level $\overline{\text{PSTAT}}$ measure as the sole source of the district effects on white students' future aspirations. Specifically, these results indicate that the differences between the average social status across districts make a small contribution in the students' future aspirations. The positive direction of the $\overline{\text{PSTAT}}$ regression coefficient (discussed below) suggests higher future aspirations vary directly with higher district social status. The nonsignificant interaction terms suggest this district-level effect varies uniformly across districts and that these group-level effects do not depend on the individual-level variables (i.e., the model demonstrates separate individual and group effects).

The correlation issues between the individual scores and the group means, considered as a drawback to using this model, did not present a problem in this analysis. The correlation between PSTAT and $\overline{\text{PSTAT}}$ was .170 and the correlation between PEECP and $\overline{\text{PEECP}}$ was .167. However, the correlation of .811 between the two group variables ($\overline{\text{PSTAT}}$, $\overline{\text{PEECP}}$) (see Appendix E, Table E-1) indicating that the two were nearly linear combinations of each other, presents more of a problem, complicating the interpretation of their separate contextual effects district on student aspirations.

In the multiple regression analysis, after the two individual-level predictors were entered, the unentered $\overline{\text{PSTAT}}$ measure showed a partial coefficient of .196 and $\overline{\text{PEECP}}$, a partial coefficient of .154, indicating that $\overline{\text{PSTAT}}$ had a stronger

effect on SFA than $\overline{PEECP}$. When $\overline{PSTAT}$ was entered into the equation, the unentered $\overline{PEECP}$ coefficient dropped to -.006, showing that the two variables largely competed for the same variation in the SFA measure.

In summary, this analysis revealed that assigning the average score of the predictors to individual parents residing within the specific school districts provided additional statistical explanation to their children's future aspirations, beyond the effects of the individual parents' social status and expectations for their children. At the school district level, the differences in parental social status positively affected student future aspiration levels. Statistically, this technique yielded results identical to an analysis that treated school districts as indicator variables, identifying the source of the group-level effects detected with the dummy variable technique.

The third analysis adjusted the independent individual- and group-level variables. The group means on PSTAT and PEECP for each district were subtracted from the individuals' scores within a district expressing them as deviations from the PSTAT and PEECP means (PSTAT - $\overline{PSTAT}$, PEECP - $\overline{PEECP}$). This procedure removes the portion of the variation the individual- and group-level variables share. The average of the transformed individual-level scores within a district becomes zero using this adjustment procedure. Table 22 presents the results of transforming individual and group variables. In addition, this procedure requires adjusting the group mean for each district, expressing it as a deviation from the grand mean of the predictor ($\overline{PSTAT}_k$ - $\overline{PSTAT}_g$; $\overline{PEECP}_k$ - $\overline{PEECP}_g$), making the average of the five means equal zero. Table 22 presents these group values before and after their adjustment. Each remainder, the group deviation score, represents the unique group "effect" of living in a particular district. Finally, a new set of six two-way interaction terms were calculated using the

Table 22

The Means and Zero-Order Correlations of the Unadjusted and Adjusted Variables Used in Former District Contextual Analysis of White Student Future Aspirations

Vars.	Unadjusted $\bar{X}$	Adjusted $\bar{X}$	Zero-Order Correlations with Student Future Aspirations		
			Unadjusted I.V.-D.V.	Adjusted I.V.	Adjusted I.V.-D.V.
SFA	4.050	.600	1.000		.871
PSTAT	3.411	.000	.279	.240	.197
PEECP	4.181	.000	.589	.559	.458
$\overline{\text{PSTAT}}$	3.411	.000	.249	.249	.335
$\overline{\text{PEECP}}$	4.181	.000	.230	.230	.558
PSTATxPEECP	14.355	.086	.528	-.115	-.108
PSTATx$\overline{\text{PSTAT}}$	11.641	.000	.305	-.030	-.024
PSTATx$\overline{\text{PEECP}}$	14.268	.000	.303	-.044	-.036
PEECPx$\overline{\text{PSTAT}}$	14.269	.000	.608	-.035	-.029
PEECPx$\overline{\text{PEECP}}$	17.494	.000	.600	-.109	-.089
$\overline{\text{PSTAT}}$x$\overline{\text{PEECP}}$	14.269	.007	.251	-.247	-.397

adjusted individual- and group-level variables. The results of these computations appear in Table 22.

The transformation of the individual- and group-level variables effectively removed the correlation between the predictor levels, witnessed in the zero-order correlation matrix for the adjusted and unadjusted variables appearing in Appendix E. Expressing the individual-level variables as deviational scores slightly decreased their zero-order correlations with the aspiration measure. Table 22 presents these coefficients for comparison in the columns labelled "Unadjusted I.V.-D.V." and Adjusted I.V.", denoting the transformation in these variables.

The multiple regression analysis, which first entered the adjusted individual-level variables, then the group-level variables, followed by the six interaction terms, yielded some interesting and slightly different results compared to the previous analyses. The row entry labelled "Adjusted I.V.s" in Table 21 displays the results of this analysis. Examining the R^2 entry, note that this model produced the same overall R^2 fit as the previous two models. The joint contribution of the interaction terms essentially remained the same, and statistically nonsignificant.

The major difference between the adjusted independent variable model and the other two techniques occurred in the measurement of the contextual effect. Comparatively, this model attributed nearly three times (R^2 = .063) the district-level effect on student aspirations as did the two previous techniques.

These results appear plausible on three criteria. First, the model left the overall R^2 fit relatively unchanged. Secondly, like the previous model, it attributed the contextual effect to district-level social status. Third, this group-level R^2 increase reflects a similar R^2 decrease in the two individual-level variables, suggesting that leaving these two measures unadjusted masked the group-level effect detected with the dummy variable and the unadjusted I.V. technique. Examining the R^2 contribution of each of the variables in Table 21, note

that these adjustments "shifted" approximately two-percent of the R^2 contribution from each individual-level predictor to the group-level predictors. In this sense, this procedure provided a better estimate of group effects relative to individual-level effects, similar to identifying "frog pond effects" (Burstein, 1980).

Given these considerations, we conclude that this model provided plausible estimates of individual- and group-level effects on student future aspirations. These results suggest that expressing the individual scores as deviations from the within-group measure may reveal stronger group-level effects than originally suspected.

In sum, this regression model which adjusted the independent variables to remove the correlation between the levels of measurement, provided a fit equal to the dummy variable and the unadjusted variable models. However, this model improved the R^2 contribution of the group-level variables by "partialling out" the group components previously masked in the individual-level predictors.

The fourth analytic technique requires that the dependent measure (Y) also be expressed as a set of deviational scores. To obtain the new Y (Y') values requires subtracting the product of the within-group regression coefficients and the within-group mean (Table 20) from the old Y coordinates (i.e., $Y' = Y - b\bar{X}$). This transformation completes the second-half of centering technique, proposed by Boyd and Iverson (1979), designed to relocate all the observations (x,y) such that the means of the explanatory variables equal zero and the dependent variable has new values. This technique purportedly centers the regression lines of each group on the Y axis while maintaining the integrity of the original within-group intercepts and slopes of these lines. The intent of the following analysis is to compare the results of this Boyd and Iverson (1979) technique to the previous models.

To transform the student future aspirations measure, an SPSS computer routine assigned the group specific partial regression coefficients and means of the

predictor variables to the individuals in the designated districts. A copy of this routine appears in Appendix F. This assignment procedure required 20 design statements (4 values x 5 districts). An additional parent predictor would require 30 (6x5) design statements in this assignment. Clearly, testing a large number of contextual units using several independent variables would make this assignment tedious and nearly intractable.

Following this assignment procedure, the next step involves the actual of adjustment of the dependent variable. To compute the new Y (Y') values, for individuals in District I for example, multiply that group's unadjusted mean for $\overline{PSTAT}$ by its partial regression coefficient and likewise the unadjusted $\overline{PEECP}$ mean times its partial regression coefficient. These two products then are subtracted from the individuals' SFA scores as in the following:

$$Y' = SFA - (b_1\overline{PSTAT}) - (b_2\overline{PEECP})$$

The new values for SFA then are expressed as a deviation from these products, the average within-group effects of PSTAT and PEECP on the original SFA scores. This distribution of Y' values then is regressed on the adjusted independent variables to identify the unique individual, group and interaction effects. Table 22 shows that this transformation changed the mean of SFA from 4.050 to .600. Table 22 also shows that correlation between the old SFA scores and the transformed SFA scores is .871, the result of removing the average within-group effect of the individual-level variables.

Table 21 displays the results of the multivariate analysis using the Boyd and Iverson technique, on the row labelled "Adjusted I.V.s - D.V." These results indicate that adjusting the Y values remarkably changed the overall fit of the model, a 20-percentage point R^2 discrepancy. Naturally this fit change reflects a change in the total available sums of squares in the dependent measure. This procedure compared to the previous model, halved the individual-level effect of

PEECP. In turn, this model attributed the majority of the statistical explanation to the contextual effects of the $\overline{PSTAT}$ (R^2 = .112) and $\overline{PEECP}$ (R^2 = .241). On the latter variable, this model placed the bulk of the contextual effect, a finding that counters the previous results indicating that $\overline{PSTAT}$, the average parental social status of the district accounted for all of the small contextual effects.

The dramatic differences between the results of this model and the previous three raise a serious question about its accuracy in this particular analysis. Adjusting the dependent measure by removing the average individual-level effects of PSTAT and PEECP apparently resulted in over-emphasizing the group-level effects.[1]

The first three models certainly provide a more conservative and consistent set of results demonstrating the individual- and group-level effects. These results suggest that some caution be exercised in the interpretation of the final model.[2]

B. Neighborhood Racial Composition

In this section, the same four analytic techniques are used to examine the neighborhood racial composition contextual effects on white students' self-other perceptions of academic ability. The intercept terms, means, and partial regression coefficients of the PSTAT and PEECP predictors are first presented followed by the analysis that compares the four approaches.

Table 23 presents the intercept terms, means, and partial regression coefficients for each of the three neighborhood racial composition groups. Whites living in racially mixed neighborhoods had the lowest perceived social status and lowest expectations/evaluations (PEECP) of their children's academic performance, of the three groups. The regression coefficients indicate that parent expectations clearly affected the student ability perception measure more than the social status variable. However, this social status measure played a more significant role (and

Table 23

The Within-Group Means and Partial Regression Coefficients (b) of the Parent Social Status and Expectation Variables for Each Neighborhood Racial Composition Group[1]

		PSTAT			PEECP			
	a	$\bar{X}$	SD	b	$\bar{X}$	SD	b	N
All White	.636	3.40	.444	.086	4.17	.642	.666	171
Mostly White	.576	3.43	.513	.003	4.20	.609	.625	463
Half White/Black	.593	3.15	.545	.186	4.00	.695	.523	24
Grand $\bar{X}$		3.41	.501		4.18	.649		658

[1]Dependent measure is Student Self-Other Perceptions of Academic Ability (SOPA).

subsequently PEECP a lesser role) in influencing SOPA for the respondents living in racially mixed neighborhoods than residents in the other two racial categories. The intercept terms reflect nearly a common origin for these three groups, a further indication of the small contextual effect observed between groups.

The dummy variable analysis, reintroduced in Table 24, demonstrated that neighborhood racial mix categories, as indicator variables, detected a contextual effect of less than one-percent (.008) on the white students' SOPA measure. At an individual-level the PEECP accounted for 40 percent of the variation in this variable. Social status contributed about five-percent (R^2 = .048). Jointly, the individual and group variables accounted for 45.6 percent of the variation in the criterion measure.

The results of the second analytical procedure, labelled "Unadjusted I.V.s" appear in Table 24. Recall that this procedure assigns the $\overline{PSTAT}$ and $\overline{PEECP}$ group means to the individual respondents within their respective neighborhood racial categories, replacing the dummy indicators with metric values. These results indicate that this procedure produced an overall R^2 fit identical to the previous technique. Furthermore, the group-level variables accounted for the neighborhood effect (R^2 = .008). The R^2 added columns indicate that this effect was nearly equally divided between the $\overline{PSTAT}$ (R^2 = .003) and $\overline{PEECP}$ (R^2 = .005) measures. The interaction terms provided a negligible effect (R^2 = .001, $F_{3,650}$ = .526, $p>.05$). The analysis excluded three terms, due to their insufficient tolerance levels, an indication of collinearity among the predictors.

The correlations between the individual- and group-level predictors were weak (PSTAT, $\overline{PSTAT}$ = .11; PEECP, $\overline{PEECP}$ = .06) as observed in Appendix E (Table E-2). However, the two group-level predictors were nearly linear functions of each other (r = .9997). In the regression analysis, after the inclusion of the first group predictor ($\overline{PSTAT}$), the tolerance level associated with $\overline{PEECP}$ dropped

Table 24

A Comparison of Four Analytic Techniques Detecting the Contextual Effects of Neighborhood Racial Composition on White Student Self-Other Perceptions of Academic Ability

Technique	R^2	R^2+Interact.	R^2Context.	R^2Interact.	R^2Added				
					PSTAT	PEECP	$\overline{\text{PSTAT}}$	$\overline{\text{PEECP}}$	Interact.
Dummy Var.	.456		.008		.048	.400			
Unadjusted I.V.s	.456	.457	.008	.001	.048	.400	.003	.005	.001
Adjusted I.V.s	.456	.458	.014	.002	.044	.398	.009	.005	.002
Adjusted I.V.s - D.V.s	.530	.532	.147	.002	.039	.344	.022	.125	.002

to .00005 indicating that the $\overline{\text{PSTAT}}$ measure accounted for nearly all the variance in the $\overline{\text{PEECP}}$ measure except for a minute vector space.

Recall that the tolerance value indicates the proportion of variance in an independent variable, being considered for inclusion into the regression equation, not explained by the other independent variables already in the equation. A zero (0.0) tolerance value would indicate that this variable is a perfect linear combination of the other predictors while a value of one (1.0) would indicate that this variable is uncorrelated with the other predictors in the equation (Nie et al., 1975). The tolerance value in this case (.0005) indicates that $\overline{\text{PEECP}}$ and $\overline{\text{PSTAT}}$ are nearly perfect linear combinations of each other, i.e., knowing the average social status of the neighborhood means knowing the average parent expectations.

With the entry of the $\overline{\text{PEECP}}$ measure the estimates of each group predictor coefficient and their standard errors significantly increased, another major indication of collinearity between these group-level predictors. These results suggest that the attribution of the group-level effects of neighborhood racial composition to either the $\overline{\text{PSTAT}}$ or $\overline{\text{PEECP}}$ measure must remain somewhat arbitrary.

The third analysis, in which the individual-level predictors were expressed as deviations from their within-group means and the group-level predictors expressed as deviations from the overall means, further explored this contextual effect. As Table 25 depicts in the column labelled "Adjusted $\overline{X}$", this transformation made the averages of these variables equal to zero. The correlations between the individual-level and group-level predictors dropped to zero, observed in the correlation matrix appearing in Appendix E (Table E-2). According to the analysis summarized in Table 24 in the row labelled "Adjusted I.V.s", this technique replicated the overall R^2 fit of the other two models. This procedure removed the correlation between predictor levels, in turn, shifting a small portion (.006) from the individual-level

Table 25

The Means and Zero-Order Correlations of the Unadjusted and Adjusted Variables Used in Neighborhood Racial Composition Contextual Analysis of White Student Self-Other Perceptions of Academic Ability

Vars.	Unadjusted $\bar{X}$	Adjusted $\bar{X}$	Zero-Order Correlations with Student Ability Perceptions		
			Unadjusted I.V.-D.V.	Adjusted I.V.	Adjusted I.V.-D.V.
SOPA	4.207	1.457	1.000		.955
PSTAT	3.412	.000	.220	.211	.196
PEECP	4.184	.000	.669	.665	.618
$\overline{\text{PSTAT}}$	3.412	.000	.093	.093	.149
$\overline{\text{PEECP}}$	4.184	.000	.093	.093	.146
PSTATxPEECP	14.363	.087	.547	-.119	-.111
PSTATx$\overline{\text{PSTAT}}$	11.644	.000	.225	-.019	-.018
PSTATx$\overline{\text{PEECP}}$	14.276	.000	.223	-.019	-.018
PEECPx$\overline{\text{PSTAT}}$	14.276	.000	.671	-.019	-.018
PEECPx$\overline{\text{PEECP}}$	17.504	.000	.671	-.017	-.016
$\overline{\text{PSTAT}}$x$\overline{\text{PEECP}}$	14.276	.002	.094	-.070	-.041

effects to the contextual variables. This shift nearly doubled the group-level effect though it remained quite small (R^2 = .014). This model, in contrast to the unadjusted model, attributed this effect primarily to the social status of the neighborhood racial categories ($\overline{PSTAT}$, R^2 = .009) rather than to the parent expectations ($\overline{PEECP}$, R^2 = .005) group variable. The interaction effect detected by this model remained small and nonsignificant.

In sum, this model which removed the correlation between predictor levels, reproduced an overall R^2 contribution identical to the previous two models. As observed in the analysis of former district effects, these results suggest that this procedure improves the R^2 contextual effect by sifting this additional contribution out of the individual-level variables that masked these effects. This model indicated that the social status of these neighborhood categories provided most of this positive and additive effect on student self-other perceptions of academic ability. Parent expectations played a similar, yet weak role in producing this contextual effect.

The fourth model, using adjusted independent and dependent measures, provided a different R^2 fit from the previous models. These results appear in Table 24. This centering procedure, which expressed the SOPA variable as a deviation from the products of the two predictors' (PSTAT, PEECP) within-group means and partial regression coefficients for each district, contributed an additional R^2 of seven percent over the previous models. Most dramatically the contextual effect changed nearly 15 percent (R^2 = .147) between the two sets of models, without seriously altering the individual-level PSTAT and PEECP effects. In contrast to the previous two models, this technique attributed most of the contextual effect to the differences in the mean parent expectations between neighborhood racial categories, rather than the mean social status.

Due to the considerable disparity between the results of this and the previous three models, the most conservative conclusions about neighborhood racial composition contextual effects would be based on the results of the first three models. These models suggest that this contextual effect is weak and that the multicollinearity between the group-level predictors makes the attribution of their separate effects largely infeasible.

Apparently, the Boyd and Iverson model (1979), that adjusts both independent and dependent variables, behaved consistently in the former district and, neighborhood racial composition analyses. Both analyses detected much larger contextual effects than the other models, again suggesting that this approach provides somewhat biased group effect estimates. We will examine these results of this technique much more closely at the conclusion of this analysis, offering some suggestions for the disparity in the results between this technique and the other three. At this point, this researcher is most comfortable with results from the model which adjusts only the independent variables. The remaining analyses on school contextual effects continues this comparison of the four analytic techniques.

School Effects

In the following analyses, we will first examine the school effects on white student achievement, then use these same high schools in an examination of their contextual effects on both black and white student achievement. As with the two previous analyses, the starting point in this discussion centers on an examination of the within-group intercept terms, means, and partial regression coefficients of the context, in this case, the selected high schools. Table 26 displays these values for each of the schools. These schools show some variability in their average PSTAT and SOPA scores. Similarily, their regression coefficients indicate that the effects

Table 26

The Within-Group Means and Partial Regression Coefficients (b) of the Parent Social Status and White Student Self-Other Perceptions of Academic Ability Variables for Each High School[1]

		PSTAT			SOPA			
	a	$\bar{X}$	SD	b	$\bar{X}$	SD	b	N
School 196	22.434	3.48	.441	4.295	4.05	.643	25.142	43
School 294	20.732	3.44	.460	-.226	4.06	.521	29.444	42
School 390	18.682	3.16	.439	.105	4.10	.472	24.803	36
School 392	22.789	3.35	.490	2.639	3.94	.525	17.885	26
School 394	22.084	3.55	.452	2.337	4.29	.566	20.924	60
Grand $\bar{X}$		3.42	.469		4.12	.561		207

[1] Dependent measure is white Student Academic Achievement (CAT percentile)

of these variables on achievement differ between schools. The joint R^2 values of these two variables for the schools varied from 17 to 55 percent. Parental social status showed a particularly weak effect achievement in schools 294 and 390. These results suggest that the contextual analysis include interaction terms to detect unequal variable effects between schools.

Table 27 reintroduces the results of the dummy variable analysis that overall accounted for 43.3 percent of the variance in white student achievement and detected a 4.5 percent R^2 school-level effect on student achievement. The results of the second technique, which replaced each school's indicator variable with its respective PSTAT and SOPA averages, also appear in Table 26. In contrast to the dummy variable technique, this "unadjusted I.V.'s" model attributed less than one-percent (R^2 = .005) contribution of the contextual effects to the group-level variables. Instead this model detected a statistically significant interaction effect (R^2 = .047) on school achievement.

An inspection of the six two-way interaction terms revealed that the two group-level variables, $\overline{\text{PSTAT}}$ and $\overline{\text{SOPA}}$, accounted for the majority (R^2 = .035) of this nonadditive effect, while the remaining five product terms collectively contributed the remaining percentage. These results indicate that joint effect of the two group-level variables accounted for the differences in school achievement better than their separate effect. Specifically, these results suggest that high levels of school achievement did not concomitantly occur with respectively high levels of school-level social status or with high levels of the average student perceptions of academic ability, yet in combination, these variables accounted for differences in school achievement. We return to an examination of this interaction effect following a comparison of the results from the next two analytic techniques.

The third model, using the adjusted independent individual- and group-level predictors, provided an overall R^2 fit identical to the unadjusted technique,

Table 27

A Comparison of Four Analytic Techniques Detecting the Contextual Effects of Schools on White Student Academic Achievement

Technique	R^2	R^2+Interact.	R^2Context.	R^2Interact.	R^2Added				
					PSTAT	SOPA	$\overline{\text{PSTAT}}$	$\overline{\text{SOPA}}$	Interact.
Dummy Var.	.433		.045		.036	.352			
Unadjusted I.V.s	.393	.440	.005	.047	.036	.352	.005	.000	.047
Adjusted I.V.s	.393	.440	.035	.047	.023	.335	.023	.012	.047
Adjusted I.V.s-D.V.	.358	.486	.042	.128	.020	.295	.002	.040	.128

revealed in Table 27. The adjustments effectively removed the correlation between predictor levels (see Appendix E, Table E-3). Consistent with the unadjusted technique this model detected an R^2 interaction effect of 4.7 percent. In contrast to the previous model, however, the adjusted technique partially isolated the contextual effect identified by the dummy variable analysis. This contextual effect was not quite as strong using this model (R^2 = .035) compared to the dummy variable analysis (R^2 = .045).

Adjusting the independent variables partially diminished the individual-level effects of the PSTAT and SOPA measures as witnessed in Tables 27 and 28. As in the previous analyses, the unadjusted variables apparently masked the contextual effects, that the dummy variables made distinct. When adjusted, the independent variables indicated that the $\overline{\text{PSTAT}}$ and $\overline{\text{SOPA}}$ measures shared the contextual effect, and that the $\overline{\text{PSTAT}}$ variable made a slightly stronger contribution (R^2 = .023) than the $\overline{\text{SOPA}}$ (R^2 = .012) effect. Both regression coefficients had positive weights, indicating that achievement varied positively with these group-level variables.

As noted, this model detected an R^2 interaction effect, equal to the previous technique. A closer examination of the specific contribution of each term indicated that the two group-level variables again accounted for the majority of this effect (R^2 = .039) with remaining terms adding less than one-percent each to the total.

These results present an important caveat to the interpretation of the school effects demonstrated here. Specifically, this analysis indicates that the within school effects on student achievement by the individual-level PSTAT and SOPA measures vary uniformily. However, the between school difference (differences in intercepts, essentially) stem from the specific levels of the $\overline{\text{PSTAT}}$ and $\overline{\text{SOPA}}$ group measures, such that these differences are most pronounced with the combination of

Table 28

The Means and Zero-Order Correlations of the Unadjusted and Adjusted Variables Used in the School Contextual Analysis of White Student Academic Achievement

Vars.	Unadjusted $\bar{X}$	Adjusted $\bar{X}$	Zero-Order Correlations with White Student Academic Achievement		
			Unadjusted I.V.-D.V.	Adjusted I.V.	Adjusted I.V.-D.V.
ACH.	75.140	-29.307	1.000		.842
PSTAT	3.420	.000	.189	.152	.142
SOPA	4.115	.000	.619	.597	.560
$\overline{\text{PSTAT}}$	3.420	.000	.151	.151	.042
$\overline{\text{SOPA}}$	4.115	.000	.172	.172	.196
PSTATxSOPA	14.127	.044	.512	-.148	-.186
PSTATx$\overline{\text{PSTAT}}$	11.717	.000	.211	.060	.056
PSTATx$\overline{\text{SOPA}}$	14.082	.000	.215	.047	.044
SOPAx$\overline{\text{PSTAT}}$	14.082	.000	.619	-.004	-.004
SOPAx$\overline{\text{SOPA}}$	16.947	.000	.614	.089	.083
$\overline{\text{PSTAT}}$x$\overline{\text{SOPA}}$	14.082	.008	.182	-.015	.382

the two group-level variables. Although we might interpret their effects separately, these analyses suggest such an interpretation might prove misleading and that a more appropriate or at least conservative interpretation would consider their joint effects on school achievement due to their nonadditive nature. We return to this consideration with an examination of these interaction effects following the next analysis.

Tables 27 and 28 display the results of adjusting both independent and dependent variables, using the Boyd and Iverson single-equation centering technique. This model showed a slightly poorer R^2 fit for the individual and group predictors than did the previous three techniques. The contextual R^2 fit (.042), however, was nearly identical to the dummy variable results.

Compared to results of the other models, this technique differed the most dramatically in R^2 fit provided by the interaction terms. It tripled the contribution attributed to these terms (R^2 = .128). The $\overline{\text{PSTAT}}$ x $\overline{\text{SOPA}}$ term accounted for 11 percent of the nearly 13 percent of the variation totally detected by this model.

In examining the results of this model, it appears that it produced a R^2 fit quite similar to the other three techniques, at least in detecting the contextual effects. Unlike the previous models, however, the $\overline{\text{PSTAT}}$ variable showed a negative regression coefficient in the estimate of its effect on student acheivement, after the $\overline{\text{SOPA}}$ measure was included into the regression equation. These results suggest that the average social status of schools (measured from the respondents' individual status) varied indirectly with its student achievement levels, a finding that countered the results from the previous models. Perhaps this change in the direction of the $\overline{\text{PSTAT}}$ regression coefficient was partly due to the interaction effect between the aggregate level measures ($\overline{\text{PSTAT}}$ x $\overline{\text{SOPA}}$). It is worthwhile to examine this effect more closely at this point.

Interpreting interaction effects on continuous-level variables presents some difficulty (Kerlinger and Pedhazur, 1973). Interaction terms using continuous variables are synonymous with product terms, the use of which Kerlinger and Pedhazur (1973) discourage. To simplify the examination of the group-level interaction effects in this study, we use the mean achievement score of each school for a comparison to their respective average $\overline{\text{PSTAT}}$, $\overline{\text{SOPA}}$, and $\overline{\text{PSTAT}}$ x $\overline{\text{SOPA}}$ values. Furthermore, we use a ranking procedure to show that the interaction term changed the fit of the model such that higher levels of academic achievement were associated with higher levels of the independent variables, in this case the product term.

Table 29 presents the average scores of the criterion and predictor variables in conjunction with their rank (1-5) on these scores among the five schools. In this table, note that School 196 reported the highest achievement and School 392 the lowest achievement of the schools. Note also that we ranked the schools according to their achievement. Next, compare this ranking to the ranks assigned to the schools' $\overline{\text{PSTAT}}$, $\overline{\text{SOPA}}$, and $\overline{\text{PSTAT}}$ x $\overline{\text{SOPA}}$ scores. These ranks do not correlate perfectly with achievement ranks, yet they occur in an order similar to the achievement ranks, except for Schools 196 and 390 on the $\overline{\text{SOPA}}$ measure where the ranks are reversed (in bold). This reversal indicates that the average self-other perceptions of students in these two schools were inconsistent with their average social status and academic achievement (i.e., high $\overline{\text{ACH}}$, high $\overline{\text{PSTAT}}$, low $\overline{\text{SOPA}}$).

Now examine the ranks associated with the interaction term. Specifically, this term corrected this reversal rank, making the levels of the $\overline{\text{SOPA}}$ measure dependent on the $\overline{\text{PSTAT}}$ levels in producing an effect on achievement. In other words, the interaction term compensated for these two "outlier" schools that deviated from the linear pattern of these group-level relationships.

Table 29

The Schools' Average Scores and Ranks on Achievement, Social Status, Student Ability Perceptions, and the Interaction Term

School	$\overline{ACH}$	Rank	$\overline{PSTAT}$	Rank	$\overline{SOPA}$	Rank	$\overline{PSTAT}$x$\overline{SOPA}$	Rank
196	80.72	1	3.48	2	4.05	4	14.13	2
394	79.05	2	3.55	1	4.29	1	15.21	1
294	74.38	3	3.44	3	4.06	3	13.94	3
390	72.94	4	3.16	5	4.10	2	12.96	5
392	61.15	5	3.34	4	3.94	5	13.19	4

This crude technique illustrates the nature of this interaction and suggests that this term provides a better explanation of the school effects than the $\overline{PSTAT}$ or $\overline{SOPA}$ measure considered individually, at least for two of the five schools. This ranking procedure suggests that the school-level effects follow the order of the PSTAT measure, but this interpretation may be misleading.

D. School Contextual Effects - Black and White Students' Achievement

This analysis compares the results of the four analytic techniques examining black and white student academic achievement in these five high schools. Again, these four techniques include: 1) the use of dummy variables, 2) group mean predictors assignment to schools, 3) adjusting the individual- and group-level predictors, and 4) adjusting both the independent and dependent variables. Black students are included in this analysis, although they only add 30 more subjects.

Table 30 displays the results of the within-group regression analysis of student achievement on the race, PSTAT, and SOPA predictors for each school. The mean value for race in this table identifies the proportion of black student with complete data on these variables within each school. The grand mean indicates that, on the average, blacks comprised 10 percent of the student in this analyses. School 390 showed the largest proportion, and School 294 the smallest proportion of blacks.

An examination of these within-group regression coefficients reveals that race made a strong within-school effect. The strength of the race coefficient shows no direct relationship with the school sample proportion of blacks, although this assertion deserves caution given that some of these estimates are based on 2 to 3 black students. Comparing the PSTAT and SOPA values in Table 26 for white students to these values in Table 30 reveals that adding blacks to the analysis produced no dramatic changes in the mean scores on the SOPA coefficient.

Table 30

The Within-Group Means and Partial Regression Coefficients (b) of the Parent Social Status and the Student Self-Other Perceptions of Academic Ability Variables for Each High School[1]

		RACE			PSTAT			SOPA			
	a	$\bar{X}$	SD	b	$\bar{X}$	SD	b	$\bar{X}$	SD	b	N
School 196	22.953	.04	.208	-16.253	3.44	.478	5.187	4.07	.647	25.824	45
School 294	20.500	.02	.152	-28.305	3.43	.455	-.226	4.07	.529	29.444	43
School 390	24.844	.27	.444	-18.756	3.06	.484	6.161	4.03	.525	27.987	49
School 392	25.266	.19	.397	-37.787	3.26	.537	2.368	3.98	.502	17.304	32
School 394	23.572	.03	.178	-.48.581	3.53	.459	3.259	4.29	.561	21.230	62
Grand $\bar{X}$		.10	.276		3.36	.506		4.11	.565		231

[1]Dependent measure is Student Academic Achievement (CAT Percentile).

However, their inclusion apparently increased the effects of the PSTAT variable especially in School 390, the school with the largest proportion of black respondents.

Table 31 reintroduces the results of the dummy variable analysis presented earlier in this chapter. This technique which designated the schools as indicator variables detected an R^2 group-level effect of 4.8 percent. The larger overall R^2 contribution in this analysis compared to the analysis for whites reflects the importance of the race variable in explaining achievement.

The second analytic technique, replacing the dummy variables with the PSTAT and SOPA means, yielded nearly an identical overall R^2 fit. Due to the limited number of blacks, no group average variable for race was created. This technique detected a very weak contextual effect attributing the R^2 fit disparity of the model to the interaction terms. As observed in the analysis of white student, the $\overline{\text{PSTAT}}$ x $\overline{\text{SOPA}}$ product term accounted for the majority of this interaction effect (R^2 = .035).

In sum, this model produced results similar to the dummy variable technique. However, it attributed most of the group-level effect to the product term of the two group measures, indicating that school differences in achievement result from the particular levels of these variables in combination.

The third analysis, using adjusted independent individual- and group-level variables, showed similar results to these other two techniques, as observed in Table 31. This procedure did not adjust the race variable because the analysis did not contain a group race variable. This analysis detected half the group effect identified with the dummy variable (R^2 = .022) technique. The $\overline{\text{PSTAT}}$ measured accounted for most of the effect R^2 = .017). The interaction effect of the $\overline{\text{PSTAT}}$ x $\overline{\text{SOPA}}$ remained prominent (R^2 = .050). As observed in the previous analyses using this procedure, it apparently shifted part (R^2 = .021) of the effects

Table 31

A Comparison of Four Analytic Techniques Detecting the Contextual Effects of Schools on Students' Academic Achievement

Technique	R^2	R^2+Interact.	R^2Context.	R^2Interact.	R^2Added					
					Race	PSTAT	SOPA	$\overline{\text{PSTAT}}$	$\overline{\text{SOPA}}$	Interact.
Dummy Var.	.546		.048		.169	.043	.286			
Unadjusted I.V.s	.499	.548	.001	.049	.169	.043	.286	.0009	.0001	.049
Adjusted I.V.s	.499	.548	.022	.050	.169	.028	.280	.017	.005	.050
Adjusted I.V.s - D.V.s	.476	.658	.091	.181	.148	.020	.217	.091	.000	.181

previously attributable to the individual-level variables to the group-level variables as the correlation between the two levels of predictors dropped to zero in the process. The results of these adjustments of the predictors appear in Tables 31 and 32 and Appendix E (Table E-4).

The fourth analytic technique provided results that differed considerably from the previous models. The "main effects" part of this model (race, PSTAT, SOPA, $\overline{\text{PSTAT}}$, $\overline{\text{SOPA}}$) yielded a smaller R^2 fit, although the contextual effect increased nearly eight percent. This model shrunk the contributions of the individual-level effects, indicating that the contextual and especially the interaction components produced a sizable effect on student achievement. Including these interaction terms (primarily $\overline{\text{PSTAT}}$ x $\overline{\text{SOPA}}$) dramatically improved the R^2 fit according to this model.

This fourth technique, which required adjusting the dependent measure as a function of the average within-group individual effects, differed in this case from the previous analysis using this technique. In this situation, the dependent measure was not adjusted on the race variable because no "average race" group variable existed. However, the PSTAT and SOPA partial correlation coefficients reflected (controlled for) the effects of race in the calculation of the new dependent measure scores. That is, the new distribution of achievement scores was created by subtracting the SOPA and PSTAT partials (with the effects of race removed) and their means from each individual's achievement score. Boyd and Iverson offer no suggestions or examples indicating the proper procedure(s) in cases where individual-level variables do not include group-level variable counterparts.

To complete this analysis of school effects, we again examined the interaction effects of the $\overline{\text{PSTAT}}$ x $\overline{\text{SOPA}}$ terms on student achievement. Basically, the same pattern reappeared as we observed before. Specifically, high achievement scores did not consistently show concomitantly high ability perception

Table 32

The Means and Zero-Order Correlations of the Unadjusted and Adjusted Variables Used in the School Contextual Analysis of the Student Academic Achievement

Vars.	Unadjusted $\bar{X}$	Adjusted $\bar{X}$	Zero-Order Correlations with Student Academic Achievement		
			Unadjusted I.V.-D.V.	Adjusted I.V.	Adjusted I.V.-D.V.
ACH.	71.680	40.517	1.000		.786
Race	0.104		-.411		
PSTAT	3.360	.000	.338	.268	.235
SOPA	4.109	.000	.581	.549	.482
$\overline{\text{PSTAT}}$	3.360	.000	.250	.250	.404
$\overline{\text{SOPA}}$	4.109	.000	.214	.214	.289
PSTATxSOPA	13.871	.051	.568	-.175	-.244
PSTATx$\overline{\text{PSTAT}}$	11.321	.000	.363	-.067	-.058
PSTATx$\overline{\text{SOPA}}$	13.820	.000	.356	-.013	-.011
SOPAx$\overline{\text{PSTAT}}$	13.820	.000	.600	-.012	-.011
SOPAx$\overline{\text{SOPA}}$	16.896	.000	.488	-.013	-.011
$\overline{\text{PSTAT}}$x$\overline{\text{SOPA}}$	13.820	.014	.254	-.049	-.085

measure scores across schools. Multiplying these two measures together changed the nature of their fit such that the product terms compensated for the discrepancy between levels of achievement and the predictor values. The inclusion of blacks into the analysis only provided slightly more variation in the predictors in this pattern of relationships.

Having examined the community and school contextual effects using four analytic techniques, the following sections review the results of the analysis. The first section deals with the substantive results, addressing the research questions posed in Chapter III of this text. The second section evaluates the results from a statistical standpoint in a comparison of the four analytic techniques.

EXAMINATION OF RESEARCH QUESTIONS - Part II

Contextual-Level Relationships

In Chapter III, several research questions were stated, focusing on the community and school effects on individual perceptions and behaviors. To be consistent with the variables of interest in this section, we grouped the research questions under two major headings, racial perceptions and schooling perceptions. The following discussion addresses these two areas, after restating the general research questions.

I. **Community Contextual Effects** - Does the community perceptual climate affect the individual-level relationship between parent perceptions of race and schooling and their children's perceptions of race and schooling?

A. Racial Perceptions

The exploratory contextual analysis using the dummy variable technique did not detect an additional community effect on the child's racial attitudes beyond the individual-level effects of their parents' racial attitudes. Simply stated,

knowing the racial attitudes of the community where the child resides did not contribute additional information about the child's racial attitudes. This finding remained true for all three community identifiers, namely, former school district, neighborhood racial composition, and former school. The source of "explanation" of these attitudes remains, in this case, at the family level largely as a function of the parent(s)' racial attitudes. This does not exclude the posibility that other community identifiers might contribute additional explanation to this relationship.

The question asked in Chapter III inquiring about the effects of community attitudes toward school desegregation (PATSD) on the child's racial attitudes was excluded from the contextual analysis because the parent racial attitudes (PRA) variable predicted the child racial attitudes better at the individual-level. This exclusion was based on the decision rule to use the best individual-level predictor of the criterion measure for the exploratory contextual analysis.

B. Schooling Emphasis

This category included six questions, concerned with the additional effect community perceptions make on the child's perceptions of schooling. Recognizing from the literature the powerful influence parent expectations make on their children's attitudes and behaviors, four of these questions addressed these effects at the community level. The first two questions examined the community effects on children's perceptions on the importance of education. We address these two questions first, then examine the remaining four. The individual-level analysis revealed that the parent perceptions of the importance of eduction (PIE) variable predicted this criterion measure better than the parent perceptions of school quality (PPSQ). Applying the decision rule to use the best predictor, the PPSQ variable was excluded from the exploratory contextual analysis.

The contextual analysis using the PIE and PSTAT variables as covariates failed to detect a statistically significant community effect on the child's perceptions of the importance of education. Specifically, none of the community identifiers (former school district, neighborhood racial composition, former school attended) distinguished among children on the emphasis they placed on education.

Four research questions focused on the effects of community expectations and evaluations of child performance (PEECP). Specifically these questions asked: How do these community expectations affect the child's future aspirations, self-other perceptions of academic ability, sense of control, and perceptions of the school academic climate?

The analysis demonstrated that community expectations affected both student future aspirations, and student self-other perceptions of academic ability. The (former) school district where the student resided affected their aspirations, and the racial composition of their neighborhood affected their individual-level ability perceptions. Analyzed separately by race, these two contextual effects held only for the white students. In both cases the community effect was weak (if we choose to exclude the results of Boyd and Iverson model).

The attribution of the former district effect on white student future aspirations depends on the technique used to analyze these effects. The model using unadjusted independent variables, indicated that the average social status of a district contributed an additional three-percent of statistical explanation to the student future aspirations. Differently stated, two students with the same scores on parental social status (PSTAT) and parent expectations (PEECP) but residing in different school districts will have different aspiration scores, this difference due to the average social status of their districts, with this effect varying directly with the district-level social status.

The positive value of the $\overline{PSTAT}$ regression coefficient and the nonsignificant interaction terms indicated that, as the average social status level changed (increased) across district, it subsequently and "uniformly" increased the aspirations of their student residents. According to this model, the average academic expectations parents held for their children in these districts contributed no additional explanation to the differences between districts in the aspiration levels of the children. At an individual-level, however, the parent expectations produced a strong positive effect on student aspirations.

The model which adjusted the independent variables indicated similar results except that this model detected and attributed stronger contextual effects to the district average social status variable.

The fourth model that centered the independent and dependent variables, yielded results considerably different from the other models. These results diverged from the others in the detection and attribution of the contextual effects. These results were largely discounted due to this disparity.

From a conservative standpoint, it seems logical to conclude that the average social status ($\overline{PSTAT}$) of the school district contributed an additional, yet weak effect on the future aspirations of their students. The community parental expectations variable ($\overline{PEECP}$) provided no additional explanation to this relationship after removing the effects of district-level social status. Given the high correlation between the two variables, however, either group variable might suffice in accounting for the district-level contextual effect, especially if we consider the social status ($\overline{PSTAT}$) variable as a proxy for the expectations ($\overline{PEECP}$) variable.

The second community effect occurred using the neighborhood racial composition categories. The dummy variable analysis dectected an exceptionally small (R^2 = .008) undifferentiated between-category group effect on the student's

academic ability perception measure. Substituting the group means $\overline{PSTAT}$ and $\overline{PEECP}$, for these dummy categories revealed that the two group variables shared and divided this effect between them and that both coefficients showed a positive effect. The third model largely replicated these results except that it detected a slightly larger contextual effect than the two prior models by shifting a portion of the individual-level effect to the group measure. The fourth model again produced results quite divergent from the previous three. In addition to the surprisingly large contextual effect, the model shifted most of the effect to the parent expectation ($\overline{PEECP}$) variable. These results seem questionable and generally unacceptable, in this case.

In sum, the neighborhood racial composition (all white, mostly white, mixed) only slightly affected the student academic ability perceptions. The collinearity between the two aggregate measures ($\overline{PSTAT}$, $\overline{PEECP}$) made singular attribution of this effect to either variable largely infeasible. It seems reasonable to conclude that these variables share this weak effect.

In the original formulation of these research questions, the parent expectation variable was expected to best "predict" the school climate measure. Due to the particularly strong relationship for blacks the parent perception of school quality (PPSQ) measure proved itself as the best predictor, in the multivariate analysis. Accordingly, the PPSQ variable was used as a covariate in the exploratory contextual analysis. This analysis showed no significant group effect with any of the community identifiers. Likewise, when tested separately for blacks, this PPSQ variable showed no contextual effect. Because of its priority in the multivariate analysis for whites, (see Table 5) the parent expectation variable (PEECP) was used as a covariate in their exploratory analysis of white student perceptions of the school climate. This analysis in turn showed no significant group effect.

The PEECP showed itself as the first priority predictor in the student sense of control variable in the stepwise multivariate analysis. A separate multivariate analysis for blacks and whites revealed that the PEECP remained the best predictor of white student sense of control. However for blacks, the parent importance of education (PIE) variable emerged as the best predictor of their children's sense of control.

An exploratory contextual analysis for the whole group and separately for each racial group (using the PIE variable for blacks) revealed that the community perceptions did not significantly affect the student sense of control measure. This analysis indicated that the sense of control measure remained a function of the individual-level relationship between the parent and child.

Having examined the research questions posed for the community analysis, we now address the research questions inquiring about school contextual effects on achievement.

II. **School Contextual Effects** - Does the school-level perceptual climate affect the individual-level relationship between student perceptions of race and schooling and their academic achievement?

The multivariate analysis of student academic achievement revealed that the student's self-other perceptions of academic ability best predicted this measure, among the student perception variables. The remaining variables were excluded from the exploratory contextual analysis and are not addressed separately as research questions. The following section provides a discussion of the school-level results, which used the SOPA measure variable as a covariate, in conjunction with the school-level social status.

The exploratory contextual analysis revealed that only the high schools in this study significantly affected the levels of their students' achievement, over and beyond the individual-level effects of race, social status, and academic ability

perceptions. A separate analysis for white students indicated that this same effect held. The sample contained too few blacks separately to test this effect on their achievement.

The results from three analytic techniques presented a clear, yet somewhat complex picture. In general, these models indicated that these group-level variables added some four-percent additional explanation to student achievement beyond the effects of the individual-level variables. The models indicated that the effect of each of these two variables was positive, or in other words, student achievement varied directly with the average social status and the average ability perceptions of the students in these schools.

More importantly, the models consistently demonstrated that these two variables did not act uniformly and independently in their effects on student achievement. Specifically, the levels of $\overline{SOPA}$ showed a dependency on the levels of the $\overline{PSTAT}$ variable in producing a joint effect and better fit to the student achievement data. The product term of these two variables made the levels of the predictor scores relatively consistent with the student achievement levels (i.e., high predictor scores, high achievement). These results demonstrated that between-school differences in individual-level student achievement should best be viewed as a nonlinear function of two variables, social status, and student perceptions of academic ability. These results suggest the social status of a school may compensate either positively or negatively for their students self-other perceptions of academic ability that appear inconsistent with the levels of achievement in that school. Social status then may exert a suppressing effect on "inappropriately high" self-other perceptions, or overcomes the self-other perceptions that are "inappropriately low" for a school with a relatively high level of achievement. We can only speculate on this effect, but it suggests that these

measures tap some of the social and psychological mechanisms operating on student achievement.

In sum, the results of these models suggest that the school-level effects of social status and student ability perceptions on student achievement are best understood by considering them jointly (at least for this sample of schools). From a substantive standpoint, we can conclude that these group-level variables positively affected student achievement and explain between school differences in student achievement. In other words, student achievement is not simply a function of the student's family background (social status) or academic ability perceptions, but that achievement is affected by social status and student academic ability conceptions in the school where the individual student attends. This finding lends some support to the assertion that schools exert an additional effect, through a variety of mechanisms (e.g., "environmental push", "academic climate"), on their students' achievement which transcends the individual-level students' perceptions and attitudes.

Further discussion of this point in conjunction with a summary and the conclusion of this study appear in the following chapter. This chapter examines the contributions and limitations of this study, plus offers suggestions for future research in contextual analysis. Before turning to this chapter, we attempt to provide the reader with an evaluation of the analytic techniques used to detect and specify the sources of group-level effects. This discussion follows.

EVALUATION OF THE ANALYTIC TECHNIQUES

Four analytic techniques assessed the community and school effects on student perceptions and student achievement, respectively. This section critiques these techniques from a comparative standpoint with an emphasis on the utility of each model.

Following the suggestion of Hauser (1974) and Boyd and Iverson (1979), this researcher used a linear regression technique, synonomous with the analysis of covariance approach, to detect effects. This model, which treats contextual categories, e.g., a set of elementary schools, as indicator variables in the regression equation, and controls for the individual-level variables as covariates, simultaneously tests for categorical group effects on the criterion measure. A regression line for each group category gets linearly fitted to the criterion data points. Essentially, this technique tests the effects of belonging to a particular group or classification on the criterion measure. An F-test determined the statistical significance of this group membership effect.

This model proved valuable in several respects. Primarily it provided a simple and efficient technique for exploring and detecting group-level effects. Using the group identifiers as indicator variables in a multiple regression equation made this technique particularly viable and statistically powerful. This technique identified the particular group accounting for group-level differences in the individual-level criterion measure. With a large sample size (N>200), this approach detected extremely small contextual effects, as observed in the community analysis using neighborhood racial composition categories. Certainly, this technique represents a vast improvement over the contingency table method typically used to identify group effects.

This technique presented some limitations. The procedure provided no differentiation of group effects, only that group membership affected individual scores. Essentially, this model must remain descriptive in this sense with essentially no explanatory capabilities. In retrospect, interaction terms may have proven useful. However, in addition to the interpretation problem, it would have added several more predictors to the equation, quickly exhausting the degrees of freedom in estimating parameters for the small groups.

Another limitation regarding the use of this technique involve its failure (using the SPSS software) to internally compare each pair of regression coefficients and indicate whether the slopes differ from each other. Some researchers might focus on these differences. The present analysis focused on testing differences between the arbitrarily assigned reference category and a particular group. Primarily, we focused on overall R^2 contribution of the indicator variables, which does not change with the selection of the reference category. In other words, we wanted to know if group membership contributed any additional effect on the criterion measure, after removing the effects of the individual-level variables.

Although this dummy variable technique generally detected a larger R^2 contribution than the other models and it detected even the smallest contextual effects, the meaningfulness of these minute effects appear equivocal. For example, a contextual R^2 effect of less than one percent may appears too trite for consideration. Certainly Hauser (1974) and fellow critics of contextual analysis would classify such effects as trivial or uninteresting.

The second analytic technique used the group means of each contextual category (e.g. each school) instead of the dummy variables. A group's individual scores on a predictor were averaged, and this average score was assigned to each individual within that group. In the case of two predictors the individuals received two group means, one for each predictor. In the multiple regression analysis the criterion measure was first regressed on the individual-level predictors then on the group-level (means) variables.

This model generally produced an R^2 fit equivalent to the dummy variable analysis except in the school analysis, where the interaction terms played a prominent role. In the school analysis, this technique indicated the importance of including interaction terms for detecting unequal predictor effects.

This model provided a major improvement over the dummy variable analysis in its capacity to identify the specific source(s) of the group-level effect. For example, this model attributed the contextual effect on student future aspirations to the average social status of the students within a school district. In contrast to the dummy variable model, this technique specified the source of these group effects. Additionally, this procedure made the interpretation of significant interaction effects more plausible.

This model showed its major limitation in separating group-level effects nested in the individual-level variables. Apparently, this masking occurred because of the correlation between the individual- and group-level variables. Generally, these correlations were small, (a function of group size and variability) yet large enough to partially conceal contextual effects. The third analytical technique which removed this shared variation between the two variable levels, overcame this major limitation. The next section comparatively reviews the strength and weaknesses of this model.

The third analytic technique expressed a respondent's individual-level score as a deviation from the group mean of that predictor, computed from averaging individual's scores within a contextual category, representing the respondent's undique individual-level score. In turn, each individual's group score was expressed as a deviation from the grand mean of a predictor. This deviation represented the unique group membership score on the predictor, ascribed to individuals belonging to a particular contextual category. These procedures reflect the adjustments made in the predictor variables, the first part of the centering technique developed by Boyd and Iverson (1979).

This procedure showed merit on several counts. Without changing the overall R^2 fit demonstrated with the previous models, this procedure effectively isolated group effects, apparently by shifting the previously concealed effect out of the

individual-level predictor. This technique allows the assignment of group scores, based on individual-level data, to these same individuals without the problem of collinearity between the two levels. Expressing the individual and group scores as deviations effectively removed the correlation between levels.

This technique shares with the second model the virture of differentiating the source(s) of the group effects, a marked improvement over the dummy variable technique. The two models generally acted consistently in the distribution of the contextual effect. Unfortunately the two models share the inability to remove correlations between predictors on the same levels. This collinearity problem appeared in both models resulting in some cases of inordinately large parameter estimates and subsequently large standard error values. Secondly, this technique removed the shared association between predictors, but it did not remove their shared effects in their covariation with the criterion measure.

In reviewing the benefits and limitations of this model we conclude that this model provides the most logical approach to analyzing contextual effects. It managed to replicate the overall R^2 fit of the other models, yet adjust the individual-level predictors to isolate, clarify and make attribution of these effects to specific group-level variables. Perhaps this approach presents the "safer" and more readily understood set of procedures than the fourth technique that requires transformation of the dependent variable.

The fourth analytic technique retains the adjustments made in the independent individual-and group-level predictors. In this model an individual's dependent variable score is expressed as a deviation from the product of that individuals' group mean and partial regression coefficient, on a given predictor. This procedure, developed by Boyd and Iverson (1979), shifts the Y coordinate of the data point (X,Y) to a new position around the group regression line retaining the integrity of the slope and intercept of the original regression line.

Perhaps this technique raises more questions than it answers. A statistical check on Boyd and Iverson's claim that this technique maintains the integrity of the within-group coefficient estimates and intercepts validated their contention (see note 2). However, internally consistent this method, it generally produced an overall R^2 fit that differed (dramatically in some cases) from the fit identified by the other three techniques. This marked difference in overall R^2 fit and, particularly, the identification of considerably larger contextual effects than detected by the other techniques makes it difficult to conclude that this technique accurately detects contextual effects.

In their examples using this technique Boyd and Iverson show that the model produced an overall R^2 fit that differed some 29 points from the dummy variable analysis using the same data for both analyses. The authors do not comment on this discrepancy between the two models, although it was apparent that the technique changed the total sums of squares in the criterion measure. I used their sample data of 40 cases to check these calculations and to examine the results using the unadjusted and adjusted independent variable techniques. This analysis revealed, as in the present investigation, that the dummy variable, the unadjusted independent variable, and the adjusted independent variable techniques all generated an identical overall R^2 fit, which differed from the results of the Boyd and Iverson model. The unadjusted and adjusted models differed in their attribution of R^2 effect given to the individual- and group-level predictors.

A fellow researcher (Sprague, 1984), reviewing this model concluded that the Boyd and Iverson centering technique is not robust in testing contextual effects between groups with unequal numbers of subject. Group size, of course, affects the variation in the dependent and independent measures, an important assumption (homogeneity of variance among groups) in linear model testing. Differences in group size also affect the partitioning of components of variation in the total

sums of squares (Kerlinger and Pedhazur, 1973), although this is far less of a problem in multiple regression analysis than in the analysis of variance procedure.

Unlike the data Boyd and Iverson used to test the centering model (i.e., equal group size, equal variances in the predictor and criterion variables), the present study tested for contextual effects between groups with widely varying numbers of subjects, especially in the community analysis. Such large disparities in group size probably distorted the estimates in the community analysis. In contrast, the analysis of the high schools using the centering technique generated results quite similar to those using the dummy variable technique. In this case, the schools did not vary substantially in group size nor in the within-group variation of the predictor among the schools. Statistically weighting the groups making them equal in size and variability may should reduce the distortion in these estimates. The development and application of this weighting procedure exceeds the scope of this investigation. However, we will return to this point in the summary discussion presented in Chapter V of this text.

An additional comment about this model seems appropriate here. After thoroughly reviewing this centering procedure, a professional statistician concluded that this adjusting of the dependent measure tended to maximize group-level effects (see note 1). This statistician equated the procedure with stepwise regression analysis which first removed group-level effects from the dependent measure. In other words, this procedure "stacked" the analysis in favor of demonstrating group-level effects. As observed in the contextual analysis of the former district and neighborhood racial compositional effects, this model attributed considerably more effect to the group variables than the other techniques demarcated, lending some support to this statistician's contention.

Finally, we must make a few comments about the technical procedures involved in adjusting the independent and dependent variables that form the crux of

the centering technique. In general, the number of steps involved in this process makes the procedure largely impractical and intractable for large scale multivariate analyses. Group means, grand means, and partial regression coefficients, that require separate analyses, must first be derived. Using the SPSS procedures, which do not retain these values, requires that the user input each set of values for each group for each variable. For example, inputting these values for 10 groups on three variables requires 60 design statements (i.e., three group means and three partial regression coefficients for each group). Trial runs demonstrated that the partial regression coefficients required at least four decimal place precision for accurate transformations of the dependent measure. In addition, computing the new variables and their interaction terms required several more design statements in all, making the computer program tedious, lengthy, and expensive to execute. In sum, the complexity and inefficiency involved in making these transformations largely relegates the centering procedure to a simplistic, bench-level analysis.

To summarize this evaluation of the Boyd and Iverson model with respect to the other models, it remains unclear as to its accuracy in the detection and attribution of contextual effects especially with largely unequal group sizes among these units. The results it generated typically differed from the other techniques, making it suspect. Perhaps it is helpful to classify these techniques on a conservative to liberal continuum in their estimates of contextual effects. Given the results of the above analysis it appears that the first three models (dummy variable, unadjusted I.V.s and adjusted I.V.s) produce the more conservative estimates of group-level effects. In contrast, the centered model (adjusted I.V.s - D.V.) generates more liberal estimates of contextual effects.

With these considerations in mind, we turn to the next chapter that summarizes the results of the analysis, identifying the strengths and weaknesses of

this study, and suggests areas for future research in the area of contextual analysis.

SUMMARY

In this chapter, we first analyzed the individual-level relationships between parent and child (student) race and schooling perceptions, and then the relationships between these student perceptions and their academic achievement. We then submitted select individual-level relationships to an exploratory contextual analysis designed to detect community and school effects on the student criterion measures. We reanalyzed the statistically significant group-level effects using three analytic models, mathematically approximating the source of these effects. After addressing the research objectives concerned with community and school effects, we compared and evaluated the four analytic techniques.

[1]Methodological Note

This issue appears the most problematic of the Boyd and Iverson single-equation centering technique. The authors focus on developing a model that makes individual, group, and interaction effects independent (orthogonal) in a multiple regression analysis. They contend, and rightly so, that high collinearity among predictors frustrates step-wise ordering techniques in that predictors entered first appear to account for most of the explained variation. Changing or reversing the step-wise ordering sequence in such cases might produce opposite effects (i.e., which predictor -- individual, group, or interaction term -- produces the most effect on the criterion?)

To avoid this problem, at least between levels of predictors, the authors developed this centered model. This approach may, however, overemphasize group effects by first adjusting the dependent variable with group values. According to James Stapleton, Professor of Statistics and Probability at Michigan State University, this approach is roughly equivalent to entering the group variable first into the stepwise equation. In a sense, the group-level variable is allowed to produce its effect, then the individual-level variables follow.

Throughout our long discussions of this technique, Dr. Stapleton maintained that adjusting the dependent variable favored an overestimation of these group effects. Furthermore, he pointed out that the correlation between all three predictors ($A,\bar{A},A\bar{A}$) could only be zero in special cases due to the nature of the covariance computations. Dr. Stapleton concluded that changing the dependent variable changed the estimates of the parameters too extensively. He considered adjusting the independent variables, to express them as deviations from group values, as appropriate but not for the dependent measure. Skeptical of its accuracy, he concluded that the second part of this model not be used.

[2]Methodological Note

Boyd and Iverson contend that this procedure retains the values of the within-group intercepts and regression coefficient estimates. To verify this claim, I compared the intercept and partial regression coefficients, using the unadjusted independent and dependent variables to these coefficients, generated from the analysis using the adjusted predictors and the dependent measure (SFA). It was not possible to analyze the within-group mean effects, i.e., they were constants.

This analyses revealed that two procedures generated identical results. Both the intercept and regression coefficient estimates matched. As expected, in the second procedure (predictors and criterion adjusted) the intercept term was the mean of the dependent measure, which did not change with the entry of the first or second predictor. In essence, this value is fixed with the prior removal of the within-effects of the predictors.

Primarily this analysis provided a procedural check on the adjustments made in the criterion measure. The consistent results between the two approaches provide support to Boyd and Iverson's claim that the values remain unchanged using this adjustment technique. Of course, this test does not prove the overall accuracy of the model.

CHAPTER V

SUMMARY, CONTRIBUTIONS, AND SUGGESTIONS FOR FUTURE RESEARCH

In this final chapter, we briefly summarize the objectives, methods, and the results of the investigation. In reaching some conclusions about the findings, we comment on the merit of these efforts and suggest, with respect to the limitations of this study, avenues for future investigation.

SUMMARY OF THE RESEARCH

This study examined four major research objectives. The first two objectives addressed the nature of the individual-level relationships between parent and child (student) racial and schooling perceptions, and the relationship between these student perceptions and their academic achievement.

The second two objectives sought a select reexamination of these individual-level relationships, nested within community and school parameters, with the intention of determining whether these social contexts contributed any additional effect on student perceptions and academic achievement.

The selection of this particular data set for this secondary analysis rested on the premise that the respondents' recent exposure to changes, introduced by county-wide school desegregation efforts, made these individual-level relationships and the group-level effects upon them, particularly salient. These particular data were originally collected during the first year of the school desegregation implementation.

A multivariate regression analysis determined the order, magnitude and direction of the relationships between the parent and student race and schooling

perception variables, and likewise, for the relationship between these student perception variables and their academic achievement measure. Race and social status were forced into these regression equations as control variables prior to the perception variable in the analyses. We also conducted separate analyses for blacks and whites, first forcing in the social status variable prior to the perception variables. We then submitted these relationships to exploratory contextual analyses, designed to detect group membership effects on a student criterion measure by simultaneously removing the effects of the individual-level covariates and treating the specific community and school parameters as indicator variables. Finally, we compared the results of these equations detecting significant group-level effects to the results produced by three related contextual analysis models designed to specify the source(s) of these effects, using approximate group-level measures.

In general, the analyses revealed that parent and child race and schooling perceptions were positively (and often strongly) related, and that many of the schooling perceptions correlated directly with student achievement, particularly the students' self-other perceptions of academic ability. Blacks and whites generally shared a similar ordering in the best "predictor" of the criterion measure, but generally differed in the magnitude (less for blacks) of these coefficients. The central finding of these analyses reiterated the importance of the relationships between parent and child academic expectations and their implications, particularly for blacks, on student achievement. Along these lines, one conclusion clearly emerged from these analyses. Expectations and achievement go hand-in-hand and despite the significance blacks attribute to the schooling process, their actual experience with it reflects low expectations, from a number of sources, and largely, lower academic achievement. Certainly, we must continue to actively intervene in changing the course of this relationship.

The exploratory contextual analyses revealed that the community context, using a number of identifiers, largely failed to demonstrate a separate, group-level effect. Based on the extensive number of exploratory analyses conducted, probability alone suggests that we might expect to find some significant effects. Of the two detected, school district on student future aspirations and neighborhood racial mix on student self-other perceptions of academic ability, both revealed weak group membership effects, that held only for white students. A second set of analyses examining school-effects revealed that the particular high school a student attended added a small contribution to student achievement. A comparison of students at the elementary and junior high school levels revealed no such difference.

As noted earlier, the results from the high school analysis suggested that (randomly) selecting high achieving and low achieving schools for a comparative analysis might have maximized the potential of detecting school-level effects. Recall that the majority of the high school effects occurred between a comparison of a high achieving and low achieving school. Such selection might distinguish these two groups of schools in the kinds of social and psychological mechanisms operating within them that influence their achievement levels. Many of the studies examining "effective" and "ineffective" schools, identified by their achievement levels, use this approach in describing such properties as teacher expectations and school learning climate (Bickel, 1983).

The final portion of this investigation compared the results of the dummy variable technique to three analytic techniques which replaced the community and school dummy variables with the group average scores derived from respondent scores within each contextual unit. These group scores generally captured the group-level effect identified by the dummy variable method. Of the three techniques, the model which expressed the predictors as individual- and group-level

deviations consistently provided the most reasonable individual and contextual effects. The centering method which further adjusted the criterion measure yielded more liberal and disparate estimates, casting some question about its accuracy, especially when comparing groups with largely unequal sizes. On the basis of these disparities and the complexities involved in designing these transformations, we concluded that the centering procedure proved unsuitable for large scale, multivariate analyses. The final section in Chapter IV provided an evaluation of these four respective techniques.

CONTRIBUTIONS AND SUGGESTIONS

In Chapter I, we stated that this study provided substantive and methodological contributions. We return now to reflect on these contributions in conjunction with some reflections on shortcomings of this study and potential areas for further investigation.

One contribution of this study stems from its comparison of parent and child race and schooling perceptions. Most studies on school desegregation ignore this relationship treating each in isolation, focusing mainly on changes in student outcomes. Instead, we compared black and white families in how they view interracial situations and their beliefs, expectations, and values surrounding the schooling process. As a second contribution, we further explored the implications of these variables on student achievement. It demonstrated among other things the strong link between expectations and achievement and hinted at the reciprocal nature between the two. We did not establish a causal link to this relationship but we observed the strong association. We should state that the measures used showed about half the "explanatory" capability for black families compared to white families. With this shortcoming comes the recognition that researchers need to concentrate on developing measures that tap much of this unidentified, yet

probably systematic variation found in the perceptions of black parents and their children.

The third and perhaps most important contribution flows from the effort in this study to locate the individual-level relationships within a social context. Building on a sociological tradition that makes assertions about the powerful influence of social context, we sought to gain a further understanding of the community and school effects on these race and schooling perceptions. That these efforts largely failed to demonstrate these separate contextual effects does not negate their influence, but suggests that other contextual parameters more specific and directly indentifiable, either perceived or physical, might show stronger and clearer effects. We speculate that Hauser's review of these results might lead him to conclude that these group-level effects, like most in the contextual analysis literature, appear trivial. Certainly others might contend, like Hauser, that these effects reflect random error, misspecification, and that perhaps they fall into the contextual fallacy trap. Probably no contextual analysis, given the level of theory development in the discipline, can refute these difficult accusations.

However, we must reiterate the exploratory nature of this investigation. The techniques used here show promise for such explorations. More importantly, these analytic techniques in the future must be buttressed with sound sociological theory to demonstrate their actual merit. We mathematically approximated and generally identified the source(s) of the group-level effects detected with dummy variable technique. Future efforts must concentrate on replacing these approximations with actual metric measures of group phenomena that take these explorations below the surface level of investigation.

In addition to improving the specification of the contextual identifiers and group-level measures, future research must concentrate on establishing a causal

order to contextual effects. Specifically, we must wrestle with such internal validity issues as selection, since contextual effects may result from respondent self-selection and group-level recruitment on some level of the criterion measure. Many earlier small group research studies demonstrated the effects of group selection and socialization. Although large experimental designs may prove impractical for this causal research, certainly a time-series analysis based on a longtitudinal design that traces respondents' scores on the criterion measures, prior to and following their entry into a particular social setting, would markedly improve such efforts.

A fourth contribution, to which we just alluded, derives from this study's attempt to systematically compare four analytic techniques for analyzing group-level effects. As part of this contribution, we introduced the Boyd and Iverson (1979) single equation centering technique as an approach for uniquely identifying individual, group and interaction effects on individual-level data. We divided this model into two analytical techniques by first examining the results of adjusting the independent variables, the second by examining the results of transforming both the independent and dependent measures. The results consistently produced with the first technique appeared reasonable while those in the second appeared questionable. We offered suggestions for the discrepancies found in the fourth model, although we must concede that these results deserve more consideration from the statistically sophisticated. In any case, to the knowledge of this researcher, this study made the first attempt to compare these analytic techniques.

Future research must continue these efforts, further testing these techniques on carefully specified contextual parameters. More importantly, theoretical development must advance on a level consistent with the sophistication of these techniques presented here, if we plan to further demonstrate at an aggregate-level,

the social and psychological mechanisms that influence human thought and behavior.

A final contribution of this study that should not be overlooked stems from its use of an existing data set for conducting a secondary analysis. Frequently such large data sets, which contain valuable information, fall into disuse following their original application in answering a set of research questions. This study demonstrated that an entirely different set of research questions and methods were applicable to one such data set, beyond its original intent. Naturally, many of the limitations of this investigation derive from the impositions placed on these data, particularly in the use of the rather nonspecific community identifiers and in representing schools with a very limited number of respondents. We must also recognize that the general absence of community and school effects in this study possibly rests on the use of these preexisting data taken from measures largely insensitive to group-level effects.

Certainly collecting new data for this investigation might improve the results, yet these results might suffer many of the same and other unanticipated limitations. Using an existing data set, this analysis identified meaningful individual-level relationships apparently suitable for contextual analysis. Future research should use existing data bases exploring them for information potentially captured in such data. Researchers involved in meta-analysis often combine and analyze such data sets, discovering that this cost-efficient technique produces new findings and insights into sociological issues.

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APPENDIX A

Parent and Student Questionnaires

PARENT QUESTIONNAIRE

STOP READ

Show whether and how much you agree or disagree with each of the following statements by drawing a circle around the answer that shows how you feel.

USE THE FOLLOWING ANSWERS:

SA = you strongly agree with the statement

A = you agree with the statement, but not strongly

NEUTRAL = you are unsure or have no feelings one way or the other

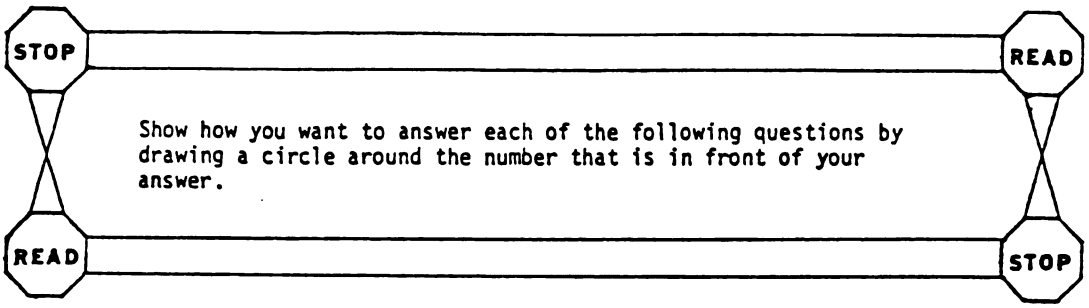
D = you disagree with the statement, but not strongly

SD = you strongly disagree with the statement

READ STOP

1.	It is not important for my child to have a high quality education.	SA	A	NEUTRAL	D	SD
2.	It is important for my child to do as well as possible in school.	SA	A	NEUTRAL	D	SD
3.	To get ahead in life, my child needs as much education as possible.	SA	A	NEUTRAL	D	SD
4.	My child is not getting a good education in school.	SA	A	NEUTRAL	D	SD
5.	I am satisfied with my child's school, as compared to other schools in New Castle County.	SA	A	NEUTRAL	D	SD
6.	Overall, my child's school encourages student achievement.	SA	A	NEUTRAL	D	SD
7.	The teachers and counselors in my child's school encourage students to attend college.	SA	A	NEUTRAL	D	SD
8.	It is a good idea for blacks and whites to get to know each other.	SA	A	NEUTRAL	D	SD
9.	It is a good idea for blacks and whites to be in the same classes at school.	SA	A	NEUTRAL	D	SD

10.	It is a good idea for blacks and whites to live in separate neighborhoods.	SA	A	NEUTRAL	D	SD
11.	It is all right for people of different races to marry each other.	SA	A	NEUTRAL	D	SD
12.	The school my child attends should be segregated.	SA	A	NEUTRAL	D	SD
13.	Desegregated schools provide a better education than segregated schools.	SA	A	NEUTRAL	D	SD
14.	Blacks and whites get along better with each other in school when they are in the same classes.	SA	A	NEUTRAL	D	SD
15.	Blacks and whites get along better with each other outside of school if they don't go to the same school.	SA	A	NEUTRAL	D	SD
16.	The teachers in my child's school generally support school desegregation.	SA	A	NEUTRAL	D	SD
17.	The students in my child's school generally support school desegregation.	SA	A	NEUTRAL	D	SD
18.	The parents in my neighborhood generally support school desegregation.	SA	A	NEUTRAL	D	SD
19.	I support school desegregation in New Castle County.	SA	A	NEUTRAL	D	SD
20.	I encourage my child to do his or her best in school.	SA	A	NEUTRAL	D	SD
21.	I would not help my child if he or she had problems doing his or her homework.	SA	A	NEUTRAL	D	SD
22.	I would let my child stay home from school if he or she just didn't feel like going.	SA	A	NEUTRAL	D	SD
23.	I would feel comfortable about inviting someone of a different race to my home.	SA	A	NEUTRAL	D	SD
24.	It is all right for people of different races to date each other.	SA	A	NEUTRAL	D	SD



25. Ideally, how far would you like your child to go in school?

1. Not finish high school
2. Finish high school
3. Some college beyond high school
4. Finish college (takes about 4 more years after high school)
5. Doctorate or professional degree (more school than just finishing college)

26. Overall, how would you describe your racial attitudes?

1. Very conservative
2. Conservative
3. Moderate
4. Liberal
5. Very liberal

27. How frequently do you check to make sure your child has completed homework assignments?

1. Never
2. Once a month
3. Once a week
4. Two or three times a week
5. Every day

28. How often do you invite someone of a different race to your home for a social function?

1. About once a week
2. About once a month
3. About once every three months
4. About once every six months
5. Never

29. How often do you take part in activities at your child's school?

1. About once a week
2. About once a month
3. About once every three months
4. About once every six months
5. Never

30. How good a student do you think your child could be in school?

1. One of the best students
2. Better than most of the students
3. Same as most of the students
4. Not as good as most of the students
5. One of the worst students

31. How would you rate your child's school work?

1. Very good
2. Good
3. Average
4. Poor
5. Very poor

32. To what group do you belong?

1. Black
2. White
3. Latino
4. Other (specify) _____

33. What is your sex?

1. Male
2. Female

34. Are any of your children attending school in a school district outside the one in which you live?

1. Yes
2. No

35. Is your child presently attending

1. public schools?
2. parochial schools
3. other private schools

36. What level of education do you have?

1. Did not graduate from high school
2. Graduated from high school
3. Some college or other education beyond high school
4. B.A. or B.S degree
5. Master's degree
6. Doctor's or professional degree

37. What level of education does your spouse have? (Omit if you have no spouse)

1. Did not graduate from high school
2. Graduated from high school
3. Some college or other education beyond high school
4. B.A. or B.S. degree
5. Master's degree
6. Doctor's or professional degree

38. Compared to other families in New Castle County, which of the following best describes your family?

    1. Upper class
    2. Upper-middle class
    3. Middle-middle class
    4. Lower-middle class
    5. Working class

39. What is the racial composition of your neighborhood?

    1. All white
    2. Mostly white
    3. About half white and half black
    4. Mostly black
    5. All black

40. When you were in elementary, junior high, and high school, were the schools you attended:

    1. All white
    2. Mostly white
    3. About an even proportion of black and white students
    4. Mostly black
    5. All black

41. Were the teachers you had in elementary, junior high, and high school:

    1. All white
    2. Mostly white
    3. About an even proportion of black and white
    4. Mostly black
    5. All black

42. If you work for pay, which of the following categories best describes your job?

    1. Executive or upper level professional
    2. Manager or lower level professional
    3. Administrator in a large concern; owner of a medium sized independent business
    4. Owner of a small business; clerical or sales worker; technician
    5. Skilled worker
    6. Semi-skilled worker
    7. Unskilled worker

43. If your spouse works for pay, which of the following categories best describes his/her job? (Omit if you have no spouse)

    1. Executive or upper level professional
    2. Manager or lower level professional
    3. Administrator in a large concern; owner of a medium sized independent business
    4. Owner of a small business; clerical or sales worker; technician
    5. Skilled worker
    6. Semi-skilled worker
    7. Unskilled worker

44. Compared to other families in New Castle County, how would you rate your family on its overall prestige?

1. Much higher than average
2. Higher than average
3. Average
4. Lower than average
5. Much lower than average

45. Compared to other families in New Castle County, how would you rate the members of your family on overall occupational status?

1. Much higher than average
2. Higher than average
3. Average
4. Lower than average
5. Much lower than average

46. Compared to other families in New Castle County, how would you rate your family on overall income, possessions, and wealth?

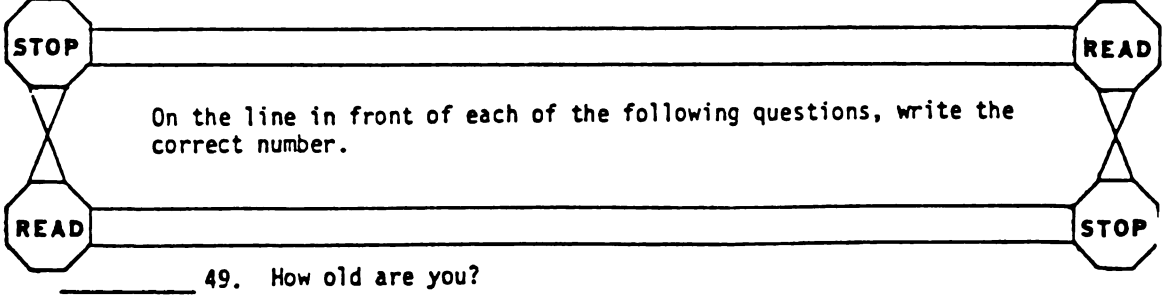
1. Much higher than average
2. Higher than average
3. Average
4. Lower than average
5. Much lower than average

47. Compared to other families in New Castle County, how would you rate your family on status of friends and acquaintances?

1. Much higher than average
2. Higher than average
3. Average
4. Lower than average
5. Much lower than average

48. Compared to other families in New Castle County, how would you rate your family on power and influence over others?

1. Much higher than average
2. Higher than average
3. Average
4. Lower than average
5. Much lower than average



_____ 49. How old are you?

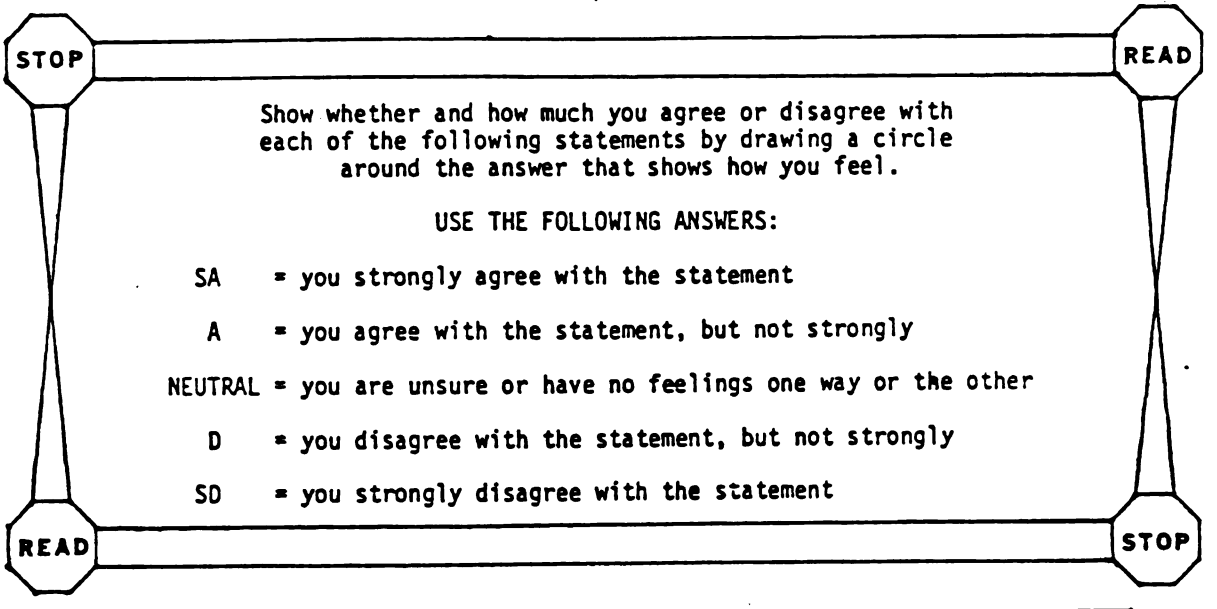
_____ 50. Thinking of your six best friends, how many are white?

_____ 51. Thinking of your six best friends, how many are black?

_____ 52. As a result of the court-ordered desegregation, is your child attending a different school this year than he/she would have attended?

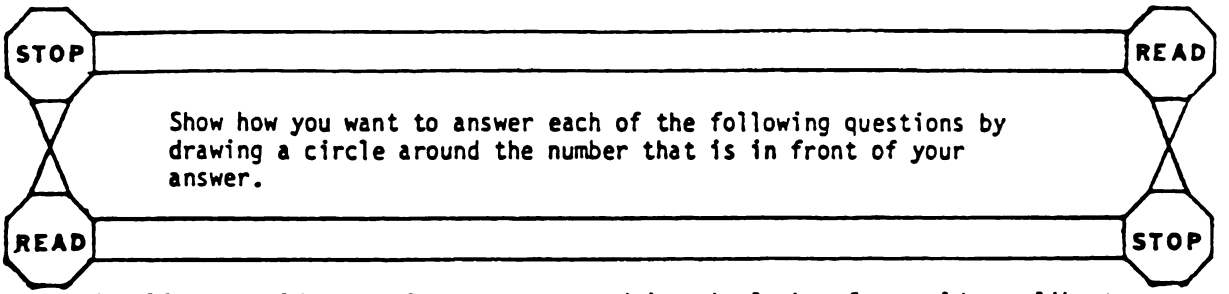
_____ 53. What school would your child have attended, had it not been for court-ordered school desegregation? (Write name of school).

STUDENT QUESTIONNAIRE



1.	It is important for me to do my best in school.	SA	A	NEUTRAL	D	SD
2.	I am not getting a good education at my school.	SA	A	NEUTRAL	D	SD
3.	My teachers encourage most of the students in my school to go to college.	SA	A	NEUTRAL	D	SD
4.	I don't like going to school.	SA	A	NEUTRAL	D	SD
5.	It is a good idea for blacks and whites to get to know each other.	SA	A	NEUTRAL	D	SD
6.	It is a good idea for blacks and whites to live in separate neighborhoods.	SA	A	NEUTRAL	D	SD
7.	It is a good idea for blacks and whites to be in the same classes at school.	SA	A	NEUTRAL	D	SD
8.	It is all right for people of different races to marry each other.	SA	A	NEUTRAL	D	SD
9.	To get ahead in life, I need as much education as possible.	SA	A	NEUTRAL	D	SD
10.	Getting good grades is easier when blacks and whites are in the same classes.	SA	A	NEUTRAL	D	SD
11.	It is all right for people of different races to date each other.	SA	A	NEUTRAL	D	SD

12.	Blacks and whites get along better with each other in school when they are in the same class.	SA	A	NEUTRAL	D	SD
13.	Blacks and whites get along better with each other outside of school if they don't go to the same school.	SA	A	NEUTRAL	D	SD
14.	My parents encourage me to do my best in school.	SA	A	NEUTRAL	D	SD
15.	My parents don't help me if I have problems doing my homework.	SA	A	NEUTRAL	D	SD
16.	My parents check to see if I have done my homework.	SA	A	NEUTRAL	D	SD
17.	My parents would let me stay home from school just because I didn't feel like going.	SA	A	NEUTRAL	D	SD
18.	I don't think I will be able to do what I want when I grow up.	SA	A	NEUTRAL	D	SD
19.	I can do well in school if I work hard.	SA	A	NEUTRAL	D	SD
20.	You have to be lucky to get good grades in my school.	SA	A	NEUTRAL	D	SD
21.	I would enjoy studying with a student of a race different from my own (black or white) as much as with one from my own race.	SA	A	NEUTRAL	D	SD
22.	I would join a club I was interested in even if some of its members were of a different race.	SA	A	NEUTRAL	D	SD
23.	If I could, I would invite people of a different race to my home.	SA	A	NEUTRAL	D	SD



24. If you could go as far as you wanted in school, how far would you like to go?

    1. Not finish high school
    2. Finish high school
    3. Some college beyond high school
    4. Finish college (takes about 4 more years after high school)
    5. Doctorate or professional degree (more school than just finishing college)

25. How good a student are you now?

    1. One of the best students
    2. Better than most of the students
    3. Same as most of the students
    4. Not as good as most of the students
    5. One of the worst students

26. How good a student do you think you could be in the school you now attend?

    1. One of the best students
    2. Better than most of the students
    3. Same as most of the students
    4. Not as good as most of the students
    5. One of the worst students

27. How good a student do your teachers think you could be?

    1. One of the best students
    2. Better than most of the students
    3. Same as most of the students
    4. Not as good as most of the students
    5. One of the worst students

28. How would your teachers rate your school work compared to that of others in your school?

    1. Very good
    2. Good
    3. Average
    4. Poor
    5. Very poor

29. How far in school do you think your teachers would like you to go?

    1. Not finish high school
    2. Finish high school
    3. Some college beyond high school
    4. Finish college (takes about 4 more years after high school)
    5. Doctorate or professional degree (more school than just finishing college)

30. How far in school do you think your parents would like you to go?

    1. Not finish high school
    2. Finish high school
    3. Some college beyond high school
    4. Finish college (takes about 4 more years after high school)
    5. Doctorate or professional degree (more school than just finishing college)

31. How good a student do your parents think you could be in school?

    1. One of the best students
    2. Better than most of the students
    3. Same as most of the students
    4. Not as good as most of the students
    5. One of the worst students

32. How would your parents rate your school work?

    1. Very good
    2. Good
    3. Average
    4. Poor
    5. Very poor

33. How many students in your school <u>don't</u> care if they get bad grades?

    1. Almost all of the students
    2. Most of the students
    3. About half of the students
    4. Some of the students
    5. None of the students

34. How many students in your school make fun of or tease students who get very good grades?

    1. Almost all of the students
    2. Most of the students
    3. About half of the students
    4. Some of the students
    5. None of the students

35. How many students <u>don't</u> do as well as they could do in school because they are afraid other students won't like them as much?

    1. Almost all of the students
    2. Most of the students
    3. About half of the students
    4. Some of the students
    5. None of the students

36. Of the teachers that you know in your school, how many don't care if the students get bad grades?

1. Almost all of the teachers
2. Most of the teachers
3. About half of the teachers
4. Some of the teachers
5. Almost none of the teachers

37. Of the teachers that you know in your school, how many don't care how hard the student works?

1. Almost all of the teachers
2. Most of the teachers
3. About half of the teachers
4. Some of the teachers
5. Almost none of the teachers

38. Which one of the following best describes your level or program?

1. Elementary school
2. Middle or junior high school
3. High school - Advanced or special preparatory
4. High school - College preparatory
5. High school - Business
6. High school - Vocational
7. High school - General
8. Other (specify) _____
9. Don't know

39. How much time do you usually spend doing homework after school?

1. Two hours or more a day
2. Between 1 and 2 hours a day
3. Between a half hour and one hour a day
4. Less than 1/2 hour a day
5. None, or almost none

40. Are you male or female?

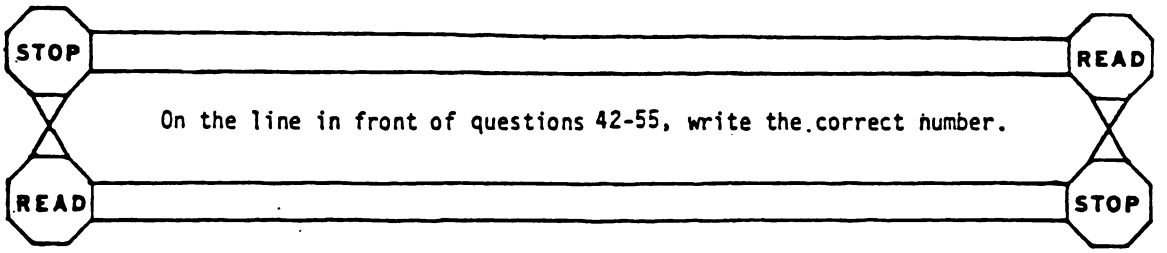
1. Male
2. Female

41. To what group do you belong?

1. Black
2. White
3. Latino
4. Other (specify) _____

42. How do you usually get to school?

1. School bus
2. Car
3. Walk
4. Bike
5. City bus
6. Other _____



_____ 43. What grade are you in now?

_____ 44. How old are you?

_____ 45. How many older brothers do you have?

_____ 46. How many younger brothers do you have?

_____ 47. How many older sisters do you have?

_____ 48. How many younger sisters do you have?

_____ 49. About how many black teachers have you had?

_____ 50. Thinking of your six best friends, how many are white?

_____ 51. Thinking of your six best friends, how many are black?

_____ 52. How many teachers do you have?

_____ 53. How many of your teachers this year are white?

_____ 54. How many of your teachers this year are black?

_____ 55. How many minutes does it usually take you to go from home to school?

_____ 56. What is your classroom or homeroom number?

57. On the line below, write the name of your school.

_____

APPENDIX B

Questionnaire Items Comprising the Parent and Student Scales

Questionnaire Items Comprising the Parent and Student Scales

Parent Scales

Item No.	Racial Attitudes
8	It is a good idea for blacks and whites to get to know each other.
9	It is a good idea for blacks and whites to be in the same classes at school.
10	It is a good idea for blacks and whites to live in separate neighborhoods.
11	It is all right for people of different races to marry each other.
12	The school my child attends should be segregated.
14	Blacks and whites get along better with each other in school when they are in the same classes.
15	Blacks and whites get along better with each other outside of school if they don't go to the same school.
23	I would feel comfortable about inviting someone of a different race to my home.
26	Overall, how would you describe your racial attitudes?
28	How often do you invite someone of a different race to your home for a social function?

Item No.	Status
38	Compared to other families in New Castle County, which of the following best describes your family?
44	Compared to other families in New Castle County, how would you rate your family on its overall pestige?
45	Compared to other families in New Castle County, how would you rate the members of your family on overall educational status?
46	Compared to other families in New Castle County, how would you rate your family on overall income, possessions, and wealth?

Item No.	Status (cont'd)
47	Compared to other families in New Castle County, how would you rate your family on status of friends and acquaintances?
48	Compared to other families in New Castle County, how would you rate your family on power and influence over others?

Item No.	Attitudes Toward School Desegregation
13	Desegregated schools provide a better education than segregated schools.
16	The teachers in my child's school generally support school desegregation.
17	The students in my child's school generally support school desegregation.
18	The parents in my neighborhood generally support school desegregation.
19	I support school desegregation in New Castle County.

Item No.	Perceived School Quality
4	My child is not getting a good education in school.
5	I am satisfied with my child's school, as compared to other schools in New Castle County.
6	Overall, my child's school encourages student achievement.
7	The teachers and counselors in my child's school encourage students to attend college.

Item No.	Evaluation and Expectations of Child's Performance
25	Ideally, how far would you like your child to go in school?
30	How good a student do you think your child could be in school?
31	How would you rate your child's school work?

Item No.	Importance of Education
1	It is not important for my child to have a high quality education.
2	It is important for my child to do as well as possible in school.
3	To get ahead in life, my child needs as much education as possible.
20	I encourage my child to do his or her best in school.
21	I would not help my child if he or she had problems doing his or her homework.
22	I would let my child stay home from school if he or she just didn't feel like going.
27	How frequently do you check to make sure your child has completed homework assignments?

Student Scales

Item No.	Racial Attitudes
5	It is a good idea for blacks and whites to get to know each other.
6	It is a good idea for blacks and whites to live in separate neighborhoods.
7	It is a good idea for blacks and whites to be in the same classes at school.
8	It is all right for people of different races to marry each other.
12	Blacks and whites get along better with each other in school when they are in the same class.
21	I would enjoy studying with a student of a race different from my own (black or white) as much as with one from my own race.
22	I would join a club I was interested in even if some of its members were of a different race.
23	If I could, I would invite people of a different race to my home.

Item No.	Self-Other Perceptions of Academic Ability
25	How good a student are you now?
26	How good a student do you think you could be in the school you now attend?
27	How good a student do your teachers think you could be?
28	How would your teachers rate your school work compared to that of others in your school?
31	How good a student do your parents think you could be in school?
32	How would your parents rate your school work?

Item No.	Future Aspiration
24	If you could go as far as you wanted in school, how far would you like to go?
29	How far in school do you think your teachers would like you to go?
30	How far in school do you think your parents would like you to go?

Item No.	Importance of Education
1	It is important for me to do my best in school.
9	To get ahead in life, I need as much education as possible.
14	My parents encourage me to do my best in school.
15	My parents don't help me if I have problems doing my homework.
16	My parents check to see if I have done my homework.
17	My parents would let me stay home from school just because I didn't feel like going.
19	I can do well in school if I work hard.

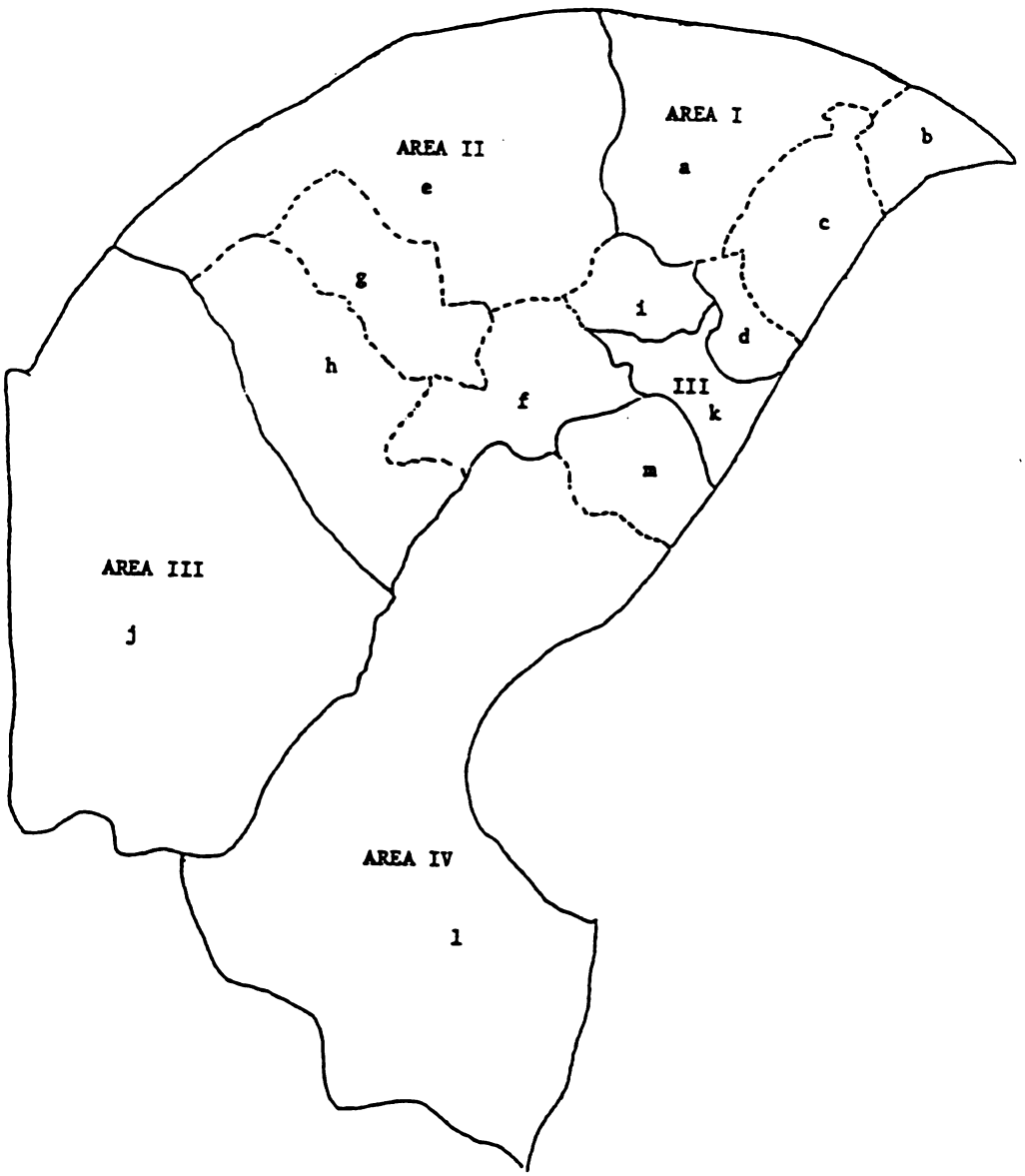
Item No.	School Academic Climate
33	How many students in your school don't care if they get bad grades?
34	How many students in your school make fun of or tease students who get very good grades?
35	How many students don't do as well as they could do in school because they are afraid other students won't like them as much?
36	Of the teachers that you know in your school, how many don't care if the students get bad grades?
37	Of the teachers that you know in your school, how many don't care how hard the student works?

Item No.	Sense of Control
18	I don't think I will be able to do what I want when I grow up.
19	I can do well in school if I work hard.
20	You have to be lucky to get good grades in my school.

APPENDIX C

A Map Depicting the Attendance Areas and Former School Districts of New Castle County

A Map Depicting the Attendance Areas and Former School Districts of New Castle County



AREA I - Formerly: (a) Alfred I. DuPont, (b) Claymont, (c) Mt. Pleasant, and (d) part of Wilmington

AREA II - Formerly: (e) Alexis I. DuPont, (f) Conrad, (g) Marshallton-McKean, (h) Stanton, and (i) part of Wilmington

AREA III - Formerly: (j) Newark, and (k) part of Wilmington

AREA IV - Formerly: (l) New Castle-Gunning Bedford, and (m) De La Warr

APPENDIX D

Zero-Order Correlation Matrices of the Parent and Student Scales

Table D-1

Intercorrelation Matrices of Total Sample[1]

Parent Scales

	PRA	PSTAT	PATSD	PPSQ	PEECP	PIE	SACH
PRA	1.000	.022	.506	.220	.141		
PSTAT		1.000	-.090	-.096	.349		.389
PATSD			1.000	.349			-.129
PPSQ				1.000	.093	.104	-.080
PEECP					1.000	.177	.604
PIE						1.000	
SACH							1.000

Student Scales

	SRA	SOPA	SFA	SIE	SSAC	SSC	SACH
SRA	1.000	.212	.201	.234	.221	.247	
SOPA		1.000	.511	.268	.209	.325	.534
SFA			1.000	.236	.212	.372	.512
SIE				1.000	.278	.421	
SSAC					1.000		.166
SSC						1.000	.237
SACH							1.000

[1] All coefficients presented have an associated probability (p) of .05 or less.

Table D-2

Correlation Matrix of Parent and Student Scales[1] by Grade Levels of Students (K-6, 7-8, 9-12)[2]

	PRA	PSTAT	PATSD	PPSQ	PEECP	PIE
	.527		.309	.234	.139	
SRA	.466	-.126	.358	.141	.225	
	.536		.398	.228		
		.300			.673	.188
SOPA		.306			.526	
	.128	.218	.114	.162	.670	
		.315			.527	.150
SFA		.314			.622	.136
	.127	.288			.622	
	.124			.103	.257	.407
SIE						.386
		-.114		.162		.266
	.149	.111	.112	.195	.228	.257
SSAC		.182			.188	
	.137		.125	.260	.184	
	.131	.106	.117	.146	.332	.276
SSC			-.137		.278	.163
	.124		.086	.106	.294	.102

[1]All coefficients presented have an associated probability (p) of .05 or less.

[2]First coefficient K-6 grade level, second coefficient 7-8 grade level, third coefficient 9-12 grade level.

APPENDIX E

Zero-Order Intercorrelation Matrices of the Unadjusted and Adjusted Independent Variables Used in the Analyses of the Student Criterion Measures

Table E-1

An Intercorrelation Matrix of the Unadjusted and Adjusted[1]
Independent Variables Used in the Analysis of White Student Future Aspirations

	PSTAT	PEECP	PSTAT	PEECP	I1[2]	I2	I3	I4	I5	I6
PSTAT	1.000	.297 .282	.170 .000	.137 -.000	.811 .038	.989 -.070	.989 -.045	.314 .016	.307 .003	.162 -.001
PEECP		1.000	.135 .000	.167 -.000	.793 -.172	.307 .019	.313 .003	.988 -.061	.989 -.120	.158 -.000
PSTAT			1.000	.811 .811	.182 .020	.313 .000	.281 .000	.280 -.000	.247 -.000	.952 -.918
PEECP				1.000	.181 .003	.250 -.000	.281 -.000	.280 -.000	.308 -.000	.951 -.899
I1					1.000	.809 -.122	.813 -.138	.796 -.001	.792 -.001	.191 -.023
I2						1.000	.995 .835	.345 .143	.333 .097	.296 .000
I3							1.000	.346 .095	.344 .137	.295 .000
I4								1.000	.995 .865	.295 .000
I5									1.000	.292 .000
I6										1.000

[1]Within a cell, the first coefficient is for the unadjusted variables, the second is for the adjusted variables.

[2]Interaction terms: I1 = PSTATxPEECP, I2 = PSTATxPSTAT, I3 = PSTATxPEECP, I4 = PEECPxPSTAT, I5 = PEECPxPEECP, I6 = PSTATxPEECP.

Table E-2

An Intercorrelation Matrix of the Unadjusted and Adjusted[1] Independent Variables Used in the Analysis of White Student Self-Other Perceptions of Academic Ability

	PSTAT	PEECP	PSTAT	PEECP	I1[2]	I2	I3	I4	I5	I6
PSTAT	1.000	.289 .284	.105 .000	.105 .000	.807 .038	.995 .003	.998 .004	.297 .018	.294 .018	.105 -.000
PEECP		1.000	.060 .000	.060 .000	.792 -.192	.290 .018	.290 .019	.995 -.047	.998 -.046	.060 -.000
PSTAT			1.000	.999 .999	.102 .020	.201 -.000	.161 -.000	.158 .000	.117 -.958	.999 .093
PEECP				1.000	.102 -.091	.200 -.091	.161 -.087	.158 -.087	.117 .020	.999 .119
I1					1.000	.805 .999	.807 .167	.794 .166	.794 .000	.102 -.019
I2						1.000	.999 .166	.308 .166	.301 .000	.201 .019
I3							1.000	.303 .999	.298 -.000	.161 -.019
I4								1.000	.999 -.000	.158 -.017
I5									1.000	.117 -.070
I6										1.000

[1]Within a cell, the first coefficient is for the unadjusted variables, the second is for the adjusted variables.

[2]Interaction terms: I1 = PSTATxPEECP, I2 = PSTATxPSTAT, I3 = PSTATxPEECP, I4 = PEECPxPSTAT, I5 = PEECPxPEECP, I6 = PSTATxPEECP.

Table E-3

An Intercorrelation Matrix of the Unadjusted and Adjusted[1] Independent Variables Used in the Analysis of White Student Academic Achievement

	PSTAT	SOPA	PSTAT	SOPA	I1[2]	I2	I3	I4	I5	I6
PSTAT	1.000	.199 .181	.287 -.000	.143 .000	.773 -.089	.971 .008	.980 -.021	.265 .111	.218 .090	.260 -.000
SOPA		1.000	.104 -.000	.209 -.000	.769 -.142	.209 .085	.234 .110	.963 .024	.981 .159	.171 -.000
PSTAT			1.000	.496 .496	.261 .083	.507 .000	.373 -.000	.366 -.000	.197 -.000	.905 .322
SOPA				1.000	.239 .111	.258 .000	.337 -.000	.331 -.000	.395 -.000	.818 .708
I1					1.000	.763 .110	.785 .133	.792 .061	.772 .122	.290 .027
I2						1.000	.975 .512	.334 .110	.251 .167	.462 .000
I3							1.000	.322 .171	.290 .115	.412 .001
I4								1.000	.971 .512	.405 -.000
I5									1.000	.324 -.000
I6										1.000

[1]Within a cell, the first coefficient is for the unadjusted variables, the second is for the adjusted variables.

[2]Interaction terms: I1 = PSTATxSOPA, I2 = PSTATxPSTAT, I3 = PSTATxSOPA, I4 = SOPAxPSTAT, I5 = SOPAxSOPA, I6 = PSTATxSOPA.

Table E-4

An Intercorrelation Matrix of the Unadjusted and Adjusted[1] Independent Variables Used in the Analysis of Student Achievement

	PSTAT	SOPA	PSTAT	SOPA	I1[2]	I2	I3	I4	I5	I6
PSTAT	1.000	.229 .195	.348 .000	.247 .000	.798 -.174	.961 -.057	.984 -.068	.322 .018	.265 .082	.335 .000
SOPA		1.000	.145 -.000	.204 .000	.762 -.134	.242 .017	.254 .081	.942 .087	.981 .036	.179 -.000
PSTAT			1.000	.710 .710	.323 .018	.589 .000	.452 .000	.466 -.000	.274 -.000	.961 -.115
SOPA				1.000	.300 .084	.425 .000	.412 .000	.425 -.000	.388 -.000	.877 .580
I1					1.000	.784 .181	.807 .180	.791 .134	.778 .079	.338 .053
I2						1.000	.980 .710	.415 .275	.312 .177	.569 .000
I3							1.000	.380 .182	.322 .216	.470 .000
I4								1.000	.970 .692	.485 .000
I5									1.000	.339 -.000
I6										1.000

[1]Within a cell, the first coefficient is for the unadjusted variables, the second is for the adjusted variables.

[2]Interaction terms: I1 = PSTATxSOPA, I2 = PSTATxPSTAT, I3 = PSTATxSOPA, I4 = SOPAxPSTAT, I5 = SOPAxSOPA, I6 = PSTATxSOPA.

APPENDIX F

An SPSS Computer Program for Assigning, Adjusting, and Regressing Independent and Dependent Variables (Centering Technique)

An SPSS Computer Program for Assigning, Adjusting, and Regressing Independent and Dependent Variables (Centering Technique)

```
COMMENT     Select Former District (FD)
SELECT IF   (FD EQ 1 or 2 or 19 or 21 or 28)

COMMENT     Assign the Means for Social Status (MT) and Parent Expectations
            (ME) to Respondents within Each District

COMMENT     Assign the Regression Coefficient Values for Social Status (ST)
            and Parent Expectations (SE) to Respondents within Each
            District

COMMENT     District I Values
IF          (FD EQ 1) MT = 3.2348
IF          (FD EQ 1) ME = 3.9848
IF          (FD EQ 1) ST = .052911
IF          (FD EQ 1) SE = 1.085062

COMMENT     District II Values
IF          (FD EQ 2) MT = 2.9825
IF          (FD EQ 2) ME = 3.6667
IF          (FD EQ 2) ST = .627203
IF          (FD EQ 2) SE = .703307

COMMENT     District III Values
IF          (FD EQ 19) MT = 3.4818
IF          (FD EQ 19) ME = 4.1585
IF          (FD EQ 19) ST = .156563
IF          (FD EQ 19) SE = .820449

COMMENT     District IV Values
IF          (FD EQ 21) MT = 3.4148
IF          (FD EQ 21) ME = 4.2368
IF          (FD EQ 21) ST = .174223
IF          (FD EQ 21) SE = .570217

COMMENT     District V Values
IF          (FD EQ 28) MT = 3.4144
IF          (FD EQ 28) ME = 4.1597
IF          (FD EQ 28) ST = .007013
IF          (FD EQ 28) SE = .909606

COMMENT     Calculate the New Student Future Aspirations (SFA2) Values
COMPUTE     NY = SFA2 - (ST * MT) - (SE * ME)

COMMENT     Calculate the New Individual Social Status Values
COMPUTE     NX1 = PSTAT2 - MT
```

```
COMMENT     Calculate the New Individual Parent Expectations Values
COMPUTE     NX2 = PEECP2 - ME

COMMENT     Calculate the New Group-Level Values for Each District by
            Subtracting the Grand Mean for Social Status and Parent
            Expectations
COMPUTE     NXB1 = MT - 3.4108
COMPUTE     NXB2 = ME - 4.1812

COMMENT     Calculate the New Interaction Terms Using the Adjusted
            Independent Variables
COMPUTE     NI1 = NX1 * NX2
COMPUTE     NI2 = NX1 * NXB1
COMPUTE     NI3 = NX1 * NXB2
COMPUTE     NI4 = NX2 * NXB1
COMPUTE     NI5 = NX2 * NXB2
COMPUTE     NI6 = NXB1 * NXB2

COMMENT     Calculate the Original Interaction Terms
COMPUTE     I1 = PSTAT2 * PEECP2
COMPUTE     I2 = PSTAT2 * MT
COMPUTE     I3 = PSTAT2 * ME
COMPUTE     I4 = PEECP2 * MT
COMPUTE     I5 = PEECP2 * ME
COMPUTE     I6 = MT * ME

COMMENT     Include All Variables in a Regression Design Statement
REGRESSION  Variables = SFA2, PSTAT2, PEECP2, MT, ME, I1 TO I6, NY,
            NX1, NX2, NXB1, NXB2, NI1 TO NI6/

COMMENT     Regress Three Models:  Unadjusted I.V., Adjusted I.V., and
            Adjusted I.V. - D.V.
            Regression = SFA2 with PSTAT2(12), PEECP2(10), MT(8), ME(6),
            I1 TO I6(4)/
            Regression = SFA2 with NX1(12), NX2(10), NXB1(8), NXB2(6),
            NI1 TO NI6(4)/
            Regression = NY with NX1(12), NX2(10), NXB1(8), NXB2(6), NI1
            TO NI6(4)/

COMMENT     Print the Means, Standard Deviations (1), and the Correlation
            Matrix (2) for All Variables
STATISTICS  1,2
```