Winter 2000

Community Social Disorganization Theory Applied to Adolescent Academic Achievement

Spencer Ross Baker
Old Dominion University

COMMUNITY SOCIAL DISORGANIZATION THEORY APPLIED TO ADOLESCENT ACADEMIC ACHIEVEMENT

by

Spencer Ross Baker
B.A. May 1995, North Carolina Wesleyan College
M.A. December 1997, Hampton University

A Dissertation Proposal Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

URBAN SERVICES

OLD DOMINION UNIVERSITY
December 2000

Approved By:

Dr. Jack E. Robinson,
Dissertation Committee Chair

Dr. Mona J. E. Danner,
Committee Member

Dr. Petra E. Snowden,
Concentration Area Director

Dr. Edward S. Neukrug,
Committee Member

Dr. Jane Hager,
Interim Dean, Darden College of Education

ABSTRACT

COMMUNITY SOCIAL DISORGANIZATION THEORY APPLIED TO ADOLESCENT ACADEMIC ACHIEVEMENT

Spencer Ross Baker
Old Dominion University, 2000
Director: Dr. Jack E. Robinson

Over the years, the public education system has been transformed by outside political and societal forces to provide an equal opportunity for all students. Investigations of the public education system were not consistent and yielded divergent results on how to improve adolescent academic achievement. These divergent results were caused by different operationalizations of variables, data analytical procedures that possibly provided biased parameter estimates, and a failure to use a comprehensive theory. Although these results were inconsistent, the latest transformation of the public education system currently involves holding schools, administrators, parents, and students accountable for learning.

The measurement of success in adolescent academic achievement was reflected by the results of standardized tests. Throughout the relevant literature, a strong link can be found between adolescent development, adolescent academic achievement, and adolescent social deviancy. In past and current research, the community social disorganization theory was used to explain variance in adolescent social deviancy.

The purpose of this dissertation was twofold. First was conducting explanatory research using community contextual variables to investigate adolescent academic achievement. Second was the extension of multilevel analyses to investigate the school within its social context of the community. This dissertation employed community social disorganization theory to explain variations in adolescent academic achievement as

measured by standardized tests. In addition to employing theory, this dissertation utilized structural equation modeling and multilevel analyses to reduce biased parameter estimates and to investigate the relationships between community contextual variables. These procedures were also used to determine whether contextual variables at the school level or the school district level influenced adolescent academic achievement and which was more significant.

The first structural equation model of the school district for school year 1997-98 accounted for 68% of the variance in adolescent academic achievement. This model was replicated on a different school year and it accounted for 75% of the variance in adolescent academic achievement. Next, contextual variables at the school level were modeled and 65% of the variance was accounted for. A multilevel analysis with structural equation modeling was used with both school district and school contextual variables included. Within the school district, 80% of the relative variance in adolescent academic achievement was accounted for and at the between school district level 97% of the relative variance was accounted for. Although these findings of the multilevel analyses should be interpreted cautiously (Bollen, 1989; Gustafsson & Stahl, 2000; Joreskog, 1999b), this study advances the use of multilevel analyses.

These strong models hold great promise for investigating adolescent academic achievement using the community social disorganization theory along with appropriate statistical methods of structural equation modeling and multilevel analyses. The multilevel analyses must be replicated with future data to provide confirmation and support of the current results.

This dissertation is dedicated to those who are leading unfulfilled lives based on deferred dreams. In addition, this dissertation is dedicated to those of us leading fulfilled lives in spite of deferred dreams. No longer should we be invisible to the dominant society as we have been. No longer should we have to theorize what happens to a dream deferred. We will only have to look into those faces that are no longer invisible. This dissertation is based on the dream that we may all grow in a promoting environment to reach our fullest potential using those talents and gifts that were given to us before the beginning of time.

This dissertation is a pronouncement to the dreams of Charles Senior, Julia, Jeanette, Charles Junior, Margaret, Patty, Kathy, Rodney, Amelia, William, Larzette, and Gina. The dreams of Janis, Michael, William, Stacey, Melvin, and Dominique are captured within this document and make it a living document. Their dreams are contagious and have been captured by Tanya, Cree, Trey, Ja'n, Tye, Stephanie, Danny, Sam, and Julia. In closing, this dissertation was written in loving memory to Charles Senior, Julia, Kathy, Rodney, and so many more who have gone ahead to prepare new dreams for us to fulfill.

ACKNOWLEDGEMENTS

A project such as this could never had been completed alone without much needed technical assistance, inspiration, love, and understanding. Patience was called on often by all. First, I need to acknowledge the great support of the military industrial complex. My loved ones formerly in the U.S. Navy, my friends and cohorts in the U.S. Air Force, and those who I envied in the U.S. Army were inspirations to me for identification of the mission and accomplishing it. I have to acknowledge all the wonderful support from colleagues who became friends from both Hampton University and Old Dominion University – especially those who were so bold as to read this document and attend discourses where we cogently defended it. They provided understanding even when they did not understand what it was I actually was doing. Next, the members of my committee provided collective and individual support in their own way. Jack Robinson always asking me why, how, and to explain. Mona Danner was always firing my passion to identify the social injustices. Ed Neukrug seeking causality in a post-modern world. Each sent me to new heights in learning and each served as a catalyst in my journey to determine "who stole the cookies." My committee worked feverishly attempting to correct my writing; however, I know I slipped some errors by them. These errors are mine and mine alone.

Finally, the ones who made all of this worthwhile – my family – receive my deepest thanks. My family of origin, especially my brother Charles, continues to receive my love for providing early inspiration of what I might become when I grow up; an ongoing process. In my extended family, I always found a source of energy and support. But, my family of choice, especially Jan and Dominique, is the one who had to live with this entire process. Thank each of you for your part in making my deferred dreams a reality!

TABLE OF CONTENTS

LISTS OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

PURPOSE

In the 1960's, the American public possessed a dream of equality that was first promised by the founders of our nation so eloquently in documents and in the lyrics of patriotic songs. This dream of equality was marshaled in by the Civil Rights movement (Berube, 1994) and covered all aspects of our existence with efforts to correct the inequalities of our past. A significant area of this dream was equality of education to aid minorities, those who were economically disadvantaged, and other marginalized groups to achieve the American dream (Bracey, 1995; Moynihan, 1965) that we read and sang about. Although this dream of equality accomplished many goals, many other goals, especially in education, were not readily achieved and our efforts were prematurely labeled failures. Legislators seeking votes gave voice to these failures especially within the area of public education. Public opinion turned from the dream of equality in education and embraced a national standards movement as the answer to social inequalities in public education (Berube, 1994). As the national standards movement gained wide momentum, the promises, writings, and song lyrics of our forefathers about America as a land of equal opportunity rang hollow in the ears of minorities, those who were economically disadvantaged, and other marginalized groups and, once again, deferred (Page, 2000).

This dissertation's purpose was adapting the community social disorganization theory to explain adolescent academic achievement in the public education system. Through this application of theory to explain adolescent academic achievement, a better

understanding is gained of how community contextual variables interact to influence equality of education and perceptions of public school failures. To achieve this purpose, this dissertation employed structural equation modeling and multilevel analyses to understand how these contextual variables influence each other and adolescent academic achievement as measured by standardized tests. This understanding of how adolescent academic achievement is influenced provides answers beyond national standards when addressing social inequalities in the public education system.

This dissertation extends the current literature by investigating the influences of community contextual variables on adolescent academic achievement using a comprehensive and integrative theory of community social disorganization. This current study also extends the literature by increasing the understanding of data analyses by employing multilevel analyses with structural equation models.

Overview of Academic Achievement

Although the U.S. public education system is the envy of many nations (Ravitch, 1983), many of the American public view the system as a dismal failure. This public view is captured in the headlines of newspapers, publications and the rhetoric of elected officials (Bracey, 1998) assailing students as not being smart enough, civil enough, or disciplined enough to succeed. In the court of public opinion, the most prominent judgment of this perceived failure is adolescent academic achievement as most commonly measured by standardized testing (Hanushek, 1986). Currently, the public still views academic achievement as synonymous with overall student performance. The failure to achieve academically is interpreted by many as a failure of the student to perform overall (Hanushek, 1986). For this failure in academic achievement, the

students, their parents and teachers were found at fault (The National Commission on Excellence in Education, 1983).

In the Commonwealth of Virginia, this perceived failure was the primary motivation for the implementation of statewide academic standards of learning in core subjects measured by statewide achievement tests. The failure to pass achievement tests will result in grade retention or no high school diploma for students (Virginia Commission on the Future of Public Education, 1997). Along with these standards, Virginia implemented school accountability for the academic failure of their students. The failure to meet statewide student pass rates on achievement tests will result in loss of accreditation for schools (Virginia Commission on the Future of Public Education, 1997). Virginia assumed that, if the academic standards were in place, the students would learn; and, if accountability were strictly maintained, the teachers would teach. A guilty verdict was assigned for the failure of students to perform and achieve academically. Standards and accountability were perceived by many as answers to the inequalities in academic achievement and implementation programs were placed into motion. Within Virginia and across the nation, this failure of students to perform and achieve academically was resolved with standards and accountability (Bracey, 1998).

Standards and accountability are not recent innovations. Cremin (as cited in Bracey, 1995) stated in a hyperbole that "Just about the time Adam first whispered to Eve that they were living through an age of transition, the Serpent doubtless issued the first complaint that academic standards were beginning to decline" (p. 29). Academic achievement is a complex phenomenon that continues to resist simplistic public judgments and indictments, political assumptions, and social sciences research that is less

than rigorous. The perceived failure of students' performance remains because the implemented answers of standards and accountability failed to adequately address the social inequalities that influence student performance as measured by adolescent academic achievement (Bracey, 1995, 1998).

Inquires into the Public Education System

This perception of failure within the public education system is not new and has demanded the attention of numerous practitioners, policy makers, and parents for the major portion of the 1900's, but especially the last 50 years (Bracey, 1995). This focus has been very diverse and included issues such as the equality of education opportunity for all students (Coleman et al., 1966) racial integration (Fisher, 1990; Kozol, 1991; Orfield & Yun, 1999), the economic future of the nation (The National Commission on Excellence in Education, 1983), accountability, and national standards for all students to achieve (Ravitch, 1983; The National Commission on Excellence in Education, 1983). Through this diverse focus, the education system was transformed by outside societal and economic forces in an attempt to answer perceived social ills and improve the educational process (Ravitch, 1983), which, in turn, is believed to improve the national economy (The National Commission on Excellence in Education, 1983).

During this transformation, a multitude of inquiries (Coleman et al., 1966; Hanushek, 1986; Mayer, 1991; Payne & Biddle, 1999; The National Commission on Excellence in Education, 1983) was conducted to determine how to improve the educational process. These inquiries sought to find the key constructs such as school funding, student's background, and school quality, which could be enhanced to improve the educational process as measured by academic achievement. Across these studies,

these constructs of school funding, students' background and school quality consisted of different observable measurements, e.g., teacher to pupil ratio, free or reduced lunch participants, percentage of students held back, etc., and measured differently at different levels of analyses. Different operationalizations of latent constructs and differential measurements caused possibly biased results (Hanushek, 1986). Also, analysis of data across different unit levels of analyses caused biased results. These inquiries reported divergent results with no consistent finding to provide a clear focus for policy development or apply educational resources to improve the public education system (Hanushek, 1978, 1986, 1989).

These divergent results and inconsistent findings were primarily based on the use of different observable variables and different methods of measurement to identify constructs (latent variables). Another cause was the economic data analysis approaches established by the seminal Equality of Educational Opportunity report, which is more commonly known as the Coleman Report (Coleman et al., 1966). These data analysis approaches were called the education production function analyses and used in most studies of education. Education production function analysis employs least squares regression procedures. Hanushek (1978) noted that "educational production functions are interpreted as if the included variables are conceptually and accurately measured, when in fact this is not the case. However, the severity of such problems differs significantly across studies and clearly explains part of the apparent inconsistency in findings. Moreover, within most studies, measurement errors are probably most important in the case of school inputs, leading in general to underestimates of the importance of school

inputs" (p. 366). As a result of using these educational production function analyses, the perception of public education's failure continued to grow.

Most studies of the public education system found that the key indicator to improve the educational process was an indicator not under public control—the student's background (Coleman et al., 1966; Hanushek, 1986, 1989). These investigations used many different measurable indicators of very complex, hypothetical constructs (unobservable, latent variables) to predict or explain academic achievement but the majority of investigations were not based on any theory of academic achievement (Pedhazur, 1982, 1997). Dating back to the Coleman Report, this failure to base investigations on theory was due to the nonexistence of a comprehensive theory regarding academic achievement (Pedhazur, 1982, pp.189-190). Pedhazur (1997) cited that "some researchers (e.g., Coleman, 1970) justified the use of crude analytic approaches on the grounds that the state of theory in the social sciences is rudimentary, at best, and does not warrant the use of more sophisticated analytic approaches" (p. 334). During this study, the review of related literature did not reveal studies or reports that employed a specific theory to guide the investigator in explaining adolescent academic achievement.

Both the failure to use theory and the inferences made from the misapplication and possible biased parameter estimates of statistical procedures exacerbated the misunderstanding of school quality and students' background and their influences on adolescent academic achievement. Without a theory, the researcher had no guidelines for establishing methodological procedures for analyzing data and making inferences from the results. The possible biased parameter estimates may be caused by statistical

procedures using least squares regression and the aggregation or disaggregation of data at different levels of analyses. These failures to use established methodological procedures resulted in divergent results and no identified area for intervention to improve the educational process.

Purpose of the Study

During an extensive review of the literature, the indicators of social deviance have suggested that a more comprehensive model of the community social disorganization theory may have more explanatory value in investigating adolescent academic achievement. Across studies, these indicators of social deviance have demonstrated a concomitant relationship with adolescent development and adolescent academic achievement. In different studies of adolescent academic achievement, researchers used data analyses procedures that possibly produced biased results because the hierarchical nature of the data was ignored.

The purpose of this dissertation was twofold. First was to adapt the community social disorganization theory to explain variance in 8th grade adolescent academic achievement as measured by standardized tests within Virginia urban public schools. In addition, this dissertation employed statistical procedures to reduce the biases from aggregation or disaggregation of data contained in the results of parameter estimation and to better understand the relationships between relevant contextual variables. These statistical procedures will employ structural equation modeling and multilevel analysis.

The results of this study will help direct limited resources and actions by legislators, educators, and counselors to improve the urban and possibly rural educational process by understanding the relationships of the variables involved. The statistical

procedures employed will aid in understanding and disentangling the constructs of students' background characteristics from indicators of school environment and socioeconomic status as measured by the concentration of students eligible for free and reduced lunch programs. This clearer understanding of the educational process will identify the relationships between complex constructs influencing student performance and adolescent academic achievement both at the school district level and the schoolhouse level.

Overview of Chapter

In this chapter, a background of public education's transformation and an overview of today's expectations and inequalities of education with a special focus on the Commonwealth of Virginia are provided to develop a clear understanding of the problem. Within this background, statistical procedures used to analyze data are discussed to identify possible biases. A theoretical framework for this dissertation is discussed using the indicators of community social disorganization theory along with research questions to be investigated. Then, an overview of this dissertation is addressed.

Throughout this review, the term Negro is used interchangeably with Black American. During the period of some cited reports, the term Negro was a socially and politically acceptable term for many and will be used in this dissertation in the context of cited reports. However, for purposes of this study, the terms Negro, Black American, and African American are synonymous. In addition, the terms White, White American, and European American are considered synonymous.

Across cited studies from different disciplines, the constructs of ecological, environmental, contextual, and community (to include neighborhood, school district, and

school) effects are used almost interchangeably. Although these separate studies use different variables to operationalize these constructs, these constructs are similar and are composed of the family, neighborhood, and community social organizations where an individual lives. This study will draw from the literature consistent variables common to these studies to operationalize school district effects and school effects. In Virginia, the school district is the independent city or county where macro-level variables will be identified and the term school district will be used synonymously with community and neighborhood in the relevant literature.

BACKGROUND

Public Education System Background

From a sociological view, education has many objectives and great importance within society. Through education, culture is passed on from generation to generation and is similar with socialization (Robertson, 1987, p. 375). Education is the vehicle most used by individuals and groups for social mobility and change in social status. Robertson (1987) identified three characteristics of American education that are not found in the same combination in other societies. These characteristics were cited as a commitment to mass education, a utilitarian emphasis, and community control of local schools. In the United States, there is a common belief in a basic right to education and that this education should be provided free to all. Taxing everyone, including people without children and those with children in private schools, finances public education. On the other hand, in European countries, education has been tailored to the needs of job markets. In Europe, there are separate schools for the academically able and those not so able (Bracey, 1995). In the United States, schools were used for a wide range of

utilitarian purposes to include addressing social problems, e.g., teenage pregnancy, and, with community control, a child's educational experience may depend on the school's neighborhood location (Ravitch, 1983). These factors form a foundation for education in America that is envied by many throughout the world.

Early Decisions, Reports and Acts

The educational process was formed and transformed throughout the years by significant U.S. Supreme Court decisions regarding segregation and funding of the public education system. Plessy v. Ferguson in 1896 established "separate-but-equal" facilities for Blacks and Whites that included public schools. Brown v. Board of Education in 1954 eradicated the "separate-but-equal" doctrine, especially in public schools (Fisher, 1990). Therefore, the public school system was transformed to meet the intent of the public discourse of our values as a nation and our belief in equality. However, these decisions were not enforced until the passage of the Civil Rights Acts of 1957 and 1964. These Acts led to the Elementary and Education School Act of 1965 that provided the first federal general school aid to local school districts, but with a threat of no federal funds under Title VI for states that practiced racial discrimination in schools (Fisher, 1990).

Although these Acts were seen as focused on the plight of Black Americans, they were directed toward all minorities and those who were economically disadvantaged. Following this focus on Black Americans, Daedalus, the Journal of the American Academy of Arts and Sciences, published two issues of the journal with a central theme of the Black American, which provided an overview of their sociological and economical background relative to the Civil Rights Act of 1964. Moynihan (1965) wrote in the first

issue that a complex cycle of deterioration and pathology begins and ends with the children. Moynihan reported that more non-White than White males gave economic reasons for dropping out of school and that minority children were increasingly entering the main grades without advanced preparation. In addition, Moynihan called into question the quality of the education that Blacks received and the significant unemployment rates as a result of poor education and social problems. These significant unemployment rates have persisted throughout the years (Wilson 1987, 1991, 1997).

Moynihan (Office of Policy Planning and Research, 1965) led a separate investigation of the Black Family and went further in explaining the difference between equality of opportunity and the equality of outcomes. In this seminal and controversial report, Moynihan predicted the demise of the Black American family based on social disorganization caused by the familial matriarchy of reversed roles. Moynihan reported the following:

> The matriarchal pattern of so many Negro families reinforces itself over the generations. This process begins with education. Although the gap appears to be closing at the moment, for a long while, Negro females were better educated than Negro males, and this remains true today for the Negro population as a whole.
>
> The difference in educational attainment between nonwhite men and women in the labor force is even greater: men lag 1.1 years behind women.
>
> The disparity in educational attainment of male and female youth age 16 to 21 who were out of school in February 1963, is striking. Among the

> non-white males, 66.3 percent were not high school graduates, compared with 55.0 percent of the females. A similar difference existed at the college level, with 4.5 percent of the males having completed 1 to 3 years of college compared with 7.3 percent of females.
>
> The poorer performance of the male in school exists from the very beginning, and the magnitude of the difference was documented by the 1960 Census in statistics on the number of children who have fallen one or more grades below the typical grade for children of the same age. The boys have more frequently fallen behind at every age level. (White boys also lag behind white girls, but at a differential of 1 to 6 percentage points.) (Moynihan, 1965, pp. 30-31).

Providing additional evidence of this family matriarchal structure, Rainwater (1965) argued that both White and Black lower class families tended to be matrifocal in comparison to middle class families. Rainwater discussed the outcomes of this matrifocal structure in economic, educational, and powerlessness terms. In educational terms from the matrifocal structure, Rainwater cited "slum schools now function more to stultify and discourage slum children than to stimulate and train them" (p. 197). These educational concerns discussed by Moynihan and Rainwater were given emphasis by a provision contained in the Civil Rights Act of 1964.

The Civil Rights Act of 1964 provision required a survey be conducted "concerning the lack of availability of equal educational opportunities for individuals by reason of race, color, religion, or national origin in public educational institutions at all levels in the United States . . ." (Coleman et al., 1966). The Coleman Report was the first

of many investigating the contextual issues found in sociological theories of the educational process and its quality that inevitably lead to equal opportunity in housing, employment, and every other aspect of quality of life identified by Moynihan. Coleman et al. collected data from over 570,000 students, 60,000 teachers, and 4,000 schools.

This survey addressed four broad questions, which were the extent of segregation, equal educational opportunities, how much students learn as measured by standardized tests, and to determine possible relationships between students' achievement and school effects. The Coleman Report identified these four broad questions as:

> The first is the extent to which the racial and ethnic groups are segregated from one another in the public schools.
>
> The second question is whether the schools offer equal educational opportunities in terms of a number of other criteria which are regarded as good indicators of educational quality. The attempt to answer this elusive question involves describing many characteristics of the schools.
>
> Some of these are tangible, such as numbers of laboratories, textbooks, libraries and the like. Some have to do with the curriculums offered—academic, commercial, vocational—and with academic practices such as the administering of aptitude and achievement tests and "tracking" by presumed ability. Others of these aspects are less tangible. They include the characteristics of the teachers found in the schools—such things as their education, amount of teaching experience, salary level, verbal ability, and indications of attitudes. The characteristics of the student bodies are also assessed, so far as is possible within the framework of the study, so

> that some rough descriptions can be made of the socioeconomic backgrounds of the students, the education background of their parents, and the attitudes the pupil have toward themselves and their ability to affect their own destinies, as well as their academic aspirations.
>
> Only partial information about equality or inequality of opportunity for education can be obtained by looking at the above characteristics, which might be termed the schools' input. It is necessary to look also at their output—the results they produce. The third major question, then, is addressed to how much the students learn as measured by their performance on standardized achievement tests.
>
> Fourth is the attempt to discern possible relationships between students' achievement, on the one hand, and the kinds of schools they attend on the other (Coleman et al., 1966, pp. iii-iv).

The results of the Coleman Report had significant impacts throughout America within the public education system. Coleman et al. found that the great majority of American children attended schools that were largely segregated and, among minority groups, "Negroes are by far the most segregated" (p. 3) and that school characteristics varied significantly and more specifically by the region of the school.

In addition, the Coleman Report found that minority pupils scored "as much as one standard deviation below the majority pupils' scores in the 1st grade" (p. 21) and this lower performance increased by the 12th grade. Additionally, differences between schools account for a small fraction of differences in pupil achievement. In their fourth finding, Coleman et al. discovered that "analysis indicates, however, that children from a

given family background, when put in schools of different social composition, will achieve at quite different levels" (p. 22). This finding led to mass busing of Black students to more affluent White schools and the disruption of many communities. In regards to differences between schools, the report stated:

> that schools bring little influence to bear on a child's achievement that is independent of his background and general social context; and that this very lack of an independent effect means that the inequalities imposed on children by their home, neighborhood, and peer environment are carried along to become the inequalities with which they confront adult life at the end of school. For equality of educational opportunity through the schools must imply a strong effect of schools that is independent of the child's immediate social environment, and that strong independent effect is not present in American schools (Coleman et al., 1966, p. 325).

Although these statements were interpreted to mean schools did not influence academic achievement, Coleman et al. did not find a strong relationship between family background and student achievement. Family background only accounted for 12% to 18% of the variation in children's verbal skills and even less of the variation in reading and math skills. However, when compared to the school effects, they appeared strong. Hanushek (1997) cited this misinterpretation of the report's findings as:

> The Coleman Report, which found that measured school resources explained a small portion of the variance in student achievement, has been commonly interpreted as implying that "schools don't make a difference." This latter interpretation confused the effects of measured differences with

> the full effects of schools and has been shown to be wrong. It ignores the significant difference between measured resources (of the kind on which policy frequently focuses) and the true effects of schools (p. 148).

As a result of the Civil Rights Act and the Coleman Report, the public education system was transformed with mass busing and desegregation plans. Berube (1994) called this period "the equity movement." However, in 1974 the U.S. Supreme Court's decision in Milliken v. Bradley ended the expansion of desegregation rights. This ruling struck down the desegregation of largely minority city schools with suburban students in metropolitan Detroit. This ruling was made in spite of findings of intentional discrimination by both state and local officials (Orfield & Yun, 1999). In this decision, the Court was split 5 to 4 and decided that the cross district busing plan would disrupt school district lines and violate the tradition of local school control (Fisher, 1990).

National Standards Movement

During the 1960s and 1970s, several legislative initiatives were passed by the U.S. Congress to ensure a safety net during the nation's war on poverty. These egalitarian social policies were attacked by conservatives in the 1980s as well as the Reagan presidency (Jencks, 1993). Within education, the equity movement was replaced with "the excellence movement" (Berube, 1994). This movement within public education was heralded in with the issuance of the report titled A Nation At Risk (The National Commission on Excellence in Education, 1983), which was a purported answer to the nation's current economic crisis. The National Commission on Excellence in Education in 1983 authored this polemic and alarmist report and their recommendations covered the content of education, standards and expectations, time, teaching, leadership,

and fiscal support. Although this report cited different students' abilities and aspirations, its main thrust was to raise standards without additional funding for the public education system.

A Nation at Risk report and its standards for public education had many supporters. Hirsch (1987) was more explicit in the call for reform and called for national standards of a shared common knowledge and stated "no doubt, reforms outside the schools are important, but they are hard to accomplish. Moreover, we have accumulated a great deal of evidence that faulty policy in schools is the chief cause of deficient literacy" (p. 20). Hirsch was not alone. During the National Governors Association meeting in Charlottesville, VA, 1989, President Bush attended and addressed education. From this conference came the Goals 2000: Educate America Act, which passed Congress in 1994 (Spring, 1998).

In 1994, with the Commonwealth of Virginia leading the way, this national standards movement gained great momentum and wide public support (Ravitch, 1997) as evidenced by a survey conducted by the National Center for Education Statistics (NCES). NCES (1998) sent questionnaires to 1,360 principals of a nationally representative sample of U.S. public schools and found that 78% reported using content standards to a moderate or great extent. In addition, there was support for national standards in the urban environment even with cited problems of dense areas of poverty and multiple social ills (Ravitch, 1998).

A call for standards in education was not new (Bracey, 1995). However, standards failed to address the individuality of students, teachers, schools and communities. Wiggins (as cited in Bracey, 1995) found fault in this approach based on

the subjectivity in judging the standard. Wiggins was quoted as stating "students learn by such mysterious and one-way assessment that they cannot reframe questions, reject questions as inappropriate, challenge their premise, or propose a better way to prove their mastery. The moral and political harm is significant. Too many students learn to just 'give them what they want' and to accept or acquiesce in bogus but 'authoritative' judgments" (Bracey, 1995, p. 143). There is little room for individual variation in national standards for students' responses but national standards cannot control the variation in teachers' questions or their judgments of the correct response.

Faulty Data Analyses Lead to Faulty Assumptions

Bracey (1995) traced the beginnings of overall standards to the 1840s with Horace Mann and to the 1890s with the work of the Committee on Secondary School Studies, also known as the Committee of Ten. Bracey cited the confusion between standards and standardization and stated:

> It is said, sometimes in envy and sometimes in derision, that the French minister of education knows at any moment what page students are reading in all of France. Such standardization of student coverage is not what most people have in mind when they propose standards, although it must be said that those who have advocated standards have not clearly delineated how different students might meet the standards differently, except in the most general, and therefore, vague terms. This lack of clarity, coupled with the mantra "all students can learn," causes some to be anxious that a set of standards will lead not to improved performance but only to standardization (p. 140).

The current foundation of the national standards movement can be traced to the Coleman Report finding that there was no variation between schools for academic achievement—the characteristics of the school do not affect academic achievement. Although this finding of no variation between schools was misinterpreted, national and state policies were based on this premise (Bracey, 1995; Hanushek 1996, 1997). In a later report, Bryk and Raudenbush (1988) discovered different results in a separate study when analyzing data using hierarchical linear modeling (multilevel analysis) with structural equation modeling procedures versus traditional linear regression analysis that Coleman et al. (1966) used. When investigating students' performance, data are aggregated at the school district level, school level, and student level. Traditional measures of regression and analysis of variance may not detect differences because these methods used fixed parameters across the data set. Raudenbush (1988) identified two key elements for employing multilevel analysis as:

> First, such methods enable researchers to formulate and test explicit statistical models for processes occurring within and between educational units. Under appropriate assumptions, such multilevel modeling solves, in principle, the problem of aggregation bias. Such bias occurs in part because a variable typically takes on different meanings and has different effects at different levels of aggregation, and in part because estimation of such effects is prone to selection biases at each level (Burstein, 1980). .. Second, these methods enable specification of appropriate error structures, including random intercepts and random coefficients. Asymptotically efficient estimates of the variances and covariances of random effects are

> now available for unbalanced designs. In most settings, appropriate specification of error components solves the problems of misestimated precision which have plagued hypothesis testing in nested, unbalanced data sets. Misestimated precision arises in multilevel analyses based on ordinary least squares estimation because standard error estimates fail to include components of variance and covariance arising from grouping effects" (p. 86).

Bryk and Raudenbush (1988) conducted a study using a different data set and employed statistical methods that allowed these parameters to vary; detecting previously undetected variations among levels. Using these procedures, Bryk and Raudenbush discovered "over 80 percent of the variance in mathematics learning was between schools! These results constitute powerful evidence of school effects that have gone undetected in past research" (p. 96). Bryk and Raudenbush findings significantly conflict with the Coleman Report finding that there was no difference between schools.

Resegregation of Public Schools

The civil rights movement was the initial catalyst for the public education system's transformation. Our national goals were to end segregation and provide an equal education to all. These goals have not been met and the segregation of our public school system is still evident. Kozol (1991) was startled by the remarkable degree of racial segregation that persisted almost everywhere. Kozol stated that:

> the nation, for all practice and intent, has turned its back upon the moral implications, if not yet the legal ramifications, of the Brown decision. The struggle being waged today, where there is any struggle being waged at

> all, is closer to the one that was addressed in 1896 in Plessy v. Ferguson, in which the court accepted segregated institutions for black people, stipulating that they must be equal to those open to white people (p.4).

Orfield and Yun (1999) continued this discussion on resegregation of our public education system. Orfield and Yun expand segregation beyond racial and ethnic terms to include a strong social class component. They find that African American and Latino students were segregated into schools where the majority of students were non-White with a large concentration of poverty. While segregated White students were in majority White schools with high proportions of middle-class students. The results of this resegregation were cited as creating more unequal schools and lower test scores for non-White students with large concentrations of poverty.

Summary

This background on the transformation of the public education system from equality of educational opportunity to national standards provides a retrospective view. Seminal reports such as the Coleman Report may have asked the wrong question (Bronfenbrenner & Ceci, 1994) and used inappropriate statistical methods and theoretical approaches to answer them (Byrk & Raudenbush, 1988; Pedhazur, 1982). However faulty the analysis or approaches, these reports form the focal point of a national standards movement and obfuscate our understanding of what actually affects students' performance. Many relevant reports and studies regarding adolescent development (i.e., American Psychological Association [APA], 1993; Black & Krishnakumar, 1998; Bronfenbrenner & Ceci, 1994; Crane, 1991; Jencks, 1993; NCES, 1997, 1996a) provide a better understanding of students' academic performance. These reports were overlooked

or disregarded for their importance in understanding those contextual variables influencing adolescent academic achievement.

As a leader in the national standards movement (Ravitch, 1997), Virginia's public education system has a history fraught with traumatic transformation since Brown v. Board of Education. As the state on the border of the nation's capitol, the judgments of the U.S. Supreme Court met strong resistance. And, even today, as the State's public education system struggles to meet its own mandated standards, all children, regardless of inequalities, are expected to achieve academically.

Virginia Public School System Background

Massive Resistance and the Perrow Plan

The transformation of education within the Commonwealth of Virginia mirrored that of the nation. After the U.S. Supreme Court decision in Brown v. the Board of Education, Virginia, along with 17 other Southern and border states, implemented several legislative policies to deny or impede the enforcement of the Supreme Court decision that was called "massive resistance" (Bartley, 1969). The Virginia government from 1954 through 1964 passed major legislation that permitted closure of public schools, amended or repealed compulsory attendance, provided freedom of choice to attend segregated schools, and pupil assignment to maintain a segregated school system (Wilhoit, 1973). Under this policy, public schools were closed rather than allow equal education for all through integration (Wilder, 1999). The Pupil Placement Board placed public school closure into effect. Ely (1976) reported:

> Once a final integration order was entered, the laws required the governor to seize and close any public school threatened with integration and to

> attempt reopening such school on a segregated basis . . .. If reorganization proved unsuccessful, a local school district could decide to open the affected school and operate it under an integrated program. In this event, however, state funds were cut off from all schools of its class within the political subdivision (p. 45).

The first occurrence was the closure of Warren County High schools in 1958 and shortly thereafter several schools in Charlottesville and Norfolk. The government provided tuition grants to parents of White students to attend private schools. On January 19, 1959, massive resistance within Virginia expired under a double legal reversal. Both the Virginia Supreme Court of Appeals and a three-judge federal district court declared the school closing laws unconstitutional. Not to be defeated, Virginia government began a campaign of containment or token integration to minimize the number of integrated schools. This plan was called the Perrow Plan, under which the state government withdrew from participation in the school issue to reduce litigation. The authority for school placement was delegated to local school boards and local government to continue state policies. In May 1959, Prince Edward County abandoned the public education system and closed their schools. By December 1964, only 5% of Blacks in Virginia were assigned to integrated schools (Ely, 1976). Until the passage of the Civil Rights Act of 1964 and the threat of federal funding loss, these efforts to impede integration remained effective.

In eastern Virginia during the 1960s, where there was no segregation in neighborhood housing between Blacks and Whites, school buses were used to transport students across counties to maintain all White and all Black schools (Fisher, 1990).

During the early 1970s, these efforts to maintain a segregated public school system continued during the Richmond school busing crisis when affected White students disappeared from the city's school system and reappeared in suburban or private schools.

The Disparity Report

It was not until different leadership was elected to the governor's office in 1990 that this inequality of education was specifically reviewed. Governor Wilder established a commission to review the inequalities within the public education system. The Governor's Commission on Educational Opportunity for All Virginians (1991) issued a report that was commonly called the Disparity Report. Within this report, conflicting views of the Virginia public education system are found. Even during the turmoil of negative policies of massive resistance and containment, the report cited former Governor Darden stating in 1964 that schools' goals should be set to ensure every child in Virginia an opportunity for a first rate education. In 1971, these aspirations for a first rate education for every child were codified with a revised Constitution and Bill of Rights, while in the State's capitol Whites were fleeing the city to avoid integration of public schools. In 1976, the Virginia legislative body implemented the Standards of Quality (SOQ) for schools throughout the Commonwealth. However, the report cited that in 1984 and again in 1986 that previous reports by Governor's Commissions noted unacceptable levels of disparity in schooling in the state and its school divisions.

The Governor's Commission on Educational Opportunity for All Virginians (1991) established three committees. The first was the Program Equity Committee to study the disparity in programs and program quality available to students. The second was the Pupil Equity Committee to study the disparity brought about when children come

to school with unequal preparation to learn. The third was the Fiscal Equity Committee to study the disparity in dollars spent per child and the equity afforded by the current funding and distribution mechanisms.

The Governor's Commission on Educational Opportunity for All Virginians (1991) reported "much of the variation in student outcomes can be explained by divisional differences in the incidence of student poverty, as measured by the percent of students participating in the federally funded Free School Lunch Program. Strong, negative correlations exist between all achievement test scores at the divisional level and the percent of students receiving free lunch by division" (p.45). The Governor's Commission on Educational Opportunity for All Virginians (1991) found that as the percent of students receiving free lunches in a division increases, achievement test scores in that division decreases, "and as much as 55 percent of the variation in test scores can be explained by the variation in the incidence of student poverty" (p.45). Although the statistical procedures used were not identified, these results are identical to those found by NCES (1997, 1996a) and the APA (1993) in national studies.

Along with the concentration of poverty, the Disparity Report identified "cyclical problems of health care, nutrition, abuse, and emotional and mental problems" (p. 45) that affect students' academic achievement. The report stated "The link between health and learning is a strong one" (p. 56) and identified numerous entities working to address these needs but doing so independently. In addition, the report cited questionable educational programs such as tracking slow learners, pull-out programs for remediation, and retention in grade that influence academic achievement. The report recommendations and conclusions included:

> While much of the lack of student preparedness can be explained by the socio-economically disadvantaged environments from which some students come, developmental preschool program[s] such as the Perry Preschool program have been shown to successfully counter the effects of these environments. Likewise, effective and educationally sound alternatives exist to questionable practices such as grade retention, long-term remediation, and student tracking (p. 57).

The Disparity Report made recommendations for changing the format of funding each school district. The report cited "The Commission's stated goal is to increase the educational opportunity of all Virginia students without leveling down the educational programs currently available to some Virginia students" (p. 73). The overall report contained 27 recommendations to optimize educational opportunities. Included in these recommendations was a recommendation for a revision of the governmental standards regarding education.

Virginia Commission on the Future of Public Education

The implementation of the Commission's recommendations in the Disparity Report to answer the inequalities found has been called into question (Virginia Commission on the Future of Public Education, 1997). However, Virginia did move forward with the national standards movement in 1994 and reformed the public education system without funding to address inequalities. Primarily a new governor, George Allen, and his office and not the elected General Assembly took these actions to establish statewide standards for public schools. This reform raised the standards for student promotion and held schools accountable through removal of accreditation for failure to

meet these standards. The revision required additional core courses and increased standardized testing of students.

In order to comply with their regulatory function, the General Assembly established the Virginia Commission on the Future of Public Education. Their Initial Final Report (1997) provided background on governance of Virginia's Public Education. This report identified the General Assembly with the primary responsibility for public education and they promulgate this responsibility through the Standards of Quality (SOQ). The Board of Education prescribes the SOQ. "Since 1994, however, the Board of Education has separately and independently engaged in extensive, standard-based education reform outside the context of the statutory law" (p.5). This was accomplished through changes to the Standards of Learning (SOL) and the Standards of Accreditation (SOA) without changes to the General Assembly's funding of the SOQ. In essence, the Board of Education placed into effect higher standards of learning and accountability without funding or approval of the General Assembly. These reform efforts without adequate funding failed to address the contextual community's relationship with academic achievement.

The Commission (1998) submitted its final report to the governor and the General Assembly. In their report, the Commission (1998) applauded the efforts of the Virginia Board of Education for greatly raising the level of expectations for all students in the public school system by strengthening the SOL and adopting a SOA designed to hold schools and students accountable for teaching and learning. They went further and stated:

> As critical as these actions and goals are, they are inadequate. More is needed. To raise the bar to another level in liberal arts and to require all students to jump over it without adequate preparation, time, coaching, training, and resources may be a prescription for failure for too many of our children. Public education cannot expand to meet the challenges of today's society or those of the future by a contraction of state fiscal responsibility. Picking up a larger share of those costs creates a greater strain than many of the poorer localities can bear (p. 7).

Summary

The Virginia goals for its public education system mirror those of the nation. As late as 1970, the disparities in equal education were based on race and socioeconomic status. Those who were fortunate to have an enriched home, neighborhood, and environment were rewarded with rich school environments. Those who were not so fortunate were punished with inadequate schools and education. These were the facts that Moynihan (1965) found and these were the social conditions prevalent during the writing of the Coleman Report. These environmental factors overshadowed the affects of schools on academic achievement. However, Bryk and Raudenbush (1998), using multilevel analysis, determined that schools did matter even with dire economic and social conditions. Coleman et al. (1966) even reported that poor, minority students performed academically better in an enriched school environment with middle-class Whites. Clearly, schools do affect academic achievement (Hanushek, 1978, 1989).

Although these disparities still exist today in disadvantaged homes, neighborhoods, and environments, these disadvantaged adolescents are still expected to

perform academically as well as those who are advantaged. The Governor's Commission on Educational Opportunity for All Virginians (1991) and the Virginia Commission on the Future of Public Education (1997) have reported these same disparities in Virginia; yet, Virginia led all states in establishing new academic standards along with accountability (Ravitch, 1997) while not addressing disparity between schools and school districts. These varied Commissions' reports have not adequately addressed the statistical procedures used and have been criticized for their failures to be specific about their recommendations. But, the message was clear that contextual factors share a significant relationship with adolescent academic achievement.

This background of the growth and transformation of the nation's public education system identifies a process strongly influenced by political considerations. Virginia's public education transformation was typical of border and Southern states. Throughout these years of growth and transformation, no easy solution was found to address the concerns formulated by expectations and inequalities. These concerns still exist today.

Public Education Today: Expectations and Inequalities

Growth of National Standards

Ravitch (1983) in her book, The Troubled Crusade, provided a review of the transformation of public education from 1945 to the 1980's and identified our dreams and expectations as "Americans have argued for more schooling on the grounds that it would preserve democracy, eliminate poverty, lower the crime rate, enrich the common culture, reduce unemployment, ease the assimilation of immigrants to the nation, overcome differences between ethnic groups, advance scientific and technological progress, prevent

traffic accidents, raise health standards, refine moral character, and guide young people into useful occupations" (p. xii).

Not only might these expectations be unrealistic in general, but also inequalities between schools and school districts make them completely impossible to attain. While, in 1945, everyone could go to school, the difference in quality between the best schools and the worst schools was great. As Ravitch noted "(o)ne's educational chances were limited by the accident of birth and by the color of one's skin" (p. xii). In later writings, Ravitch (1998) identified that education in the urban environment suffered from many problems, but most significant was the spread of dense areas of poverty "where multiple social ills converge. The correlates of poverty—poor health, inadequate housing, high crime rates, single-parent families, substance abuse—create an environment in which heroic efforts are necessary in order to sustain aspirations for the future and a willingness to work hard for delayed benefits" (p. 2). Ravitch (1997), a supporter of the national standards movement, was sensitive to the need for an answer to inequalities but felt that standards were key elements for reform of the public education system. Ravitch stated:

> The call for higher standards provides common ground for those who seek excellence and those who seek greater equality. Without constant pressure to strive for excellence, young Americans will not be prepared for the ever increasing demands of a competitive world economy. Without relentless efforts to raise levels of educational achievement among all students, the social inequities will become unbridgeable chasms as economic and technological change advances (pp. 10-11).

As identified in Ravitch's writings, these expectations and inequalities of the public education system still exist today. This nation's aspirations and desires to eliminate these inequalities were expressed in Supreme Court decisions and legislative and policy initiatives from both state and federal governments. Yet, these inequalities have grown more tenacious and have been cited again and again in seminal and current reports. Although many of these reports focused on minorities, especially African Americans, these inequalities affected all that were economically disadvantaged and primarily located within the urban environment. Even with these obvious existing inequalities in the public education system, our nation has moved closer toward national standards. This current movement is based on the belief that our schools have failed to educate; that all students, regardless of circumstance, learn the same; and, that money does not matter (Hanushek, 1986). Ravitch and supporters of the national standards movement are attempting to fulfill the dream of equal opportunity in education by establishing standards for all who are involved or depend on the public education system.

Those who support national standards believe that overall student performance is indicated by academic achievement measured by standardized achievement tests. Hanushek (1978) criticized the selection of testing as the outcome measure of schooling and stated "performance on tests is being used to evaluate educational programs, and even to allocate funds, and there are some pragmatic arguments for the use of test scores as output measures. Besides their common availability, one argument is that test scores appear to be valued in and of themselves. To a large extent, educators tend to believe that they are important, albeit incomplete, measure of education. Further, parents and decision-makers appear to value higher test scores" (p.359).

Although the American public widely embraced the national standards movement (Ravitch, 1997), it has not readily provided the solution to perceived academic achievement failure. For the third year, Education Week (1999) reported on student achievement across the states, and graded the states in four areas that were considered essential to building high-quality public education systems. These four areas are standards, assessment, and accountability; teacher quality; school climate; and, resources. Overall, the states averaged a C grade but many were pushing ahead with efforts such as improving teacher quality and devising tests that reflect the state's academic standards. They reported that forty states now have standards in all four core subjects, and eight additional states have standards in at least one subject.

Within the Commonwealth of Virginia, a leader in the national standards movement, the Education Week report reflected that, for 8th grade students' results on the 1996 National Assessment of Educational Progress (NAEP), 21% scored at least at proficient level for mathematics, and 27% scored at least at the proficient level for science. Virginia's overall grades were a 92 (A-) for academic standards, assessments, and accountability; 83 (B) for efforts to improve teacher quality; 68 (D+) for school climate conducive to learning; and, for resources: 75 (C) for adequacy, 60.3 (D+) for allocation, and C for equity.

In contrast to the Education Week article using standards as the hallmark of a quality education system, The Eighth Bracey Report on the Condition of Public Education challenged our current perceptions of education. Bracey (1998) reported on a wide range of issues affecting the public education system. These issues included comparisons of students internationally, the rise in taking Scholastic Aptitude Tests and

participation in Advanced Placement courses, education's link to the national economy, the school reform movement, and whether school funding really mattered. Bracey argued that international comparisons were methodologically unsound and there was no demonstrated link between academic achievement and the national economy. Of particular interest, Bracey identified the fact that inequalities still exist today in our public education system and that school funding does matter in resolving these inequalities and improving the most reported outcome of education—academic achievement.

Segregation of Housing

Of these inequalities that both Ravitch (1983, 1998) and Bracey (1995, 1998) discussed, Massey and Denton (1993) argued that racial segregation in housing was the key structural factor impeding academic success among African Americans. Neighborhood schools combined with housing segregation perpetuate Black poverty and low academic achievement. For Blacks, higher incomes did not buy entry to residential environments with schools conducive to academic success. Massey and Denton found that Whites in Philadelphia with an income of $32,000 lived in neighborhoods where only 2% of the births were to unwed mothers; where the median home value was $57,000; and, 6% of high school students scored below the 15th percentile on achievement tests. Blacks with the same income could expect to live in a neighborhood where 17% of all births were to unwed mothers, where the median home values was barely over $30,000, and where 20% of high school students scored below the 15th percentile on achievement tests. Thus the inference is that certain minorities even with money may be less likely to move into neighborhoods with high quality schools because

of institutional racism or other reasons, thus limiting their children's academic success and perpetuating a cycle of limiting human potential.

Summary

The context of public education today is complex because of the expectations of the public education system and the inequalities inherent to it as cited by Ravitch (1983, 1998), Bracey (1995, 1998), and Massey and Denton (1993). Although there are many individual learning theories, the lack of a comprehensive theory encompassing contextual factors for adolescent academic achievement has and continues to hamper any investigation to understand the relationship between school functioning, students' background and academic achievement (Pedhazur, 1997). Developing support for an adequate theory to apply to adolescent academic achievement must be of paramount importance to researchers, educators and counselors. This dissertation addresses the lack of theory by identifying variables that are associated with the community social disorganization theory and how these variables are associated with adolescent academic achievement. These variables can be traced through previous studies of delinquency, students' academic performance, child development, and community context. Relationships among these variables are discussed next along with the applicability of the community social disorganization theory to adolescent academic achievement as measured by standardized tests.

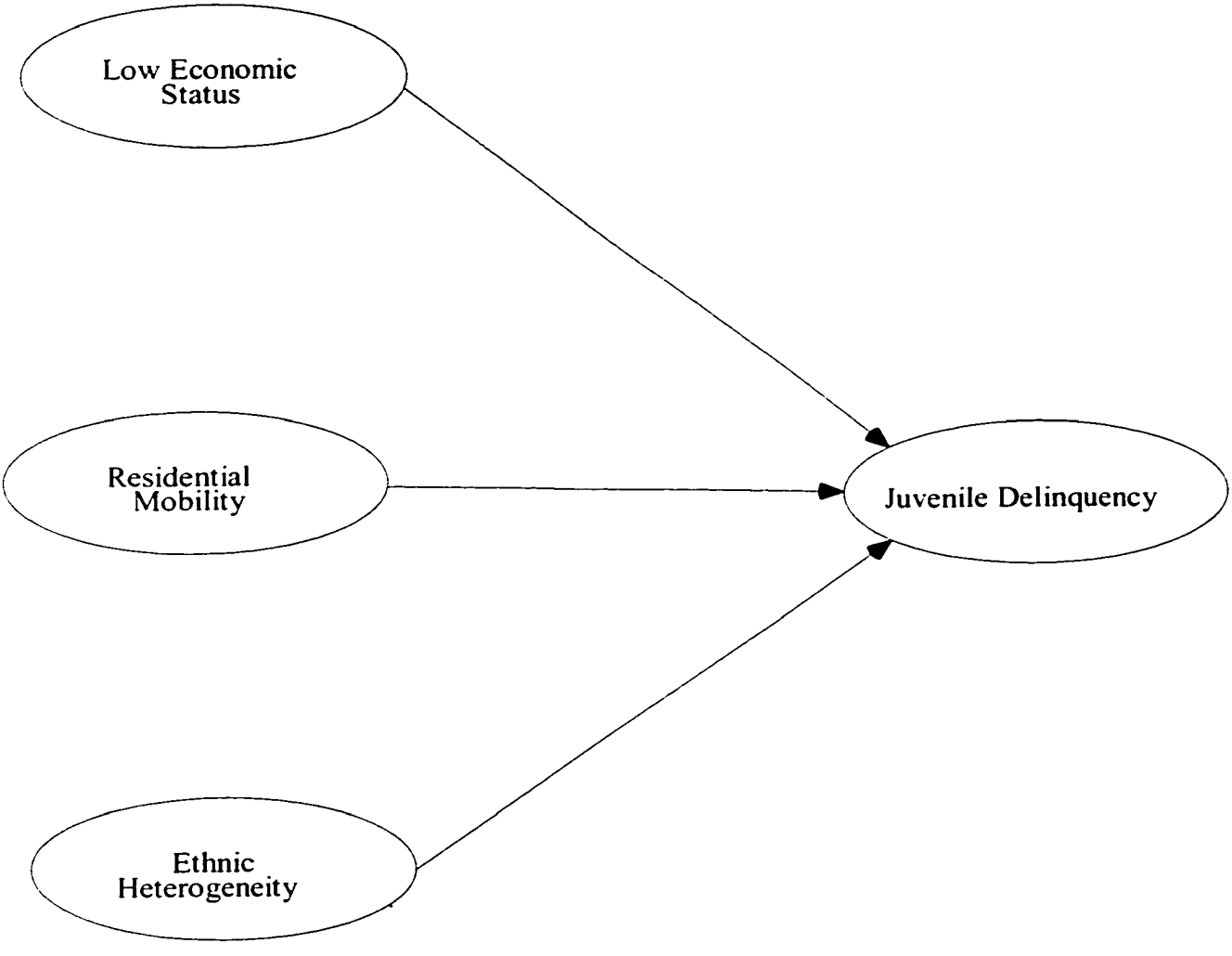
URBAN THEORETICAL PERSPECTIVE AND RESEARCH QUESTIONS

House (1936, p. 289) reported the first definition of social disorganization by Thomas and Znaniecki in The Polish Peasant in Europe and America as "a decrease of the influence of existing social rules of behavior upon the individual members of the

group." House (1936) explained this concept of social disorganization as referring to a "process rather than to a state or condition." House restated the Thomas and Znaniecki definition to connote a state rather than a process and described social disorganization as "Social disorganization is that state of affairs in a society that is characterized by the relative lack of social rules, customs, traditions, or evaluations which are recognized and accepted by all members of the society, and which tend to define the situation in every contingency and prescribe what shall be done or what attitude shall be taken." (p.289).

These were the predominant thoughts and writings during the period of Shaw and McKay early investigations of crime in the city of Chicago. Community social disorganization theory falls within the body of sociological theory and was introduced by Shaw and McKay in an attempt to understand juvenile delinquency in urban areas (Shaw & McKay, 1969). Shaw and McKay postulated that low economic status, ethnic heterogeneity (many diverse cultures), and residential mobility (residents move frequently) lead to community social disorganization within the urban environment, which in turn increased crime and delinquency rates (Sampson & Groves, 1989). Shaw and McKay (1969) while conducting studies in Chicago on juvenile delinquency discovered patterns throughout the city that identified where these delinquent incidents occurred. These delinquent incidents occurred in urban areas that were impoverished, culturally diversified and where people did not reside long and establish relationships with other residents in the community. These markers of low economic status, ethnic heterogeneity, and residential mobility became the foundation to approaches by sociologists to understand urban violence and social deviance.

Figure 1
Shaw and McKay Community Social Disorganization Theory



Shaw and McKay's (1969) community social disorganization theory is depicted in Figure 1 using the conventions of structural equation modeling. The ovals identify hypothetical constructs called latent variables. These latent variables are either independent or dependent. The independent latent variables are depicted on the left of the figure and the dependent latent variable is depicted on the right. In order to develop these latent variables, observable measurements are used. The specific observable measurements are developed from theory or relevant literature. No observable, measured variables that compose the latent variables are depicted in the figure. The lines with arrows depict the direction of the hypothesized effect. In Figure 1, the diagram depicted is called the structural or path portion of the structural equation model. More discussion about structural equation models is provided in Chapter III.

Sampson (1997) identified two strategies that dominate the study of crime and violence. "The macrosocial or community level of explanation asks what it is about the nature of communities that yields differential rates of crime and its control" (p. 31) and the individual level seeks to distinguish delinquents from nondelinquents. Macrosocial research identifies characteristics of communities, neighborhoods, and urban environments, cities or societies that lead to high rates of social deviance as indicated by high rates of crime. Sampson (1997) outlined an integration of these two strategies, community and individual, through a focus on families and children in the social context of local communities. "This framework leads to a renewed focus on children and their early life course – but without the 'de-contextualization' common to much research on child and adolescent development" (p. 32).

Sampson (1997) defined community social disorganization as "the inability of a community structure to realize the common values of its residents and maintain effective social controls" (p. 34) resulting in increased social deviance within the urban environment. The structural factors of poverty and residential instability explain variations in crime and delinquency rates. Sampson cited recent research that extended these structural factors to include population, housing density, percent of single-parent homes, family disruption, and urbanization (Sampson, 1989). Sampson (1997) postulated that communities characterized by high rates of crime and delinquency are also plagued by high rates of infant mortality, low birth weights and other factors detrimental to child development. Shaw and McKay (1969, p. 106) argued that delinquency "is not an isolated phenomenon" and they went on to document the close association of delinquency rates with several social problems that directly affect children. Ravitch (1997, 1998), Bracey (1998), the Disparity Report (1991), and the Virginia Commission on the Future of Public Education (1997) cited these same indicators of social deviance as having a strong relationship with adolescent academic achievement. Sampson (1997) concluded his argument with "not only does much delinquency emerge early in the life course and remain relatively stable over time; there is also an empirical connection between the health- and developmental-related problems of children and rates of adult crime" (p. 43) within the urban environment.

Sampson identified low birth weight and infant mortality as indicators of health services within the community. He found concentrated poverty to influence teen birth rate, school reading performance, and the high school dropout rate. However, Sampson found that "most of the effect of concentrated poverty and all of the effect of percent

Black (in the community) [ethnic heterogeneity] were indirect and mediated by family disruption, public housing, and substandard housing" (p. 44). Sampson identified this finding as suggesting that conditions of economic and racial disadvantage influence children's health and development through community level patterns of family and housing disadvantage within the urban environment.

Finally, Sampson (1997) provided insight on academic achievement and stated "although scarce, empirical evidence links community structure to cognitive development and school achievement in childhood" (p. 47). Brooks-Gunn, Duncan, Kato, and Sealand (1993) conducted an investigation examining IQ differences in infants. They found that neighborhood socioeconomic status (proportion of families in the subject's census tract with incomes greater than $30,000) had a significant positive relationship with IQ at age three as measured by the Stanford-Binet. This affect of neighborhood wealth on IQ was greater for Whites than Blacks. In a separate investigation, Brooks-Gunn et al. (1993) also found that the proportion of affluent neighbors had a significant negative relationship with teenage childbearing and school dropout rates. Also, Brooks-Gunn et al. replicated the finding for cognitive development and its relationship with neighborhood affluence.

These same markers for the community social disorganization theory, low birth weight, teenage births, poverty, crime, infant mortality rate, single-parent household, and residential mobility have been investigated separately for their influences on adolescent development and adolescent academic achievement. This theory of community social disorganization was developed including markers of deviant behavior found concentrated in the inner city and the urban environment. Low economic status has demonstrated a relationship with school performance (McLoyd, 1998; Wilson, 1987) and, in addition,

these same markers of deviant behavior in the urban environment have demonstrated some degree of relationship with academic achievement (Sampson, 1997).

This dissertation extended Sampson's (1997) assertion that there is an empirical link between these markers of social deviance and the community social disorganization theory with adolescent academic achievement as measured by standardized achievement tests. This dissertation investigated an adapted community social disorganization at the macro levels of the school district and the school. A focus was provided toward the urban environment where these markers of social deviance are concentrated and compared with schools located in rural environments. There is some evidence that the community social disorganization theory is applicable to rural areas (Simons, Johnson, Beaman, Conger, & Whitbeck, 1996).

Two primary research questions drive this dissertation:

1. To what extent, if any, does the community social disorganization theory explain the academic achievement of adolescents?
2. Will either school district effects or school effects have a significant relationship with adolescent academic achievement?

DEFINITION OF TERMS

To aid in understanding the complex topics and operationalize terms, the following definitions are provided.

Adolescent academic achievement – common indicator of overall student school performance and measured by standardized achievement tests.

Aggregation – using data collected at a lower level of analysis to represent a higher level of analysis.

Community effects – contextual or ecological effects that can include neighborhoods, schools, and other units of socialization.

Deviance – (social deviance) behavior that violates significant social norms.

Disaggregation – using data collected at a higher level of analysis to represent a lower level of analysis.

Ethnic heterogeneity – diversity of the community; used as a continuous variable and measured by identifying the majority culture and its ratio to minority cultures.

Indicators – measurable variables that are hypothesized to indicate latent variables.

Latent variable – hypothetical construct, unobservable and measured by indicators (observed measurements).

Low economic status – concentration of poverty with varied indicators, but to remain consistent with the relevant literature, primarily the concentration of students eligible for free and reduced lunch programs.

Multilevel analysis – statistical procedures to include hierarchical linear modeling and random coefficient modeling; used to analyze variables at aggregated and disaggregated levels. These levels are sometimes described as within (level 1) and between (level 2).

National standards – minimum test scores on standardized achievement tests to indicate performance; implemented statewide for all students.

Neighborhood effects – contextual variables within the neighborhood that influence adolescent academic achievement.

Partitioning of variance – statistical procedure identifying how variables covary after accounting for (holding constant) the variance of another variable.

Residential stability – movement into and out of the community as measured by the 1990 U.S. Census.

School effects – contextual variables within the school that influence adolescent academic achievement.

School District effects – effects synonymous with community and neighborhood effects that influence adolescent academic achievement used in cited reports.

Student performance – overall performance of the student as measured by standardized achievement test.

Structural equation modeling – statistical procedures to include path analysis, causal modeling, and covariance structure modeling.

Structural factors – a set of interrelated factors within the society that have functions that maintain the stability of the whole (adapted from Robertson, 1987, p.17).

Unit of analysis – the unit under investigation, such as, individual, group, organization, etc.

OVERVIEW

To adequately discuss the academic achievement of adolescents, in Chapter II, a background on the development of the community social disorganization theory is provided. The theory postulated that the prevalence of juvenile crime could be predicted by the characteristics of the neighborhood and community in which the juvenile resides. An empirical link was demonstrated between adolescent deviant behavior (juvenile crime), adolescent development, and academic achievement. This empirical link deductively led to the hypothesis that variance in adolescent academic achievement can be explained by the community social disorganization theory. To enhance understanding

of cognitive development as measured by standardized tests, a brief review of intelligence and its association with adolescent academic achievement and cognitive development is provided.

Then, the variables of interest to this dissertation are discussed and their consistency with the community social disorganization theory identified. These community contextual variables are indicators of residential mobility, low economic status, and indicators of school district and school advantage. Finally, a discussion of previous reports' statistical procedures is provided as an explanation of why these statistical procedures provided mixed results. With the advancement of computers, resurgent uses of alternative statistical procedures provide more precise parameter estimates by reducing bias in results.

In Chapter III, a description of the sample population is provided. Then, a description of the unit of analysis for each of the measurements is discussed. The contextual independent latent variables of interest and the dependent latent variables, adolescent academic achievement, are discussed and theoretical models of analysis provided. Limitations will also be discussed. In Chapter IV, the current study is placed into context with similar studies and specific data analyses procedures and findings are discussed. Finally, in Chapter V, a review of the current study along with inferences from the data analyses are discussed and recommendations for new investigations are identified.

SUMMARY

The failure of adolescents to achieve academically within the public education system is a topic of discussion that has generated numerous arguments and is the subject

of extensive research (Bracey, 1998). For the last 50 years, societal and economic forces have transformed the public education system in an attempt to answer perceived social ills and improve the national economy (Ravitch, 1983). The influences of social disorganization can be traced through the transformation of the public school system. The catalyst for the transformation of the public school system and the social disorganization was major civil rights initiatives (Berube, 1994). Moynihan (1965) described the social context of America and the plight of the largest minority faced with segregation. The practice of segregation and the movement to abolish it is still a current issue (Orfield & Yun, 1999).

The first major endeavor to study the public school system was provided by the Coleman Report. This report was a major undertaking that determined that family of origin was a primary causative factor in academic achievement. Although family background accounted for only a small portion of the variation in academic achievement, school effects were discounted in comparison. This classical report was supported and refuted by many, but it may have asked the wrong questions. Those supporters emphasized the fact that the quality of schools did not matter in academic achievement and, today, they support national standards for the public education system (Bracey, 1995).

This transformation was even more dramatic when viewed within the Commonwealth of Virginia. Prior to the historic U.S. Supreme Court decision in Brown v. Board of Education until as late as 1971, overt movements to block equality of opportunity were evident in the public school system. From massive resistance, to governmental legislation, containment, and blocking school busing, the history of

Virginia public education system is replete with disparity between schools and social inequality. This disparity is still current today and was documented in at least three General Assembly Reports.

Virginia was not alone in educational disparity. National reports identified the same current disparities with a return to "separate but equal" policies in the public education system across the nation. This resegregation policy goes beyond ethnicity to include social class and is prevalent throughout our nation's major cities.

In order to affect change in the public education system to improve academic achievement, numerous studies have been conducted. Many of these studies were not based on a theoretical perspective to guide the investigators (Hanushek, 1978, 1986; Pedhazur, 1982, 1997). These studies reported divergent results with no consistent finding to improve education (Hanushek, 1986). In addition, the statistical procedures used during these investigations are now being questioned. Different statistical procedures, multilevel analysis and structural equation modeling, have been found to provide a better understanding of the relationships between variables and more precise parameter estimates by reducing bias in results (Bryk & Raudenbusch, 1988).

The community social disorganization theory has demonstrated its ability to explain variance in adolescent deviant behavior in the urban environment (Sampson & Graves, 1988). Adolescent deviant behavior is related to adolescent development and academic achievement (Sampson, 1977). The community social disorganization theory was employed to explain the variation in adolescent academic achievement. In addition, using more exacting statistical procedures, the influences of students' backgrounds (school district effects) and those influences attributed to the school were explored. One

of this investigation's goals was to find ways to direct public policy and actions by legislators, educators and counselors to improve the educational process by understanding the relationships between variables that influence adolescent academic achievement.

In a rush to pass judgment on students, schools, and parents for failure to achieve academically, sight has been lost of the persistent inequalities of our public education system that exist. Through embracing the national standards movement, a view that all students, regardless of circumstances, should learn in the same manner is expressed (Bracey, 1995). The national standards movement was an attempt to correct these social inequalities and fulfill the American dream for all through raising academic standards and holding schools accountable.

This dissertation furthers the understanding of school districts and schools, especially in the urban environment, and their influence on adolescent academic achievement. This dissertation adds to the body of knowledge by extending an established theoretical perspective to explain adolescent academic achievement in the urban environment and possibly the rural environment. This dissertation furthers the extant literature through using different statistical procedures of multilevel analysis and structural equation modeling to investigate the complex factors influencing adolescent academic achievement within social context. This dissertation advanced explanatory models for a better understanding of the educational process.

CHAPTER II

REVIEW OF THE LITERATURE

Overall student performance is primarily defined by many as academic achievement as commonly measured by standardized achievement tests (Hanushek, 1978, 1986) and is one of the products of the public education system. In addition, academic achievement is currently viewed, rightly or wrongly, as a future indicator of the nation's economic performance (National Commission on Excellence in Education, 1983). Consequently, the academic achievement of adolescents has been investigated using a variety of indicators as causative, moderating, or intervening variables. These investigations have been fruitful in attempting to understand academic achievement; however, they do not provide an adequate overall picture for policy or community interventions (Hanushek, 1986). This dissertation investigates the variance in adolescent academic achievement using a theoretical perspective of community social disorganization to determine if the theory explains variance. In addition, to what extent, if any, school districts' and schools' effects explain the variance in academic achievement of adolescents and which, if either, will have a more significant relationship.

Currently, our national goals in education reflect our economic concerns (National Commission on Excellence in Education, 1983). Moreover, these goals, along with reported students' performance on standardized achievement tests, have placed public education at the center of a national discourse on school improvement efforts (Bracey, 1998). This national discourse must be viewed through a historical and sociological perspective to provide insight regarding what can be done to improve the public education system and students' performance. Many researchers have continuously

investigated specific factors affecting students' performance and found relationships to adolescent development (Bronfenbrenner & Ceci, 1994; Edelin, 1998; Hudson, 1998; Wasik, 1992). In separate reports, other researchers have discovered similar relationships between adolescent development and contextual neighborhood factors of the adolescent (Crane, 1991; Earls, 1998; Elliott & Wilson, 1996; McLoyd, 1998). These studies demonstrated a concomitant relationship between students' performance, adolescent development, neighborhood factors, and adolescent problem behavior, deviant behavior and juvenile delinquency (Sampson, 1997).

However, no theory has been reported that would provide an approach to integrate students' performance on standardized tests and community contextual factors (Hanushek, 1978; Pedhazur, 1982, 1997). Reviews of educational, sociological, economical, and psychological literature reveal separate approaches to understanding students' performance. In this literature, several theories have been offered from psychological, sociological, or educational perspectives to explain minority cognitive development as measured by adolescent academic achievement (Sampson, 1997). Sampson (1997) suggested the employment of the community social disorganization theory to explain variance in adolescent academic achievement.

Leung (1994) reported that we have yet to develop an integrated inquiry into schools and academic performance. Leung identified two lines of inquiry explaining the relationship between culture and cognition as it relates to school learning and where they overlap. Leung (1994) concluded, "In the desire to improve the persistent disproportionate school failure of minority students, the precise relationship between

culture and school achievement is of high interest and paramount urgency to educators as well to the nation as a whole" (p.1).

In conjunction with this integrated approach, appropriate statistical methods must be used to analyze the data at several levels simultaneously. The primary method used by investigators of school quality has been the educational production function analysis, an economics input-output analysis (Hanushek, 1986). This educational production function analysis identifies the output of the educational process, the achievement of individual students, as directly related to a series of inputs. Policy makers directly control some of these inputs—the characteristics of schools, teachers, and curricula. Other inputs, those of families and friends plus innate endowments or learning capacities of students, are generally not controlled by public officials. This method of analysis has not adequately quantified teacher characteristics and other critical inputs. Due to possible biased parameter estimates, results from these analyses have been mixed (Hanushek, 1978, 1986).

Outlining data analyses procedures, Schumacker and Lomax (1996) summarized the family of multivariable methods of data analyses as follows:

> Multiple regression seeks to identify and estimate the amount of variance in the dependent variable attributed to one or more independent variables (prediction). Path analysis seeks to identify relationships among a set of variables (explanation). Factor analysis seeks to identify subsets of variables with common shared variance from a much larger set (exploratory factor analysis), or to confirm a measurement model where variables are hypothesized to define a construct (confirmatory factor

> analysis). Structural equation modeling builds on these methods by incorporating a confirmatory factor analysis approach into the theoretical relationships among latent variables (p. 53).

In past research, statistical procedures such as ordinary least squares, weighted least squares, analysis of variance, and hierarchical or logit regression modeling were used to analyze aggregate data. These statistical procedures may prove of limited value based on possible bias of parameter estimates from using least squares regression and the aggregation or disaggregation of data (Hanushek, 1978, 1986). Structural equation modeling and multilevel analysis provided more precise methods for analyzing aggregate data from multiple levels of analysis. An expanded discussion of statistical analysis procedures for determining school effectiveness and outcomes is provided.

Through this review of studies, variables relevant to the community social disorganization theory and researchers' statistical methods of analyzing aggregate data at multilevels provided a deductive approach to investigate student performance. This chapter begins with an overview of neighborhood effects to include social disorganization and its relationship to education, adolescent development, and academic achievement. A focused view of the community social disorganization theory is provided with discussion of its validity and a discussion of alternative procedures and methods for application. A proposed bioecological model and an integrated theoretical approach were discussed. To complete this discussion of academic achievement or cognitive development, the controversy about the role of intelligence versus the role of environment must be understood. So, a brief review of intelligence, what researchers theorize, and its influences on academic achievement are provided.

A brief discussion is provided regarding relevant investigations of adolescent academic achievement. Then, variables associated with the community social disorganization theory and academic achievement were discussed. These variables were the ones to be investigated in this study. Caution must be taken in reviewing the extant literature for most provide a focus only on minorities, especially Black Americans. Currently, when reference is made to disadvantaged communities, neighborhoods or schools, overwhelmingly the reference is to minorities, poverty, and the associated social inequalities. Primary to this discussion was the urban environment where these social inequalities were concentrated. However, an argument was substantiated that the relevant discussions apply to all economically disadvantaged adolescents, parents, and communities. Although cultural differences were evident, social class differences were also underlying factors.

This chapter ends with a discussion of the differences in types of statistical analyses used to measure aggregate data and establishes that better measurements can be achieved through structural equation modeling and multilevel analysis.

SCHOOL DISTRICT EFFECTS

Community Social Disorganization Theory

Within sociological theory, social organization or disorganization and deviance provide the foundation for theoretical orientations for the study of social groups and individuals. Several different theories, identifying specific behaviors and kinds of sociological variables, shape the way investigators view social problems. Merton and Nesbit (1976, p. 40) agreed that no single theory could account for all social problems but each of the theories complement each other. Social disorganization is viewed from many

varied levels; from a nation to an individual. Social disorganization is considered a complex process but a natural process as a result of change and growth within societies, cultures, groups, communities, families, and individuals. Elliott & Merrill (1961) identified social disorganization as a "process by which groups['] relationships are broken" and agreed that "social change has occurred since the dawn of history" (p. 3). Finally, Sampson (1997) noted "both social organization and social disorganization are inextricably tied to systemic networks that facilitate or inhibit social control" (p. 34).

Social disorganization can affect an individual, the family or other social systems that make up the larger society (Elliott & Merrill, 1961, p. 457). The community has been defined in both geographical and psychological ways. Communities extend from neighborhoods to cities and can be specialized groups, e. g., a community of learners or educators. Schuler (1996, p. 3) defined community as an integration of people who live together, are like-minded to some degree and have a sense of community (a sense of belonging to a greater social unity). Etzioni (1996) described community as "a set of attributes, not a concrete place" (p. 6) with shared values. Merton and Nesbit (1976, p. 26) identified social disorganization occurring when the groups', communities' or societies' structure of statuses and roles are not working effectively. Merton and Nesbit further identified the causes of social disorganization as:

> (a) people have conflicting and not only complementary interests and values by virtue of occupying different statuses and roles in society; (b) each person inevitably occupies several statuses and roles that can impose conflicting obligations; (c) through faulty socialization, people do not learn how to fulfill their social roles; and, (d) people fail to communicate

what they want to do and what they expect of others, even when these expectations do not conflict (p.41).

Many sociological theorists have investigated criminal behavior and particularly juvenile delinquency using social disorganization. Their findings consistently identify a relationship between community contextual factors and the incidence of crime. Faris (1955) found that crime was primarily a phenomenon of urban disorganization and that there was a general association of high juvenile delinquency rates associated with urban areas. In addition, Faris reported a general correlation between truancy and the distribution rate of all delinquency in urban areas. Elliott and Merrill (1961, p. 536) considered the crime rate as "a major index to community disorganization because it is a measure of the degree to which the citizens fail to live up to the community's moral requirements."

In regard to social disorganization, the community of the school district and the community within the school itself are the focus of this report. Both the neighborhood and school are social systems as identified by Elliott and Merrill (1961), Merton and Nesbit (1976), and Sampson (1997). In contrast, Coleman (1976) stated "Unlike crime, the problems of education in American cities are not direct manifestations of community disorganization. But they are related to community organization and disorganization in important ways" (p. 572). Coleman cited three major issues effecting education as the crisis of authority in schools, school finance, and school desegregation. Coleman noted that the issue of school desegregation as the issue that has created "the greatest violence and disorder of any educational issue in many years . . ." (p. 573).

However during the 1960s and 1970s, the same issues cited by Coleman (1976) were the significant causes of the neighborhood and school transformation through social disorganization. In response to desegregation and to avoid school busing, middle class Whites moved out of the school district or transferred their children to private schools. Racism could be presumed as the major cause of this "White flight" but these middle class Whites had previously been thought to be more tolerant of cultural issues. Wilson (1991, 1987) argued that this was only a portion of the overall social problem of what he termed "social dislocations" within the central cities. Wilson identified the movement of industry, jobs and higher income residents (to include middle-class Blacks) from the inner cities. These social problems of desegregation and social dislocations caused several reactions within the urban public school system that have had long-term affects on school functioning, population served, and student performance. Community social disorganization continues to affect schools and students' performance and has not been adequately investigated.

Delinquency and Adolescent Deviant Behavior

Community social disorganization as a result of the community's assets and deficits has been studied intensely over the years but more specifically with its influences on crime and delinquency and adolescent development. Within crime and delinquency, Sampson and Groves (1989) reviewed the evolution of the theory of community social disorganization introduced by Shaw and McKay in 1942. Shaw and McKay developed their theory through a series of case studies (Shaw, 1930; Shaw, McKay & McDonald, 1938) of juvenile delinquents. Through these case studies and reports from other cities and countries, Shaw and McKay (1969) discovered a relationship of location and time

with the incidence of juvenile delinquency. In the introduction to their book, Juvenile Delinquency and Urban Areas (1969), Burgess stated "Juvenile delinquency is highly correlated with a number of presumably separate factors, including (1) population change, (2) bad housing, (3) poverty, (4) foreign-born and Negroes, (5) tuberculosis, (6) adult crime, and (7) mental disorders" (p. xi).

Shaw and McKay (1969) suggested that three structural factors—low economic status, ethnic heterogeneity, and residential mobility—led to the disruption of community social organization, and, in turn, accounted for variations in crime and delinquency. These structural factors emerged from the central theme of low economic status of neighborhoods in central cities. Shaw and McKay argued that residents of communities that were homogeneous ethnically and had long-term residents were better able to control teenage behaviors that lead to street gangs. These cohesive communities had local friendship networks and local participation in formal and voluntary organizations because of their ethnic homogeneity and stable residents. Shaw and McKay reported a correlation of .90 between delinquency rates of male juveniles aged 10-16 and criminal prosecution referral rates of young adult males aged 17-20. As an intervention, Shaw and McKay recommended a series of programmed community actions involving the residents of the community.

Although several researchers had examined this theory, Sampson and Groves (1989) stated that no one had applied this theory of community social disorganization to explain juvenile delinquency within a community. Sampson and Groves used data from the first British Crime Survey and developed a causal model. This causal model included low socioeconomic status, ethnic heterogeneity, and residential mobility. In addition,

Sampson and Groves expanded the model with indicators of family disruption and urbanization and used weighted least-squares regression analysis to analyze the data. Their findings replicated and extended the systemic model of community social disorganization. Sampson and Groves reported:

> our empirical analysis established that communities characterized by sparse friendship networks, unsupervised teenage peer groups, and low organizational participation had disproportionately high rates of crime and delinquency. Moreover, variations in these dimensions of community social disorganization were shown to mediate in large part the effects of community structural characteristics (i.e., low socioeconomic status, residential mobility, ethnic heterogeneity, and family disruption) in the manner predicted by our theoretical model (p. 799).

Sampson and Groves cautioned that their analysis did not constitute a definitive test of the community social disorganization theory. Although Sampson and Groves research supported the community social disorganization theory, Trojanowicz and Morash (1992) found fault in the model. The major fault was that Shaw and McKay assumed that if a person lives in a neighborhood that is heavily populated by one type of person and has a high crime rate; this type of person is likely to be a criminal. Trojanowicz and Morash agreed that Shaw and McKay made a major contribution to the understanding of crime but had reservations of its generalizability to other communities. Sampson (1997) addressed this concern of an over-emphasis of disorganization by terming it "differential social organization" (p. 34). Sampson (1997) explained that

neighborhoods possess different degrees of social organization not disorganization as compared to the wider society.

Sampson (1997) identified research that largely supported the "core hypothesis of Shaw and McKay (1942) that the structural factors of poverty and residential instability explain variations in crime and delinquency rates" (p. 35). Sampson continued and cited that "crime rates are positively linked to community-level variations in population and housing density, percent single-parent households, and rates of community change" (p. 35). However, Sampson (1997) found "less support for Shaw and McKay's (1942) ethnic heterogeneity thesis" (p. 36). Sampson explained that "times have changed with respect to patterns of immigration and racial segregation since Shaw and McKay were studying the city" (p.36) and argued that "subcultures [within the community] thus seem to vary not with broad social categories such as income and race/ethnicity but rather with highly contextualized and ecologically specific settings" p. 49). Sampson concluded:

> In short, cultural influences in social disorganization theory stem from processes by which cognitive landscapes rooted in the dynamics of urban social ecology influence behavioral expectations. Community and situational contexts characterized by social disorganization and cultural isolation attenuate the existential relevance of mainstream values, and this process in turn facilitates diversity of values and a collective state of anomie and mistrust. These conditions provide fertile soil for the emergence of deviant patterns of behavior that the community cannot effectively resist and that in time become rationalized. For these reasons, the evidence suggests a renewed appreciation among researchers for the

> ecology of culture of the cultural structure of a community, one that is opposed to the seemingly noncontextual culture implied by the subculture of violence (p. 42).

In a related area of research, Crane (1991) proposed that "social problems are contagious and are spread through peer influence" (p. 1227) and that communities experiencing these social problems should be viewed as an epidemic. These epidemics of social problems should occur in poor, minority neighborhoods, within cities. Crane postulated a theory similar to that of Shaw and McKay in respect to neighborhoods. Crane stated, "As neighborhood quality decreases, there should be a sharp increase in the probability that an individual will develop a social problem. The jump should occur somewhere near the bottom of the distribution of neighborhood quality" (p. 1226). To validate this theory, Crane investigated neighborhood effects on teenage pregnancy and school dropout rates. He used data from the 1970 Census Bureau Public Use Microdata Sample and a piecewise linear logit model statistical method to estimate the pattern of neighborhood effects across the distribution of neighborhood quality. Crane also made a comparison between "blacks living in the largest cities and those living in other places" (p. 1237). The report's finding provided support for the theory with limitations of possible biased estimates due to measurement error and/or missing variables. "Cognitive ability, academic achievement, attitudes, and aspirations have been found to affect dropping out and/or childbearing" (p. 1248) and they were omitted. Another omitted variable was school effects, which could not be determined. Crane found that the pattern of neighborhood effects on both dropping out of school and teenage childbearing "was precisely the one implied by the epidemic hypothesis, for both blacks and whites" (p.

1250) and reported that these results were large and significant. Crane also found the same pattern in other than large cities but the increases were not significant. Crane included in his findings and limitations:

> Part of neighborhood effects found here may actually have been attributable to school effects. But it is also possible that schools were mechanisms of neighborhood effects. Although it is important to distinguish between neighborhood effects and school effects and to determine their relation, if any, this issue does not really effect the basic interpretation of the results here. Since the two effects cannot be distinguished, it might be more precise technically to call the overall effect found here a "social context" effect. But whether the social processes that generated the sharp jumps occurred in neighborhoods, schools, or both, these sharp increases are no less striking. And, if anything, the epidemic theory makes even more sense when applied to schools because social networks are probably denser in schools than neighborhoods (p.1248).

Other investigations have been conducted and are ongoing, most notably in the multifaceted longitudinal study Project on Human Development in Chicago Neighborhoods (PHDCN) (U.S. Department of Justice [DOJ], 1998), to determine the influences of ecological factors on crime and delinquency. DOJ (1999) reported on a summary of the research by Sampson and Bartusch on PHDCN to explore attitudes toward crime, police, and the law. DOJ (1999) reported that minority group members in some of the worse neighborhoods were not tolerant of deviant behavior and found:

> The neighborhood itself affects attitudes. In neighborhoods where there is poverty and instability, people are more tolerant of deviance, although not teen fighting. At the same time, minority group members in these neighborhoods are more intolerant of deviance than whites are, even taking into account poverty and instability.

In 1988, Sampson investigated local friendship ties and community attachment using a multilevel systemic model. Sampson found that residential stability had both individual-level and contextual influences on locality-based friendships. Using weighted least squares regression to analyze the data, Sampson reported "the results support the systemic model and demonstrate the importance of linking the micro- and macro-level dimensions of local community bonds" (p.766). These results lend support to investigating factors at different levels of analyses, e.g., community, neighborhood, home, school district, and school. In a separate report, Sampson (1986) investigated the affects of socioeconomic status on official reactions to juvenile delinquency. Using ordinary least squares regression to analyze the data, Sampson found that "neighborhood SES had a consistent and relatively strong inverse effect on police records regardless of the prevalence, frequency and type of delinquency as measured by self-reports. Moreover, the neighborhood effect was invariant across sex . . ." (p.884).

Sampson, Castellano & Laub (1981) conducted an analysis of the National Crime Victimization Survey to explore patterns of neighborhood effects on juvenile delinquency overtime and found significant patterns. Sampson et al. (1981) discovered:

> In brief, rates of victimization exhibited similar patterns across neighborhood characteristics dimensions from 1973-1975, thus suggesting

> that the form of the relationship between neighborhood characteristics and victimization did not appreciably change over time. Furthermore, additional analysis revealed that when crime-specific rates of victimization for 1973-1974 were regressed on comparable rates for 1975-1976 and 1977-1978, the resulting correlations were extremely high (.995 and .986, respectively) (p. 21).

Hill, Soriano, Chen, and LaFromboise (1994) determined those sociocultural factors of racism and discrimination, poverty and inequality, and the status mobility system within the family and community influence violence among ethnic minority youth. Kazdin (1994) identified anti-social behavior by its legal designation of delinquency and its psychiatric designation of conduct disorder and found the anti-social behavior as having comorbidity to conduct problems, and aggressiveness. The behavior was reflected within youth as academic deficiencies such as achievement level, grades, being left back, early termination from school, and deficiencies in specific skills. These same factors share relationships with academic achievement, interpersonal relationships, social skills, and peer rejection.

Federal projects are ongoing to investigate how to reduce crime and revitalize communities (Executive Office of Weed and Seed, 1998) and how to extend our economic recovery to a number of central cities to reduce unemployment, loss of population, and reduce persistently high poverty (U.S. Department of Housing and Urban Development, 1999). These same basic contextual factors—low socioeconomic status, residential mobility, and ethnic heterogeneity—appear to influence adolescent development and their academic achievement (Sampson, 1997).

Adolescent Development

Often child developmental theories do not fully consider the context, e.g., culture, socioeconomic status, or environment, in which the development occurs. This context is not investigated as the primary explanation for poor school performance or behavior but as moderators or confounding variables. Bronfenbrenner and Ceci (1994) proposed an alternative, empirically testable theoretical model of human development that:

> (a) goes beyond and qualifies the established behavioral genetics paradigm by allowing for nonadditive synergistic effects, direct measures of the environment, and mechanisms of organism-environment interactions, called proximal processes, through which genotypes are transformed into phenotypes; (b) hypothesizes that estimates of heritability (e.g., h^2) increase markedly with the magnitude of proximal processes; (c) demonstrates that heritability measures the proportion of variation in individual differences attributable only to actualized genetic potential, with the degree of nonactualized potential remaining unknown; (d) proposes that, by enhancing proximal processes and environments, it is possible to increase the extent of actualized genetic potentials for developmental competence (p. 568).

This theoretical model sets forth how heredity and environment work in confluence to form human developmental processes (for specific details see Bronfenbrenner & Ceci, 1994). This model was named the bioecological model and it proposes that humans are born with certain genotypes (heredity) that are actualized by proximal processes for human competence. In essence, the environment (to include

mother-child interactions) maximizes inherited genotypes and that the more disadvantaged the environment, the greater the increase in human competence when an enriched environment is made available somewhere. Bronfenbrenner and Ceci stated "should our hypotheses turn out to have some validity" the implications for social policy as "confirmatory results would suggest that many human beings may possess innate potential for development significantly beyond those that they are presently manifesting, and that such unrealized capacities might be actualized through social policies and programs that enhance exposure to proximal processes in environmental settings that, in turn, can provide the stability and resources that enable such processes to be most effective" (p.589).

In keeping within the framework of the bioecological model, Coll et al. (1996) argued for an integrative model to study child development, especially that of minority children. This integrative approach would include social position variables (race, social class, ethnicity, and gender), social stratification mechanisms (racism, prejudice, discrimination, and oppression), segregation (residential, economic, and social and psychological), promoting/inhibiting environments (schools, neighborhoods and health care environment), adaptive culture (traditions and cultural legacies, economic and political histories, migration and acculturation patterns, and current contextual demands), child characteristics, and family (structure and role of the family, family values, beliefs and goals, and socioeconomic status/resources). The competencies investigated would continue to involve important traditional skill areas such as cognitive, social, emotional, and linguistic development.

Of these variables, the promoting/inhibiting environments are of particular interest. Coll et al. (1996) argued that the schools and neighborhoods are crucial components of children's development. They reported that neighborhoods required investigation as causative factors not only on the basis of the external resources available but also the internal resources in the community that may support or interfere with a child's social, academic and psychological competencies. In regards to the schools, Coll et al. reported that:

> Children enter schools with a rich background that includes the child's unique characteristics, family characteristics, and community characteristics. This background influences the child's ability to learn and develop within the context of the school setting. School variables that can influence child behavior can be viewed as a set of nested environments: a) the school district or system (including organizational and instructional philosophies, policies, and procedures); b) the individual schools (which includes school personnel and resources); c) and the individual classrooms (which include child, teacher, and peer characteristics and classroom structure, curriculum, and instructional strategies) (Wasik, 1992). Each of these nested environments can be inhibiting, promoting or both. Very little systematic research has been done to address how these different school variables influence the social and academic competencies of children of color (p. 1902).

The arguments of Coll et al. appear to apply to all children—regardless of race or class or the interaction thereof—for they are just as valid for White children as minority

children. As Coll et al. reported, not many studies have adapted this integrative approach. Yet, the literature is replete with studies identifying these contextual variables separately or partially in groups. These investigated variables (teenage pregnancy, school dropout, neighborhoods, and health care) are the same ones linked to the community social disorganization theory.

Other researchers have examined how neighborhoods influence adolescent development. Brooks-Gunn et al. (1993) used two data sets, the Infant Health and Development Program and the Panel Study of Income Dynamics, to examine the affects of neighborhood characteristics on the development of children and adolescents. Using a combination of ordinary least squares regression and logistic regression to analyze the data, Brooks-Gunn et al. (1993) discovered that there were reasonably powerful neighborhood effects on childhood IQ, teenage births, and school-leaving, even after the differences in the socioeconomic characteristics of families were adjusted for.

In addition, Gonzales, Cauce, Friedman and Mason (1996), in a one-year longitudinal study, examined the influence of family status variables (family income, parental education, and family structure), parenting variables (maternal support and restrictive control), peer support, and neighborhood risk on school performance for 120 African American junior high school students. Gonzales et al. (1996) based their study on the social disorganization theory of Shaw and McKay and primarily investigated their belief that neighborhood risk would have a direct, negative affect on academic achievement and that it would serve as a moderator of the influences of both parenting and peer support. This study relied on participants' self-reports. Using ordinary least squares regression and hierarchical procedures, Gonzales et al. discovered that combining

the variables of family status and parenting did not predict adolescent grade point averages. When the extrafamilial influences of peer support and neighborhood risk were entered into the equation, these variables did explain a significant proportion of the variance. Peer support was positively related to grade point average, beta = .23, and neighborhood risk was negatively related to grade point average, beta = -.19. The full model accounted for 27% of the variance in Time 2 grade point average. In addition, neighborhood risk demonstrated significant moderating influences on parenting and peer support. Their findings demonstrated the importance of contextual models that include multiple contexts.

In another related report, Simons et al. (1996) investigated parents and peer group as mediators of the effects on community structure on adolescent problem behavior. This report's subjects were 207 single parent families in small rural communities versus the inner city. Simons et al. (1996) argued that the examination of the influence of community context on child adjustment required a multilevel data set containing data at the community and individual level. Simons et al. used data from the U.S. Census, self-reports for both conduct problems and psychological distress and individual measures. Simon et al. combined indicators of latent factors to form single observed variables and used structural equation modeling to analyze the data. The procedure of structural equation modeling (also referred to as path analysis) uses ordinary least squares regression statistical methods as its primary component. Simon et al. found that, for boys, community disadvantage had a direct effect on psychological distress and indirectly increased the probability of conduct problems, as measured by self-reports. For girls, community disadvantage was unrelated to deviant behavior or emotional well being.

However, they did discover that the proportion of single parent households in the community had a direct effect on girls' conduct problems.

The cited reports and studies demonstrate that social disorganization and the theory of community social disorganization for juvenile delinquency form a foundation to begin an integrative approach to investigating adolescent academic achievement. The bioecological model holds promise for actualizing the human potential. The sociological factors of structure, social class, social statuses and positions, and deviance have all been examined in part for their relationships with adolescent academic achievement, adolescent development and delinquency. Simons et al. (1996) extended the community social disorganization theory to rural communities with some success. Many investigators are now regarding the contextual effects as significant factors for future investigations. As a system within itself, public education has been transformed by these sociological factors and may be the environment that social policies can be directed as an intervention. Disentanglement of neighborhood and school effects is necessary to determine if the public school is the environment for intervention. However, controversy still exists over the roles of inherited intelligence and that of environmental factors and their influence on cognitive development as measured by adolescent academic achievement.

Intelligence

Discussion of cognitive development as measured by academic achievement is incomplete without considering how much of cognitive development is preordained or inherited and how much is the interaction with the environment. An extensive review of the related literature regarding intelligence (APA, 1997) provides the reader with many

divergent perspectives of theories regarding intelligence. To begin any discussion of intelligence, a definition must be provided. This definition by nature is very complex and detailed, so a simplistic view is provided. Historically, theorists hypothesized that a construct of general intelligence, called g, existed and that each individual possessed a quantity of general intelligence. Although several pseudo-sciences (biometrics) developed, this theory of a general intelligence could not be proved or disproved until certain significant developments occurred.

First was the development of statistical probability and that certain attributes are distributed throughout the population in the shape of a normal bell curve with few at each end of the curve and the majority in the middle. Second, in 1896, was the development of the correlation coefficient (Galton and Pearson) that demonstrated certain attributes shared relationship with other attributes. In essence, where certain attributes were present, others would be present. In 1904, the correlational procedure was used to develop the factor analysis technique (Spearman) (Schumacker & Lomax, 1996). Finally, a complex test of different abilities to sort and rank individuals based on intelligence quotients was developed (Binet and Simon) to predict those who needed additional assistance for school performance. After the development of the first test, other tests were developed (Goddard and Terman) that demonstrated high correlation with each other. Originally, these tests were complex, detailed, time-consuming, and expensive. Later, tests were developed that were simple to administer, not time-consuming, and cheaper but still demonstrated a relationship with the original tests. These tests were developed to sort and rank people at finite levels to ensure that the results would place them on the continuum of a bell curve (APA, 1997).

So, in a simplified version, intelligence is what intelligence tests measure. Fischer, Hout, Jankowski, Lucas, Swidler, and Voss (1996) attributed this definition to Arthur Jensen and described a circular argument. Fischer et al. identified that an assumption must be made that there is a single intelligence and that it is distributed among people like a bell curve, so the test is built to yield a bell curve. Hanushek (1978) discussed similar concerns with standardized tests and stated:

> Perhaps the most important concern with standardized tests is the lack of external validation. These tests do discriminate among individuals; that is, they can divide the population into different groups. However, questions are generally selected by criteria internal to tests: (a) their ability to divide students (so that questions that can be answered by all or none of the relevant population aren't useful); and (b) their consistency with other questions (i.e., whether individuals getting a given question right tend to get other questions on the test right). Further, a given test should produce the same score if taken at different times by the same individual, and slightly different wording of questions covering the same concept should yield the same results. None of these relates directly to whether or not tests cover material, knowledge, or skills valued by society (p. 355).

These assumptions formed the basis of controversy among theorists.

Gould (1981) discussed measuring intelligence as a single quantity and identified this general argument as biological determinism. He clarified that biological determinism was vast for it encompassed virtually every aspect of interaction between biology and

society. Also, he identified the argument as it concerned intelligence to two fallacies: reification, or our tendency to convert abstract concepts into entities, and ranking, or our propensity for ordering complex variation as a gradual ascending scale. The common style for embodying both fallacies of thought was the quantification or the measurement of intelligence as a single number for each person. Gould provided the different arguments for ranking and identified craniometry, the measurement of brain size, as the leading numerical science of biological determinism during the nineteenth century. This was followed by intelligence testing in the twentieth century that assumed intelligence is a single, innate, heritable, and measurable thing. He cited "the use of these numbers to rank people in a single series of worthiness, invariably to find that oppressed and disadvantaged groups—races, classes, or sexes—are innately inferior and deserve their status" (Gould, 1981, p. 25).

Gardner (1993) argued for a theory of multiple intelligences. He believed the intelligence captured by standardized tests encompassed only linguistic and logical-mathematical intelligences. Through his research, he determined other intelligences to include spatial, musical, bodily kinesthetic, interpersonal, and intrapersonal.

Countering the notion of a single intelligence, Gardner proposed a new giftedness matrix including gifted, prodigy, expert, creative and genius. These were linked to developmental stages. Gardner (1993) explained:

> Building upon this concept of intelligence, it proves possible to come up with a new and consistent way of speaking about the giftedness matrix. An individual is "gifted" if he or she is "at promise" in any domain where intelligences figure; and the term prodigy would be applied

> to an individual of unusual precocity. An expert is a person who rapidly achieves a high level of competence within a domain, irrespective of whether any of his or her approaches are novel or experimental in any way. Conversely, an individual is considered "creative" if he or she regularly solves problems or fashions products in a domain in a way that is initially seen as novel but that ultimately is recognized as appropriate for a domain. No definition of genius flows directly from this work. But I would propose that an individual merits the term genius to the extent that his or her creative work in a domain exerts a material effect on the definition and delineation of the domain—so that in the future, individuals who work in that domain will have to wrestle with the contributions made by the creative genius. The more universal the contribution, the more it travels across cultures and eras, the greater the genius (p. 54).

These identified intelligences were the results of factor analytic studies of test scores. Gardner (1993) concluded that this was only a preliminary list and made a case for a plurality of intellect. He conducted a developmental analysis and examined four different points in the developmental trajectory: the five years old; the ten years old; the adolescent; and, the mature practitioner. Similarly, Armstrong (1993) argued:

> Research on the predictive value of IQ tests bears this out. For although intelligence tests consistently predict school success, they fail to indicate how students will do after they get out into the real world. One study of highly successful professional people indicated that fully a third of them had low IQ scores. The message is clear: IQ tests have been

> measuring something that might be more properly called schoolhouse giftedness, while real intelligence takes in a much broader range of skills (p. 8).

In support, Kunjufu (1990) questioned the timing of testing. Based on several studies, Kunjufu identified the best time to measure natural and raw intelligence of African American youth was between infancy and three years of age. At this point, African Americans out performed their European American counterparts in recognition of stimuli and response to it. He reported that the continued development of intelligence was hampered at this early age due to poor parenting and a lack of a nurturing environment. These factors were linked to the parents' socioeconomic status.

Kozol (1991) supported this belief that socioeconomic status had much more influence on one of the measurements of intelligence, academic achievement, but his focus was the family and community. His basic assumption was that student achievement was linked to disparities between schools and a nurturing environment. These disparities were driven by the economic status of the communities where the schools were located. Kozol (1995) continued this research and revealed a perpetual cycle of poverty with the segregation of the poor. He found this segregated environment in which the economically disadvantaged lived continued this low socioeconomic status with little hope of breaking the cycle. He found the environment to be the causal factor.

Etaugh and Rathus (1995) reviewed several studies to determine the influences that heredity and environment have on intelligence. They reported that experts usually see genetic influences as providing the reaction range for the complex pattern of verbal

and reasoning abilities and problem-solving skills that are interpreted to be signs of intelligence. An enriched environment may encourage all to realize their potential, minimizing possible differences in heredity. Hoffman, Paris, Hall and Schell (1988) identified intelligence scores as not an absolute measure of mental capacity but as a descriptive statistic relating present performance to that of others of the same chronological age. They discovered that each person's reaction range (based on environmental situations) for the skills tapped by IQ tests was fairly wide (25 points) and aspects of the environment determine just where along that range IQ will develop.

In opposition to the previously cited reports, Herrnstein & Murray (1994) argued that socioeconomic status of African Americans does not affect IQ and the results of intelligence tests. They stated, "The trouble is that socioeconomic status is a result of cognitive ability, as people of high and low cognitive ability move to correspondingly high and low places in the socioeconomic continuum" (pp. 286-287). They concluded that parents have high or low socioeconomic status in part as a function of their intelligence, and their intelligence also affects the IQ of the children through both genes and environment.

However, they stated that socioeconomic status "explains 37 percent of the original B/W [Black/White] difference" (Herrnstein & Murray, 1994, p. 286) and agreed this relationship was in line with the results of many other studies. Gould (1994) questioned the using of substantial heritability of with-in group IQ as an explanation of average differences between groups and Kamin (1994) seriously questioned the statistical analyses used by Herrnstein and Murray. Herrnstein and Murray may have proved that environmental fixes are possible, but they take much longer to work (Ryan, 1994).

Herrnstein and Murray (1994) agreed that the differences in African American and European American test scores were diminishing. They reported on the renorming of the Wechsler Adult Intelligence Scale in 1981 in which the difference was 1.0 standard deviation. They reported results of four normative studies for children that showed a difference of only seven IQ points for the Ravens Standard Progressive Matrices and the Kaufman Assessment Battery for Children. They further reported that the Stanford-Binet found differences of ten points for children ages 7 to 11 and twelve points for children ages 2 to 6. While questioning the adequacy of the testing procedure, they also reported results found in longitudinal data from the National Assessment of Educational Progress, the American College Testing examination, Scholastic Achievement Test, a comparison of the 1972 and 1980 national high school surveys, and some state level achievement test data.

The results were the same in all areas—the differences were decreasing because African Americans were scoring higher and not because European Americans were scoring lower. Hauser and Huang (1996) found similar results in the convergence of the average achievement test scores of Black and White youth. Herrnstein and Murray (1994) explained this reduction by stating:

> Real and important though the problems of the underclass are, and acknowledging that the underclass is disproportionally black, living conditions have improved for most African Americans since the 1950s—socially, economically, and educationally . . .
>
> Because blacks are shifted toward the lower end of the socioeconomic range, such improvements benefit them, on average, more

> than whites. If the improvements affect cognitive development, the black-white gap should have contracted. Beyond this socioeconomic leveling, there might also have been a leveling due to diminishing racism. The legacy of historic racism may still be taking its toll on cognitive development, but we must allow the possibility that it has lessened, at least for new generations. This too might account for some narrowing of the black-white gap (pp. 292-293).

To clarify the argument about intelligence, a Task Force was formed by the Board of Scientific Affairs of the American Psychological Association and charged with preparing an authoritative report on the issues surrounding intelligence. The Task Force (APA, 1995) reported several concepts of intelligence but focused on the psychometric approach. They reported that since Binet devised tests to distinguish mentally retarded children from those with behavior problems, psychometric instruments have played an important part in American and European life. This important part included admission to institutions of higher education, job placement, and entrance to the armed forces.

The Task Force reported that many of the most commonly used tests did not measure intelligence but some closely related construct. They stated there was no dispute on the stability of scores on these tests, nor that they predict certain types of achievement rather effectively. Yet, the Task Force cited "Individuals rarely perform equally well on all the different kinds of items included in a test of intelligence" (APA, 1995, p. 5). They reviewed the controversy about the importance of a general factor, g, a measure of intelligence, which these tests have in common.

Whether it is simply whatever the test measures, its heritability, or if there is more than one intelligence, the arguments over intelligence continue. Each of the arguments cited agrees that heredity and the environment affect an individual's intelligence. The argument stems over which has the major influence. As Bronfenbrenner and Ceci (1994) reported so clearly that the argument of how much variance in intelligence was attributable to heredity and how much to environment would be more fruitful if the question was changed to "how does heredity and environment interact?" Using this approach, the process can begin to actualize the human potential, enhance adolescent development, and improve academic achievement. Bronfenbrenner and Ceci included in their argument that social policy should be directed at providing an accessible enriched environment to accomplish these goals and they viewed the public school as one of these enriched environments.

These environmental variables that share a relationship with cognitive development as measured by academic achievement are the variables of interest for this investigation. These environmental variables are consistent with the community social disorganization theory and can be traced throughout the cited reports.

Current Studies on Adolescent Academic Achievement

Research regarding adolescent academic achievement provided insight on how these environmental variables influence adolescent academic achievement. This current report's findings clarified Coleman (1972) "external economies, or if negative, diseconomies" (p. 155) when attempting to measure the relative importance of various resources inputs into schools to influence adolescent academic achievement. These economies and diseconomies encompassed more than public funding of the school

system. In past analyses, using the educational production function analyses to investigate these influences have not adequately captured the impact of these public school resources in the context in which public schools and school districts function. These public school resources were possibly confounded with other community economies or diseconomies. Also, the failure to use theory to guide the investigations has exacerbated interpretations that can be made from the data used.

Since Coleman's (1972) statements about economies and diseconomies, several investigations into adolescent academic achievement were conducted identifying the same indicators of economical disadvantage within the community and home. APA (1993) argued that family income was perhaps the most powerful factor in contributing to and shaping the settings in which adolescents live. APA reported "adolescents from low-income families and neighborhoods are at much higher risk of educational failure than their more affluent suburban counterparts" (p.7). APA identified disparities in per pupil expenditures and correlated these disparities with qualitative differences in the total educational experience. APA (1993) foreshadowed the findings of Herrnstein and Murray (1994) and other reports' findings in reported differences among racial and ethnic groups in achievement test scores. These reports have consistently found family income and occupational background as the strongest predictors of school performance.

APA (1993) cited as an example "from early adolescence, it is evident that schools are unable to capture the interest or facilitate the achievement of many low-income students . . . fully 11 percent of eighth graders from low-socioeconomic-status (SES) backgrounds were absent more than one-quarter of the 1989 school year, a rate double that of high SES students" (APA, 1993, p. 104). APA found that the

socioeconomic status was strongly and consistently associated with poor academic performance. They added that many students of families or neighborhoods that are rooted in poverty "simply do not have the kind of day-to-day experiences that would stimulate their intellectual development and complement the mission of schools" (APA, 1993, p. 106).

APA's concluding comments on education indicated that over the last decade, the nation's schools have been the object of many broad-based reforms aimed at enhancing accountability throughout the education system. Emphasis has been placed on basic skills and has led to common curriculums and more requirements in mathematics, reading and science. Schools have become the dominant setting for preventive health services and violence prevention.

In contrast to APA's (1993) findings, Grissmer, Kirby, Berends, and Williamson (1994) while investigating family influence on student achievement, found that the schools of the 1970s and 1980s had not deteriorated in significant ways in their instruction in mathematics, verbal, and reading skills. Grissmer et al. reported that similar comments could not be said for educational productivity. When measuring learning per unit of resources, Grissmer et al. reported that educational productivity had deteriorated. The economic status of the community and the student population were highly correlated with other variables investigated.

Grissmer et al. (1994) could not find evidence of a deteriorating family environment influencing academic achievement of youth who were 14-18 in 1990 compared to youth who were 14-18 in 1970/1975. They reported that families of the 1990s had "more highly educated parents with fewer children and similar levels of

family income compared to the families in 1970/75" (p. xxxii). However, the level of family income masked two significant changes. Family income was maintained for many two-parent families only by having two wage earners, and family income declined significantly for many children in going from a two-parent to a single-parent family. Grissmer et al. found that the direct influences on academic achievement were very small from increased numbers of working mothers and single-parent homes. Yet, dramatic increases in academic achievement were found for non-White students with small decreases for White students. Their results indicated that these changes were caused by the success of public policies during this period.

NCES has reported on the condition of education over the years using longitudinal studies and current testing of students. NCES (1996a) conducted research regarding the location and poverty concentration of schools and their influences on academic achievement. This study made comparisons between urban schools and other schools after factoring out the higher concentration of poverty. Location was defined as urban, suburban and rural. The concentration of poverty was defined by the percentage of students receiving free or reduced lunches within the school. This NCES study revealed extensive data on student background, school experiences, and student outcomes. It provided evidence that students in urban schools were more likely than those in other locations to have characteristics such as poverty, difficulty speaking English, and numerous health and safety risks that present greater challenges to them and their educators. NCES (1996a) discovered that 8th graders in urban and urban high poverty schools scored lower on achievement tests than similar 8th graders in other than urban environments. In contrast, the 10th graders in urban and urban high poverty

schools scored about the same as those in other locations. Overall, all students from high poverty concentration areas from all locations repeatedly scored lower on standardized achievement tests.

NCES (1997) reported, "The social context of education has changed over the past few decades. The percentage of children from minority backgrounds is increasing, as is the percentage of children who have difficulty speaking English. Over the past 25 years, median family income has been relatively stagnant, and the poverty rate has changed very little" (p. 17). They reported that Black and Hispanic children remained more likely to be living in poverty, which is associated with poor school outcomes. These students are more likely to attend schools with high levels of poverty and that these schools' climates are less conducive to learning.

NCES (1997) provided descriptive information about the student background with a focus on the changes in social background to include family structures (one versus two parent homes), social economic status, and parents' educational levels. NCES (1997) concluded that minority students were more likely to attend schools with high levels of poverty and that these schools with high levels of poverty did not appear to have climates conducive to learning nor did these schools have the human and financial resources when compared to schools with low poverty levels.

These investigations (APA, 1993; Grissmer et al., 1994; NCES, 1996a, 1997) highlighted environmental or community contextual variables influence on adolescent academic achievement. These variables are found within the schoolhouse and within the school district where the schoolhouse is located.

COMMUNITY CONTEXTUAL VARIABLES

The review of the theoretical and empirical literature revealed the import of the school district (neighborhood, community) and school contextual variables in influencing and explaining cognitive development and academic achievement. These variables were found at both the school district and within the school and discussed as environmental factors affecting intelligence, deviance, and adolescent development. The primary community contextual variables for this dissertation affect the school district and the school and were identified in the cited literature.

The community contextual variables of interest for the school district were divided into two groups of latent independent variables of low economic status and children's environment. Specific variables of crime, juvenile delinquency, and ethnic heterogeneity were not included in the model for the school district but will be discussed. At the school level, the primary contextual variables of interest are the latent independent variable of school disadvantage and the observed measured variables of low economic status and urbanicity. Within the latent independent variable of school disadvantage, ethnic heterogeneity and measures of adolescent deviant behavior (school dropout rate and number of safety and violent incidents) will be included to investigate their causal relationship.

Although these structural factors were primarily used to investigate delinquency, McLoyd (1998) and Sampson (1997) called for an investigation of structural neighborhood factors and their relationship to cognitive development and academic achievement of adolescents. Bursik and Grasmick (1993) developed three factor structures to identify social disorganization and discuss the consistency of shared

relationship of the structures from 1960 to 1980. Elliott and Wilson (1996) used similar latent variables consistent with Shaw and McKay's (1969) community social disorganization theory in studying neighborhood effects and used multiple indicators for the latent variables. The latent variables of this study are somewhat similar in construction.

First, a discussion is provided for the variables not included in the school district model. Then, the school district model will be discussed with a focus on school funding. Finally, the school model will be discussed.

Variables Not Included

Crime

The indicator variable of crime rate has a strong relationship with the urban environment and adolescent academic achievement. APA (1993) reported that urban areas have the highest rates of crime, and within urban areas the rates for both offending and victimization are highest in neighborhoods with concentrated poverty. In addition, the highest rates of violent crime were in neighborhoods with high percentages of people in the 12 to 20 year old age group and large concentrations of single-parent households. These reports support Shaw and McKay (1969) findings that adult crime is highly correlated with juvenile delinquency within the same communities. The number of reported crimes is considered a major index to community disorganization for it is a measure of the degree to which the citizens fail to live up to the community's social norms (Elliott & Merrill, 1961). Although the number of reported crimes is not a true count of the number crimes committed, it is an indicator of social disorganization.

Within the number of crimes committed, reports of juvenile arrests are included but also juvenile arrests include status offenses. The common status offenses include truancy, running away from home, and being out of the control of your parents (Trojanowicz & Morash, 1992). However, the highest rates of violent crime are associated with neighborhoods that have high percentages of 12 to 20 year old age groups. Hill et al. (1994) identified poverty along with other variables, such as family disruption and segregation were the greatest predictors of violence, not race or ethnicity. APA (1993) supported this view and stated "The experience of crime is felt disproportionately by the young and the poor, less well-off socioeconomic segments of black communities" (p. 152). In addition, they reported a finding of a cluster of factors that have a clear and pervasive causal influence, including median income, percent of families below the poverty line, an index of income inequality, the percentage of Black population, and the percentage of single parent families.

Overall reported crimes that include juvenile offenses demonstrate a causal relationship with the same variables hypothesized to influence adolescent academic achievement and cognitive development (Sampson, 1997). Whether or not reported crimes and juvenile offenses precede poor academic achievement in a temporal fashion is the question to determine inclusion or non-inclusion of this variable in the model (Spector, 1981). Asher (1983) identified this time ordering as one of the conditions to establish causality. To ensure unbiased parameter estimates, this variable of reported crimes is not included in the school district model.

Ethnic Heterogeneity

Ethnic heterogeneity is normally not investigated as a primary causative factor but as a confounding variable. Shaw and McKay (1969) identified ethnic heterogeneity as a factor in developing close friendships and networks, which affects the community social organization. Although identified as a factor, Shaw and McKay alluded to ethnic heterogeneity acting through low economic status. Bursik and Grasmick (1993) cited both ethnic heterogeneity and residential mobility as no longer valid as indicators of community social disorganization. Also, Sampson (1997) argued persuasively that ethnic heterogeneity had little support in the theory of community social disorganization theory. Sampson found this little support for ethnic heterogeneity caused by the different environment today as compared to when Shaw and McKay were studying cities.

The indicator variable of ethnic heterogeneity is easily understood as a percentage of the population that is minority. Shaw and McKay (1969) theorized that ethnic heterogeneity minimized the ability of slum residents to achieve consensus. The relationship of ethnic heterogeneity with academic achievement were discussed in cited articles of Brooks-Gunn et al. (1993) and Crane (1991) and their findings did not support ethnic heterogeneity as a strong predictor of academic achievement. However, Ogbu (1981) argued that ethnic heterogeneity stemmed from a consensus among dominant-group child developmental theorists that a disproportionate number of ghetto children fail in school because they lack White middle-class types of competencies. Ogbu stated further "And they lack these competencies because ghetto parents lack the capability to raise their children as white middle-class parents raise their children." (p. 425).

Since Ogbu's arguments, several investigators have viewed academic achievement differently. In keeping with the community social disorganization theory, Payne and Biddle (1999) investigated the effects of poor school funding, ethnic heterogeneity, and child poverty on mathematics achievement and used data sets from the School District Data Book for 1995 and the Second International Mathematics study. The statistical procedures used were hierarchical linear regression with independent variables of school funding, child poverty, average level of curriculum instruction, and percent of non-White persons. The study's findings demonstrated that funding alone had a significant affect on mathematics scores and accounted for 13% of the variance in mathematics scores. In addition, when child poverty was added to regression analysis, both funding and child poverty were significant and accounted for over 25% of the variance in mathematics scores. Finally, after also entering the average level of curriculum instruction, the percent of non-White persons was added to the regression analysis. Although the net affect of race was smaller and not statistically significant, it increased the amount of variance accounted for. Background characteristics (neighborhood or family) were not used in this investigation and possibly accounted for the low amount of shared variance discovered.

Previously, Crane (1991) found similar results at the neighborhood level for ethnicity. Based on these findings (Crane, 1991; Payne & Biddle, 1999; Hill et al., 1994; Sampson, 1997) and the findings of Coleman et al. (1966) that variation in academic achievement varied across social class regardless of race, ethnic heterogeneity was not included in the school district model.

School District Model

Low Economic Status Latent Variable and School Funding

The manner in which schools are funded are directly linked to the economic status of the community. Hanushek (1981) conducted a review of a wide range of studies and found that "there is no consistent relationship between school expenditures and student performance" (p. 20). This discussion will focus on poverty and funding of schools.

Poverty and funding of schools are complex variables that must be discussed together. Normally when discussing poverty and low economic status, the focus is on the urban environment. The current figures to measure community poverty levels are misleading for the current poverty guidelines and thresholds are based on assumptions developed by the Department of Agriculture in 1963 (National Research Council, 1995). Both the poverty guidelines and threshold are updated annually based on Consumer Price Index for All Urban Consumers (University of Wisconsin, 1996). Recommendations were made to correct the poverty guidelines and threshold by accounting for in-kind resources. If implemented, these recommendations would change the composition of those who are actually in poverty (National Research Council, 1995). So, a variable identifying low economic status must go beyond those identified as poor by the annual threshold and guidelines to include those who are the working poor who reside in disadvantaged communities. This is accomplished by the inclusion of multiple indicators for the latent variable.

McLoyd (1998) found that family-level poverty, low socioeconomic status, and residence in less economically advantaged neighborhoods each independently predict lower scores on tests of intelligence and cognitive functioning. And, several other studies

previously cited (e.g., Brooks-Gunn et al., 1993; Coll et al., 1996; Crane, 1991; Duncan, Brooks-Gunn, & Klebanov, 1994) have identified poverty, both at the family level and the neighborhood level, as a factor in students' performance on standardized academic achievement tests. A close focus was not provided on school funding and its influences. The complex issue of funding public schools has been a factor since the U.S. Supreme Court decision in Brown v. Board of Education. Each of the states maintains a public school system that is generally organized into school districts, which rely heavily on financing from local property taxes. Property taxes in turn are based on property values that are unequally distributed across school districts and states (Berne & Stiefel, 1999). Renchler (1993) reported that low socioeconomic status students find themselves at a disadvantage not of their own making. They are clustered in schools that are grossly under-funded, while other nearby schools attended primarily by higher socioeconomic status students receive substantially more funding on a per pupil basis. Funding of public schools is of particular interest because it is associated with other significant quality indicators of the school—teacher experience, teacher educational level, and class size (Hanushek, 1986 & 1989).

In two Issue Briefs, NCES (1996b & 1996c) explored the relationship between percentage of minority students and education spending across school districts and whether or not rich and poor districts spend alike. Both briefs used data from the 1989-90 school year. In the first brief, NCES (1996b) investigated whether high-minority districts have less to spend than low-minority districts and introduced a new concept of "buying power." The buying power concept takes into account actual dollars to reflect difference in the cost of providing educational services. In addition, buying power

accounts for differences in cost of living and educational needs of students. When reviewing actual expenditures, NCES reported that "the actual expenditure differential between districts with the highest and the lowest percentage of minority students was $431 per student." Those districts with higher percentages of minorities outspent those with lower percentages of minorities. Yet, when viewed using the buying power concept, districts with the highest percentages of minorities spent $286 less on education per pupil a year than did districts with the lowest percentages of minority students. NCES (1996b) reported, "This change in direction occurs because school districts enrolling higher percentages of minority students are more likely to be located in high-cost urban centers and to serve substantial numbers of students with special needs, thereby reducing the 'buying power' of the dollars received" (p. 2).

In the second brief, NCES (1996c) went further and reviewed the buying power expenditures in context with measures of community wealth and public education resources. Community wealth was defined as "the median income of the households located within the school district boundaries" (p. 1). NCES compared this measure of wealth to three alternative measures of the resources available—actual expenditures per student, expenditures converted to buying power, and the average number of students per teacher. NCES results indicated that districts enrolling children from high-income communities have more to spend on public education and, when converted to buying power, the magnitude between the highest and lowest income communities is reduced from 56% to 36%. Although the difference is reduced, the inequality remains.

The U.S. General Accounting Office (GAO) (1997) provided additional support to the fact of unequal expenditures. In their report, GAO acknowledged that children from poor

families or that live in poor communities often have low levels of academic achievement and high dropout rates. GAO found that although most states pursued different strategies to supplement local funding of poor school districts, wealthier districts in 37 states had more total funding than poor districts in the 1991-92 school year. This inequity existed after adjusting for geographic and student-need related education costs. GAO concluded that poorer districts taxed themselves at extremely high rates as compared to wealthier districts to no avail in equaling education expenditures.

These issues of poverty and funding of schools coupled with low community education levels form a vicious cycle. Rotberg (CT-105: Funding Policy Options) in testimony before the U.S. House of Representatives provided recommendations in 1993 on how to address these disparities at the federal level. Rotberg reported that "Because family income, family education level, and student educational achievement are closely correlated, low-income children often face a double handicap: They have greater needs than more affluent children do, yet they attend schools with substantially less resources" (p. 1). To address this double handicap, Rotberg recommended comprehensive changes to Chapter 1 of the Elementary and Secondary Education Act of 1965. These recommendations included that federal requirements for Chapter 1 testing be eliminated. Federal testing requirements should not drive the educational programs in low-income schools and that a broader performance measure should be used. Rotberg concluded with

In recent years, several proposals—including "restructuring" schools, vouchers, national standards, and national testing—have been put forward as the reforms needed to strengthen the nation's education system. These proposals do not begin to address either the severe problems of poverty in our inner city and rural schools or the serious

underfunding of these schools (pp. 19-20). Although some have reported that school quality does not influence academic achievement, Hanushek (1986, 1989) stated unequivocally that teachers and schools differ dramatically in their effectiveness. Hanushek (1986) conducted a variation of a meta-analysis of 147 studies and reviewed those variables commonly used to capture funding—teacher/pupil ratio, teacher education, teacher experience, teacher salary, and expenditures per pupil. In this review, after controlling for family background and other educational inputs, there appeared to be no strong or systematic relationship between school expenditures and student performance. Although this finding appears to contradict Hanushek's other findings (1986), he identified several reasons to be cautious about this finding and stated:

> There are several obvious reasons for being cautious in interpreting this evidence. For any individual study, incomplete information, poor quality data, or faulty research could distort a study's statistical results. Even without such problems, the actions of school administrators could mask any relationship. For example, if the most difficult to teach students were consistently put in smaller classes, any independent effect of class size could be difficult to disentangle from mismeasurement of the characteristics of the students. Finally, statistical insignificance of any estimates can reflect no relationship, but it also can reflect a variety of data problems—those above and others such as high correlations among the different measured inputs" (p. 1163).

Shaw and McKay (1969) identified the close relationships between measurements of low economic status, residential stability, and ethnic heterogeneity with low economic

status as the focal variable. Common indicators of low economic status found in the literature normally consist of measurements of poverty (as identified by the federal and state government), and occupation. In this study, the measured variables of population, residential stability, community education level, income to rent ratio, and the unemployment rate will be used as indicators of low economic status. Each of these variables is discussed.

Population

The total population of the community provided an understanding of density of the community and provided a frame of reference for the remaining variables. This concept of density is used by other investigators (Avakame, 1999) and was a proxy for urbanicity at the district level. The measured variables of residential stability, community education level, income to rent ratio, and the unemployment rate were compared to the community population.

Residential Stability

As previously stated, the variable of residential mobility is an indicator of community instability and population change. This indicator has proven one of the stable indications throughout different reports of community social disorganization (Sampson & Groves, 1989; Sampson, 1997). However, Bursik and Grasmick (1993) identified problems with current measurement of the concept. This variable is normally measured using reports from the Bureau of Census of the percentage of residents at the same address for five or more years. Bursik and Grasmick (1993) and Wilson (1991) identified that impoverished people could not move and the neighborhood would appear stable. Bursik and Grasmick (1993) compensated for this perceived problem by keeping the

variable residential mobility in their investigation and included other relevant variables to identify a concept of regulatory capacity.

Shaw and McKay (1969) hypothesized that high residential mobility disrupts a community's network of social relations. Residential mobility is routinely measured using the U.S. Census and self-reports. This factor is not complex. However, residential mobility in this dissertation will only be investigated at the school district (neighborhood) level for its influence on adolescent academic achievement. This measure was derived from the 1990 U.S. Census and will be included as an observed measurable (indicator) variable of the latent independent variable low economic status.

Community Education Level

The indicator variable of community education has always demonstrated a relationship with children's academic achievement (Coleman et al., 1966; NCES, 1996a). Educational levels within the community also demonstrate a direct relationship with the poverty levels in the community. This variable is the per cent of individuals 18 years of age and above who have attained a high school degree. This variable was attained from the 1990 U.S. Census.

Income to Rent Ratio

As another indicator of community disadvantage, the percentage of wages to pay the Fair Market Rents (FMRs) was used. The FMRs are gross rent estimates that include the cost of all utilities except telephones and are based on the 40th percentile rent estimate. This indicator is the percentage of wages earned during a week of fulltime employment at minimum wage to pay the FMR (Virginia Polytechnic Institute and State University, 1999). The Virginia Center for Housing Research reported that about 55

percent of low-income households rent and while making minimum wage, they face rental prices at the 40th percentile (Virginia Polytechnic Institute and State University, 1999). This indicator provided a measure of what percentage of income a family pays for rent in each school district and is used as a proxy for the poverty rate.

Unemployment Rate

Bursik and Grasmick (1993) used this measured variable along with other investigators as an indicator of poverty. In Virginia with welfare to work concepts, the rate is reported low and is indicative of those in deep, long-term poverty with little or no skills.

Local Ability to Pay

The Commonwealth of Virginia developed an indicator of the local school district's ability to pay for public education (VDOE, 1997). This is a complex ratio using significant indicators of community wealth to determine state funding. This indicator provided a different perspective of community advantage or disadvantage.

Children's Environment

The environmental factors that affect children's growth and development are hypothesized to be different than that for adults. Teenage pregnancy, single-headed households, per cent of children in poverty, low-birth weight, transfer payments, and infant mortality rates have been investigated as neighborhood quality indicators (Avakame, 1999; Bursik & Grasmick, 1993; Sampson, 1997). These same variables along with a measurement of at-risk funding for the school district are hypothesized to affect children differently and will be used to measure the latent variable of children's environment.

Sampson (1997) reported the indicators of infant mortality rate and low-birth weight as key indicators of the health status of the community as well as health services available in the community. In regards to teenage pregnancy, Crane (1991) found that neighborhood effects influence both dropping out and teenage pregnancy. In addition, Crane could not separate the effects of the neighborhood from those of the school. Other studies' (Brooks-Gunn et al., 1993; Mayer, 1991) findings supported this finding of neighborhood effects on teenage pregnancy. Low socioeconomic status within these neighborhoods and schools were reported as the underlying factor in these results.

In a separate study, Mayer (1991) investigated the effects of the neighborhoods' and schools' socioeconomic status (SES) and racial or ethnic mix on teenage pregnancy and dropping out of school. Mayer used the data from the 1980 High School and Beyond survey and used statistical methods of log odds and logistic regression to analyze the data. The results suggested that students who attend high-SES schools are less likely to dropout and that girls that attend high-SES schools are less likely to have a child than students with the same family background who attend lower-SES schools. Mayer's findings suggested a stronger effect for schools than for neighborhoods. Mayer stated "White students who attend predominately black or predominately Hispanic schools are more likely to dropout and more likely to have a child than white students with the same family background who attend predominately white high schools" (p. 334). Black and Hispanic students who attended predominately Black schools were affected by the low mean socioeconomic status of the school and not as much by the ethnic heterogeneity. In these cases, the log odds differences were not great between groups.

Rate of teenage pregnancies and the number of single parent households have all been used in previous reports at the community level to indicate the quality of the community and health care provided. Black and Krishnakumar (1998) reported that the percentage of children living in poor neighborhoods where there are concentrations of welfare recipients, unemployed individuals, and single-parent families increased from 3% in 1970 to 17% in 1990. In addition, the child poverty rate was twice as high within the city as compared to suburbs. Renchler (1993) reported that most of these impoverished children are African American (43.1%) or Hispanic (39.6%).

School Model

Indicators of disadvantaged community are varied. However, the number of reported crimes, number of juvenile arrests, rate of teenage pregnancies, and the number of single parent households have all been used in previous reports at the community level to indicate the quality of the community. Similar variables of disadvantage at the school level will be of interest. These school level variables are safety and violence infractions, ethnic heterogeneity, and the school dropout rate. Safety and violence infractions and the school dropout rate are indicators of deviance and a lack of social control. In addition, the location of the school is a variable of interest. Shaw and McKay (1969) determined that crime rates reduced with the reduction in size of the population and city size. If the school is in a highly urbanized context, the indicators of deviance and lack of social control will be higher.

Robertson (1987) defined deviance as behavior that violates significant social norms and is disapproved by large numbers of people as a result. To minimize deviance and maintain social order, an effective system of social control must be used and

enforced through sanctions. Societies establish laws as strict sanctions for behavior considered too socially disruptive to be permitted (Robertson, 1987).

These factors of reported crime, number of juvenile arrests, rate of teenage pregnancies, single parent households, school dropout rate, and deviant behavior in school demonstrate a strong relationship with academic achievement in previous studies (Sampson, 1997). Throughout these reported studies, these factors never appear separately but together in groups. Together these factors provide markers of social deviance and lack of social control, which are indicative of the community social disorganization theory. Also, these factors have demonstrated throughout the reviewed literature that they must be included in any investigation of school district and school characteristics and their influences on cognitive development as measured by adolescent academic achievement.

DATA ANALYSIS METHODS: MAKING THE CASE FOR DIFFERENT STATISTICAL PROCEDURES

The Coleman Report

The Coleman Report (Coleman et al., 1966) set the standards of using the educational production function analysis for investigating adolescent academic achievement within the public school system (Hanushek, 1978). Public officials and others misinterpreted a finding of the report to mean that school resources did not matter (Goldharber & Brewer, 1997b; Hanushek, 1981, 1986, 1989). These same public officials ignored other facts contained in the report. The Coleman Report revealed that the disparities along racial lines were concentrated in the northern states and not the south. The report also revealed that academic achievement varied by social class

regardless of ethnicity (Mosteller & Moynihan, 1972). This report was and still is controversial based on the investigation's findings, methodology, analytical procedures, and its failure to use an adequate theory (Pedhazur, 1982).

Several reports were published after the Coleman Report either supporting or refuting its findings (Pedhazur, 1982, 1997). In a related study, Hauser (1971) conducted an extensive investigation of socioeconomic background and educational performance. Hauser conducted his investigation using socioeconomic theories and social stratification to interpret differential educational performances among White students enrolled in public secondary schools of Davidson County, Tennessee, in 1957. Hauser investigated the role of the student's background in the differentiation of educational performances within schools; the role of urban residence in determining the composition of student bodies; and, the logical implication of those findings for the interpretation of differences in performance among schools. Hauser used analysis of covariance with path analysis statistical methods to analyze the data. Hauser reported that the process of stratification (relationship between family of origin and educational performance) was rather weak and differences among schools were not significant. Hauser's findings tended to support the overall findings of the Coleman Report.

Hanushek (1978) criticized the Coleman Report and subsequent reports investigating academic achievement similarly and stated "part of this criticism is explained by the fact that input specification has not received much attention in many past analyses. There is little conceptual clarity, and the choice of inputs seems, sometimes explicitly, to be guided more by data availability rather than notions of conceptual desirability. For example, nowhere in the Coleman Report can one find a

statement of an underlying conceptual model" (p. 363). Hanushek added "almost all educational analyses begin with laments about how we do not have any learning theory that is suitable for guiding input-output analyses" (p. 363).

Although the Coleman Report remains one of the most cited and still influential analyses of schools, the report is commonly held to be seriously flawed (Hanushek, 1978, 1986). Pedhazur (1982) expressed serious concerns about the data analysis in the Coleman Report. These concerns stemmed from Coleman et al. (1966) attempt to explain student achievement using analytical methods to incrementally partition the variance of the variables. Incremental partitioning of variance was an attempt to determine which predictor variable shared the most variance with academic achievement after accounting for the shared variance for other investigated variables (Pedhazur, 1982, p. 189). The investigator holds one variable constant to determine how much more variance is accounted for as subsequent variables are entered into the analysis. In the Coleman Report, the family characteristics of students were entered into the analysis first, holding it constant. Then other variables were entered into the analysis to determine if they accounted for variance over and above that already accounted for by family characteristics (Coleman et al., 1966).

Pedhazur reported that "The most telling criticism of the incremental partitioning of variance used by Coleman and his colleagues in their attempt to explain verbal achievement is the absence of theory to guide the analysis" (p. 189). Without a theory, Coleman et al. conducted regression analysis and entered variables as blocks to incrementally partition the variance of each block. In all analyses, however, student family characteristics were entered first and the entry of the remaining blocks of variables

varied without a theoretical rationale (Pedhazur, 1982, p. 191). Based on a temporal order that family characteristics occurred prior to school characteristics, Coleman et al. entered the student family characteristics first. Pedhazur concluded "neither the report's conclusion about the differential effects of schools nor other conclusions regarding the process of verbal achievement are warranted in view of the analytical procedures that were used to arrive at them" (p. 191).

These same analytical procedures employed by Coleman et al. (1966) possibly biased the parameter estimates of the results. One cause for biased results is the aggregation and disaggregation of data across different levels of analyses (Raudenbush, 1988). Coleman et al. used the educational production function analysis (input-output analysis) (Hanushek, 1978, 1986, 1989) and weighted regression analysis to analyze the report's data and to determine if differences existed between schools and which variables provided the strongest affects on student achievement and verbal ability. To accomplish this, Coleman et al. collected data through questionnaires sent to students, teachers, principals of schools, and superintendents of school districts. There was a problem in identifying all the principals' returned questionnaires with the appropriate school (Coleman et al, 1966, p. 565) resulting in "the loss of detailed information regarding the racial composition of the student body." This failure of identifying all the principals resulted in "only 59 percent (689 out of 1,170) of the schools where both principal and pupil questionnaires were available" (p.565) for high schools and "74 percent (2,377) of the 3,223 principals of elementary schools" (p.565) were used in the data analyses. To analyze the data, Coleman et al. (1966) aggregated data concerning student variables over the school, disaggregated the superintendents' data to form a record with each principal's

record, and aggregated teacher variables to create averages in the school at particular grades (p. 571). Then the variables were weighted and correlated with each other. Eventually, "60 variables that appeared from exploratory analysis to be the most important were selected and used for all grades . . ." (p. 572). Coleman et al. (1966) primarily used incremental partitioning of variance by entering the family characteristics/student background into the regression equation first and then other variables of interest were entered (p. 575).

Analysis of Aggregate Data

Studying aggregate data in education is a complex process. Raudenbush (1988) stated "the traditional linear models on which most researchers rely require the assumption that subjects respond independently to educational programs. In fact, subjects are commonly 'nested' within classrooms, schools, districts, or program sites so that responses within groups are dependent" (p. 85). Understanding the advantages of structural equation modeling and multilevel analysis requires initial explanations of terms. Goldstein (1999) provided explanations of structural equation models to include multilevels as:

> In many areas of the social sciences, where measurements are difficult to define precisely, an investigator might suppose that there is some underlying construct which cannot be measured directly but nevertheless can be assessed indirectly by measuring a number of relevant indicators. Structural equation modeling, and in particular the special case of factor analysis [confirmatory], was developed for this purpose, typically dealing with individuals' behaviour, attitudes or mental performance. Where

> individuals are grouped within hierarchies, for all the same reasons discussed above, [it] is important to carry out such analyses in a multilevel framework. (p. 8).

Structural equation modeling uses correlational procedures to analyze multivariate data. In 1905, path analysis (a part of the structural equation modeling family of statistical procedures) was developed by Sewell Wright as a method of studying direct and indirect effects of variables, which cannot be determined by ordinary least squares regression analyses (Bollen, 1989; Schumacker & Lomax, 1996). These procedures test theoretical relationships and not actual causes. Structural equation modeling with a multilevel framework has demonstrated that it is a more appropriate statistical procedure to use for studying the public school system.

In addition to problems with aggregated data, biased parameter estimates can be caused by model specification problems. The selection of the correct variables for the analysis and which variables are independent or dependent are model specification problems. In multiple regression and other least squares regression analysis, the selection of the wrong set of variables can yield erroneous and/or inflated $\underline{R}^2$ values. Selecting which set of variables provide the best prediction can be timely and costly. Least squares regression provides an additive equation and does not permit any relational specification of variables. The central problem is that for least squares regression to function ideally all independent variables need to be highly correlated with the dependent variable and uncorrelated with each other. In addition, this additive function is not robust enough to measurement error and model misspecification (Schumacker & Lomax, 1996; Tabachnick & Fidell, 1996).

Although structural equation modeling uses least squares regression, it provides enhancements. Least squares regression seeks to identify and estimate the amount of variance in the dependent variable attributed to one or more independent variables, while structural equation modeling seeks to identify relationships among a set of variables. Structural equation modeling affords the ability to establish a causal relationship among independent variables, specify the specific relationship among the independent variables, and model the complex nature of variable relationships posited by the theory. Structural equation models were developed to resolve the problems associated with single observed variables and their related measurement errors. Using latent unobserved variables with several observed indicator variables is commonly accepted practice to reduce measurement errors (Schumacker & Lomax, 1996; Tabachnick & Fidell, 1996).

Bollen (1989) explained the benefits of structural equation modeling. Bollen described latent variables (hypothetical constructs, unobserved variables) as representing unidimensional concepts in their purest forms. The observed variables or indicators of latent variables contain random or systematic measurement errors, but the latent variable does not. The structural equation model compares the predicted covariance matrix of a theoretical model with the covariance matrix of the sample's data. The purpose of this comparison is to determine if the causal inferences of a researcher are consistent with the data. If the model is consistent, it only shows that assumptions are not contradicted and may be valid. Tabachnick and Fidell (1996) explained this comparison between the predicted covariance matrix of a theoretical model with the covariance matrix of the sample's data within structural equation modeling. They stated that the "parameters (regression coefficients, variances, and covariances) are estimated to create an estimated

population covariance matrix. If the model is good the parameter estimates produce an estimated matrix that is close to the sample covariance matrix. 'Closeness' is evaluated primarily with chi-square tests and fit indices" (p. 713).

Goldstein (1999) identified the need to use structural equation modeling and a multilevel framework when data was in a hierarchical structure. Pedhazur (1997) identified two issues of concern when ignoring the hierarchical structure of data and using least squares regression analysis: "(1) problems inherent in cross-level inferences and (2) the appropriate unit of analysis and analytic approach" (p. 676). Cross-level inference occurs when findings obtained from data collected at one level are used to make inferences about another level. This type of inference has come to be known as the ecological fallacy (Pedhazur, 1997, chap. 16; Hox, 1995). Pedhazur (1997) noted that "a least squares analysis ignores the fact that individuals belonging to a given group tend to be more alike than do individuals belonging to different groups. As a result, standard errors (e.g., of regression coefficients) are underestimated, resulting in increased Type I errors. Multilevel analysis, which is based on different estimation procedures, yields more realistic standard errors" (p. 692).

Educational Production Function Analysis

Using an educational production function analysis, which employs least squares regression analysis, is the standard bearer for investigating inputs and outputs of the public school system. The statistical procedures used by the educational production function analysis have provided mixed results with no strong evidence that schools or teachers have a positive influence on academic achievement (Hanushek, 1986). Many of these investigations determined that individual and family characteristics explained the

majority of the variance in student test scores (Goldharber & Brewer, 1997b) and that the funding of the school did not matter (Hanushek, 1978, 1981).

Hanushek (1978) reviewed the conceptual and empirical issues in the estimation of educational production functions that are commonly used for investigating effectiveness of schools. Hanushek reported:

> Studies included under the rubric educational production functions are generally statistical analyses relating observed student outcomes to characteristics of the students, their families, and other students in the school, as well as characteristics of schools. Most frequently, student outcomes are measured by various standardized test scores, although attitudes, college continuation, and attendance patterns have also been analyzed. These studies also diverge considerably in terms of the actual measured inputs; in terms of the level of aggregation of both dependent and independent variables (e.g., individual student, school average, or district average observations); and in terms of the precise statistical methods. Not surprisingly, given such differences, the conclusions of the various studies appear to be very different—and often apparently contradictory (p. 354).

Hanushek discussed problems and criticisms with using ordinary least squares regression analysis when there are multiple outcomes or simultaneous equations under investigation, and problems with level of aggregation, selection effects, and multicollinearity among inputs.

Comparisons of Statistical Procedures

Investigations to determine if school funding mattered revealed that the order the variables entered the equation made a difference. Baker, Mitchell, McGee & Stiff (1998), using hierarchical linear regression modeling and ordinary least squares regression, found that community education level, family poverty level, students' socioeconomic status, school dropout rate and percentage of overage students accounted for 66% of the variance in academic achievement of Virginia 8th grade students. However, when Baker et al. (1998) added total per pupil expenditure and a measure of the local community's ability to pay to the hierarchical linear regression model, these funding variables were not statistically significant and did not significantly add to the previous result of 66% of variance explained. Similarly, Hanushek (1986) had previously found that educational expenditures were not significant when they are used in conjunction with individual and family background characteristics.

Many other investigators have also found that educational expenditures do not account for significant amounts of variance in academic achievement beyond that of family characteristics (Hanushek, 1986, 1989; Goldharber & Brewer, 1997a, 1997b). These results have led some to believe that additional monies spent on educational resources are wasted.

To determine whether statistical procedures used mattered, Goldharber and Brewer (1997b) investigated the effectiveness of the educational production function model in determining school effectiveness. Goldharber and Brewer used data extracted from the National Educational Longitudinal Study of 1988 that had detailed teacher and

class level information to determine the relationships of school and family characteristics with tenth-grade mathematics scores.

First, Goldharber and Brewer used ordinary least squares regression procedures which has fixed effects across different levels such as the classroom, school and school district. Then, Goldharber and Brewer used a random effects model (multilevel analysis) that allows parameters to vary across different levels and was estimated by generalized least squares, which yielded more accurate estimates of random error terms based on the random effects model. They confirmed that the random effects specification of the model was superior to the standard ordinary least squares specification by using a Lagrange multiplier test that identified the data fitting the random effects model more accurately. Goldharber and Brewer reported that the explained portion of the variance in student achievement rose from 0.77 to 0.89. Goldharber and Brewer reported:

> The explained portion of the variance of student achievement when we move from a model with our complete set of observed characteristics to our model with teacher fixed effects rises from 0.77 to 0.89. To determine whether these models better fit the data, we perform F-tests of the hypotheses that the coefficients of the fixed effects are jointly equal to 0. In all cases we are able to reject these hypotheses at the 1 percent significance level (pp. 517-519).

Bryk and Raudenbusch (1988) had previously confirmed that these same procedures of using a random effects model of school's specification were more effective and robust. Bryk and Raudenbusch proposed using hierarchical linear modeling or multilevel analysis. Bryk and Raudenbusch stated that the statistical theory behind

hierarchical linear modeling was developed through applications of mixed-model analysis of variance, random coefficient regression models, covariance component models and Bayesian estimation for linear models. In general, the hierarchical linear modeling procedure can specify two or three interrelated equations simultaneously. Bryk and Raudenbusch found that this procedure increased the precision of coefficient estimates across levels, took into account covariation among parameters being estimated, and distinguished between true effects and sampling variation.

Nezlek and Zyzniewski (1998) supported the use of multilevel analysis over least squares regression analysis. Nezlek and Zyzniewski reported that ordinary least squares analyses "using aggregated group means typically ignore at least two important differences that may exist among groups: group size and the consistency of the responses of members within groups . . ." (p. 314). Within the least squares regression framework, investigators have used weighted least squares to resolve the inefficiency. Nezlek and Zyzniewski stated "such analyses are fundamentally incorrect because they confound individual and group level effects and provide potentially inaccurate estimates of individual level relationships" (p. 314). Advances in statistical theory and computational algorithms combined with high-speed data processing have made techniques such as random coefficient modeling (multilevel analysis) more available and used more frequently for data analysis.

Elliott and Wilson (1996) used multilevel analysis to investigate neighborhood effects on individual outcomes. Sampson (1997) outlined the use of multilevel approach in studying the individual and community levels of analysis. Sampson promoted the use of multilevel analysis while employing the community social disorganization theory in

the explanation of crime and violence in the urban environment. In this article, Sampson extended the community social disorganization theory to investigate cognitive development or academic achievement using a multilevel approach.

Thus, the most current research argues for the use of hierarchical linear modeling (multilevel analysis) instead of least squares regression analysis to study school district and school effects because of the reduction of bias in parameter estimates resulting in the data fitting the model more accurately. In addition, a resurgent use of structural equation modeling is finding more prominent application due to the need to investigate complex relationships between variables. These statistical procedures, hierarchical linear modeling and structural equation modeling, are enhancements in analyses that can provide answers to questions regarding school district effects and school effects on academic achievement. The data analysis of this dissertation will utilize both structural equation modeling and multilevel analysis, a decision supported by researchers and developers of data analysis tools (Werner Wothke, personal communication, August 11, 1999; Robert M. Hauser, personal communication, August 25, 1999; Kenneth A. Bollen, personal communication, August 27 1999; Stephen du Toit, personal communication, August 30, 1999; Mathilda du Toit, personal communication, October 7, 1999).

RESEARCH HYPOTHESES

Through the review of the literature, the community social disorganization theory has demonstrated an empirical link to explain variance within adolescent academic achievement as measured by standardized tests. The specific research hypotheses are:

1. The community social disorganization theory explains significant variance in adolescent academic achievement of Virginia 8th grade students as measured by standardized achievement tests.
2. Of school district effects and school effects, school effects explain more of the variance in adolescent academic achievement of Virginia 8th grade students as measured by standardized achievement tests.

SUMMARY

This review of the literature traced the development and validation of the community social disorganization theory to explain juvenile delinquency. The community social disorganization theory was developed with three structural factors, low economic status, ethnic heterogeneity, and residential mobility. Other investigators have found valid sociological perspectives using these factors to study juvenile delinquency. Crane (1991) applied this sociological theory to investigate neighborhood effects on the probability that an individual would develop a social problem. Crane could not segregate the effects of the neighborhood or of the school but elected to view them together as a social context effect and found these effects to be significant. Sampson (1997) extended the number of factors as indicators/markers of community social disorganization.

Theorists from child developmental fields searched for an integrative approach to study adolescent development. Ogbu (1981) proposed a cultural-ecological model to study adolescent development in the ghetto. In 1994, Bronfenbrenner and Ceci proposed a bioecological model to answer the question of how nature and nurture contribute to adolescent development. Coll et al. (1996) supported a need for an integrative approach to study child development and argued that schools and neighborhoods are crucial

components. Gonzales et al. (1996) based their investigation of child development on the community social disorganization theory. Gonzales et al. found that neighborhood risk and the extrafamilial influences of peer support did explain a significant proportion of the variance in students' grade point averages.

These studies and others demonstrate how the community social disorganization theory can be used to investigate juvenile delinquency, deviant behavior, and adolescent problem behavior outside of immediate family influences. This theory has been adapted in various forms to investigate adolescent development and those social environments, school districts and schools, where this development occurs. These social problems and the development of the adolescent have demonstrated a relationship with adolescent academic achievement but have not been investigated to understand the relationships between the variables.

Today, most theorists agree that whatever intelligence may be, both heredity and the environment affect it. As Bronfenbrenner and Ceci (1994) clearly stated, the question is not how much variation can be accounted for by either heredity or environment but how does heredity and environment interact? This discussion focuses on those environmental factors identified by Coll et al. (1996) that provide a promoting or inhibiting environment for academic achievement and intelligence to develop an understanding of how heredity and environment interact and disentangle the influences of neighborhoods and schools.

The community social disorganization theory provides a perspective to investigate the current disparities in the public education system. The investigated causes of low academic achievement cited in previous reports can be linked to the markers of social

deviance identified within the community social disorganization theory. Cultural diversity within the public school system matters when accounting for variations in academic achievement. High measures of residential mobility are an indicator of weak neighborhood ties and social control for adolescents. Low socioeconomic status is a mixture of public school funding and the community poverty level. In order to grasp the full impact of community financial resources, these factors must be viewed together and their relationships with each other investigated.

These variables and the complex relationships between them have been analyzed at different levels of aggregation, which poses problems for data analysis using fixed parameters. In order to detect significant differences among these multilevel data, hierarchical linear modeling, multilevel analysis, structural equation modeling or combinations of these procedures need to be used. These statistical procedures have been found effective for determining neighborhood and school effects.

Deductively, an empirical link has been established from using the community social disorganization theory to study juvenile delinquency and adolescent development to studying adolescent academic achievement. Through this review of the literature, the data analyses of previous studies have been brought into question when analyzing multilevel data. Using appropriate statistical analysis, Bryk and Raudenbusch (1988) discovered variations between academic achievement and schools that would have gone undetected. This dissertation will explore using the theoretical perspective of community social disorganization theory to explain variance within adolescent academic achievement. In addition, this dissertation will explore to what extent, if any, school

districts' and schools' effects explain the variance within academic achievement of adolescents and which, if either, will have a more significant influence.

CHAPTER III

METHODS

The review of the literature in Chapter II substantiates the soundness of using the community social disorganization theory to study adolescent academic achievement. Using national, state, and local data, many researchers investigated adolescent academic achievement as either a primary outcome or ancillary variable. These researchers used variables that are consistent with the community social disorganization theory, especially low economic status. Viewing adolescent academic achievement from a school district or school context provides policy makers, educators, and counselors a different perspective for interventions.

OVERVIEW

This chapter begins with a discussion of the sample population. Then, a description is provided for the unit of analysis for each of the procedures outlined in this dissertation. An overview of the theoretical models with the associated variables for both the school district and the school are discussed. In this overview, a description of the independent and dependent latent variables and their sources are operationalized. Hypothetical models are established to investigate the relationships of both the school district and the school with adolescent academic achievement. Limitations and delimitation are identified and discussed. Following limitations and delimitation, a discussion is provided on causality in structural equation models to establish the foundation for drawing inferences from the analyses.

In order to investigate whether the community social disorganization theory explains variance in adolescent academic achievement, an overall correlational design

with modeling was used for the collection and analysis of data. The correlational design was cross-sectional; all existing statistics and unobtrusive research were taken at one point in time. The dependent variable, academic achievement, was also collected for one point in time. These existing statistics were aggregate numbers and collected from various state and federal governmental sources using the source's latest report.

First, an investigation was conducted to determine if the community social disorganization theory applies through a model of school district effects and academic achievement. A replication of the model was conducted using data from a different school year. These data were collected at the school district level. Then, a model of school effects and academic achievement was investigated to determine if the community social disorganization theory applied. The data for this analysis were collected at the school building level. The first two models were used to determine if the theoretical models fit the collected data of school district and school effects using a variation of the community social disorganization theory. In order to determine the affects of school district and school effects on adolescent academic achievement, a model was investigated including both effects and analyzed using multilevel analysis.

Existing statistics were gathered for the Commonwealth of Virginia. Virginia provided an advantageous sample based on its geographical configuration. Virginia has a statewide system of cities that are independent of adjacent counties. This statewide system dates back to the 1600s and was formalized in the Virginia Constitution in 1902 (Edwards, 1992). This statewide system separates taxation: the taxes collected by independent cities are only for their use and the cities pay no county taxes. Inherent to this system of independent cities and counties is the establishment of separate school

districts meeting the boundaries of both. All national and statewide statistics are normally reported by independent city and county, which are the boundaries of the school district. Although this system of school districts originally aided Virginia's segregation efforts, it now allows direct comparisons of the same geographical boundaries for the variables of interest to determine their relationship with adolescent academic achievement.

Data Analyses

In the past, an educational production functional analysis, made popular by Coleman et al. (1966), was used to examine the relationship between school resources and student outcomes. Outcomes are usually measured by standardized achievement tests, which are regressed on a host of factors such as family background characteristics and measures of school input such as class size, teacher experience and education, and expenditures per pupil. As noted in Chapter I, the findings of these studies were mixed (Hanushek, 1989). Past results have led many to believe that schools, funding of schools, and teachers may not matter (Goldharber & Brewer, 1997a & 1997b).

The education production function analysis uses least squares regression analysis as a standard. However, using different statistical procedures for understanding the relationships between variables, better specification of variables and reduction of measurement error have provided a better understanding of factors influencing adolescent academic achievement. Structural equation modeling provides this better understanding of relationships among variables and better specification. Bryk and Raudenbusch (1988) employed multilevel analysis to more precisely estimate influences instead of least squares regression analysis and found that schools do matter.

Summary

Using a cross-sectional correlational design, this dissertation investigated adolescent academic achievement. This dissertation used structural equation modeling and multilevel analysis statistical procedures to provide a better understanding of factors influencing school performance as measured by adolescent academic achievement. The investigated latent variables with their observable measured indicators, source for the data, and date of collection are identified in Tables 1 and 2. The dissertation used modeling of school district and school effects to determine to what extent, if any, the community social disorganization theory explained academic achievement of adolescents. In addition, the investigation modeled both school district and school effects to determine which, if either, had a significant influence on academic achievement.

SAMPLE POPULATION

The subjects for this dissertation were eighth-grade students within the public school districts in the Commonwealth of Virginia during the 1997-98 school year, the last year that complete data is available. A replication was conducted using a different school year, 1996-97. This particular grade of students was selected based upon the child's age and stage of development where both school district and school effects should be evident. This age and stage of development was used by several investigators (Mulkeen, 1992; Anson, 1994; Edelin, 1998; Hudson, 1998) based on this premise. To determine if the community social disorganization theory applies, the unit of analysis for the first model will be similar to Polinard et al. (1995) for the school district. There are 132 public school districts that have eighth-grade students. These school districts varied in their demographics and socioeconomic status.

Table 1. School District Data

Variables	**Measurement**	**Source and Date**
Low Economic Status*		
Population	Estimated population.	Bureau of the Census; 1995
Residential Stability	Percentage of residents in the same house since 1985.	Bureau of the Census, U.S. Census; 1990
Unemployment Rate	Rate of unemployed to 1,000 total civilian labor force.	VA Employment Commission; 1997
Community Education Level	Persons over the age 18 who received a high school diploma or equivalent.	Bureau of the Census, U. S. Census; 1990
Income to Rent Ratio	Rent burden index for families.	Virginia Polytechnic Institute and State University, Virginia Center for Housing Research; 1999
Composite Index (Local Ability to Pay)	An average daily membership composite plus a per capita composite; both multiplied by a constant (the index will not exceed .8000).	VDOE Superintendent Annual Report; 1997 & 98
Children Environment*		
Children in Poverty	Estimated percent for children between 5 – 17 years of age in poverty.	Bureau of the Census, Small Area Income and Poverty Estimates Program; 1995
Teenage Pregnancy Rate	Rate of teenage pregnancy per 1,000 females.	VA Department of Health and Human Services; 1997 & 98
Low Birth Weight Infants	Low weight live births under 2,500 grams percent of total births.	VA Department of Health and Human Services; 1997 & 98
Single-headed households	Ratio of single-headed households to total number of households	Bureau of the Census, U.S. Census; 1990

Table 1. School District Data (Continued)

Variables	**Measurement**	**Source and Date**
Infant Mortality Rate	Neonatal deaths under 28 days of age rate per 1,000 live births.	VA Department of Health and Human Services; 1997 & 98
Funding for At-risk pupil	Average Virginia Standards of Quality funding for at risk students (total district amount divided by total number of students in district).	VDOE Superintendent Annual Report; 1997 & 98
Transfer Payments	Average total direct payments for individuals (total amount of transfer payments divided by the population)	Bureau of the Census, Consolidated Federal Funds Report; 1995
Academic Achievement*		
Stanford 9 Total Reading Score		VDOE; 1997 & 98
Stanford 9 Mathematics Score		VDOE; 1997 & 98
Stanford 9 Language Score		VDOE; 1997 & 98

Note. * - Denotes latent unobservable variables

Table 2. School Data

Variables	**Measurement**	**Source and Date**
School Disadvantage*		
Incidents (Safety and Violence)	Total number of safety/violence reported incidents	VDOE; 1997 & 98
Dropout Rate	Dropout rate in the school	VDOE; 1997 & 98
Ethnic Heterogeneity	Percent of minority to total student population.	National Center of Education Statistics, Common Core Data; 1997 & 98
Low Economic Status**	Percent of students receiving free or reduced lunch	National Center of Education Statistics, Common Core Data; 1997 & 98
Urbanicity**	The Census Bureau defined urban and rural locations.	National Center of Education Statistics, Common Core Data; 1997 & 98
Academic Achievement*		
Stanford Criterion Total Reading Score		VDOE; 1997 & 98
Stanford Criterion Total Writing Score		VDOE; 1997 & 98
Stanford Criterion Mathematics Total Score		VDOE; 1997 & 98
Stanford Criterion Science Total Score		VDOE; 1997 & 98
Stanford Criterion History Total Score		VDOE 1997 & 98

Note. * - Denotes latent variable
** - Denotes single measured variable

In a different analysis, an investigation was conducted to determine if the community social disorganization theory applied at the school level. For the second model of school effects, each public school that houses an eighth-grade class was included in the study. There are 379 public schools with eighth-grade students. The types of schools varied in their configuration and location. Many schools housed 6th, 7th, and 8th grade classes while other schools housed only 7th and 8th grades and still others had 8th, 9th, 10th, 11th, and 12th grade classes. The locations of the schools ranged from large cities with over 250,000 population to rural areas.

These public schools consist of all schools, regardless of status, that participated in statewide testing. The statewide test is the Standard of Learning achievement battery of tests consisting of History, Science, Mathematics, English Writing, and English Reading and Literature that is administered each year to 8th grade students. The number of 8th grade students statewide who participated by testing in schools ranged from a low of 94.95% in history to 96.66% in mathematics across five different achievement tests. The majority of students not taking the five achievement tests were either absent or students with identified disabilities (Virginia Department of Education [VDOE], 1999).

PROCEDURES AND MEASURES

Shaw and McKay (1969) developed the community social disorganization theory as depicted in Figure 1, Chapter I. Shaw and McKay theorized that indicators of low economic status, residential mobility and ethnic heterogeneity were causative factors in the rate of juvenile delinquency. As the indicators of low economic status increased, a sequential increase would occur in the rate of juvenile delinquency. As the indicators of residential mobility and ethnic heterogeneity increased, a similar change would be seen in

the rate of juvenile delinquency. This would be reflected in Figure 1, page 35, with correlation figures (parameters) along the lines. These conventions of structural equation modeling were used in this study's models.

Structural Equation Modeling

Figure 2, School District Model, was constructed using the conventions of structural equation modeling to depict Shaw and McKay's hypothesized relationships. Similar to other theories, most theories in social and behavioral science are formulated in terms of hypothetical constructs. The measurement of a hypothetical construct is accomplished indirectly through one or more observable indicators. In theory, the researcher defines the hypothetical construct and further specifies how the constructs are postulated to be interrelated (Scientific Software International, 1999). Figure 3 presents the School District Model with Indicators, ovals depict hypothesized constructs—latent unobservable variables either independent or dependent—which are defined by observable indicators. Routinely, a minimum of three observable indicators is used to identify the unobservable latent variable. If only one observable indicator measures a variable, the variable is depicted as a rectangle. In addition, error terms are normally depicted for all observable indicators to include those variables with single indicators and latent unobservable dependent variables.

For the purpose of simplicity and understanding, a listing is provided of latent (hypothetical constructs) variables, independent and dependent, with the indicators (observed measures) variables used to compose the latent variable (see Tables 3 and 4). Following these listings, the path analysis portion of the model will be presented without

the observable indicator variables and the error terms (see Figures 2 and 4). Next, the full structural model will be presented without error terms (see Figures 3 and 5).

In the figure (see Figures 1 – 5) for a structural equation model, the independent variables, latent or otherwise, are normally placed to the left and the dependent variables to the right. The straight lines with one arrow depict the direction of the hypothesized relationship. When an independent variable is hypothesized to have an indirect effect on the dependent variable through another variable, the independent variable will show this effect with a straight arrow line coming from it connecting with the moderator variable and then a line will be drawn to the dependent variable. Dependent latent variables have straight lines with arrows pointing toward them and connecting to another independent variable. If the variables are correlated or covary with each other, a line with arrows on each end connects the variables. If latent variables are hypothesized to form another latent variable, this is a second order latent variable that would use the same conventions as other latent variables.

Structural equation modeling with latent variables requires the a priori establishment of a hypothetical model. Most often, the latent independent variables account for only a small fraction of the variation or covariation in the latent dependent construct, because there are so many other variables that are associated with the dependent construct but are not included in the model (Scientific Software International, 1999). Using these procedures, a hypothesized theory identifying theoretical relationships between variables can be depicted in one figure. Using structural equation modeling techniques, an investigator can determine if and how well observed data fits the theorized relationships.

Procedures

The data analyses employed statistical methods of structural equation modeling to determine how well the community social disorganization theory explained variance in adolescent academic achievement. A priori theoretical models were established based on the community social disorganization theory and the reviewed literature. The indicator variables for all latent variables are identified in Tables 3 and 4 (in their respective sections). First, school district effects were investigated. The data collected at the school district level were used to determine if the model fits and to what extent the model fits the data (Figure 2 for the path model and Figure 3 for the structural model with indicator variables). Using the same model, a replication using a different school year and standardized testing period was conducted to investigate whether these findings were replicated. Next, data collected at the school level were used to determine if the community social disorganization theory fits the school model. Lastly, both school district and school effects were analyzed using multilevel analysis procedures to determine the strengths of their effects on adolescent achievement. The results of this analysis were further analyzed using structural equation modeling for further investigation. This final structural equation model allowed an investigation of school district and school effects on academic achievement and the strength of these effects.

School District Effects

The hypothesized relationship of school district effects is depicted in the path analysis model, Figure 2. The latent independent and observable variables are aligned to the left in Figure 2, the path model. The population estimate, residential stability, community education level, income to rent ratio, unemployment rate, and the composite

Table 3.

School District Variables with Indicator Model

Latent Independent	Indicators	Latent Dependent	Indicators
Children Environment	Funding for At-risk pupils	Academic Achievement	Language
	Teenage Pregnancy		Total Reading
	Children in Poverty		Mathematics
	Single-headed households		
	Transfer payments		
	Infant mortality rate		
	Low-birth Weight		
Low Economic Status	Estimated population		
	Residential Stability		
	Community Education Level		
	Income to Rent Ratio		
	Unemployment Rate		
	Composite Index (Local Ability to Pay)		

Figure 2
School District Model

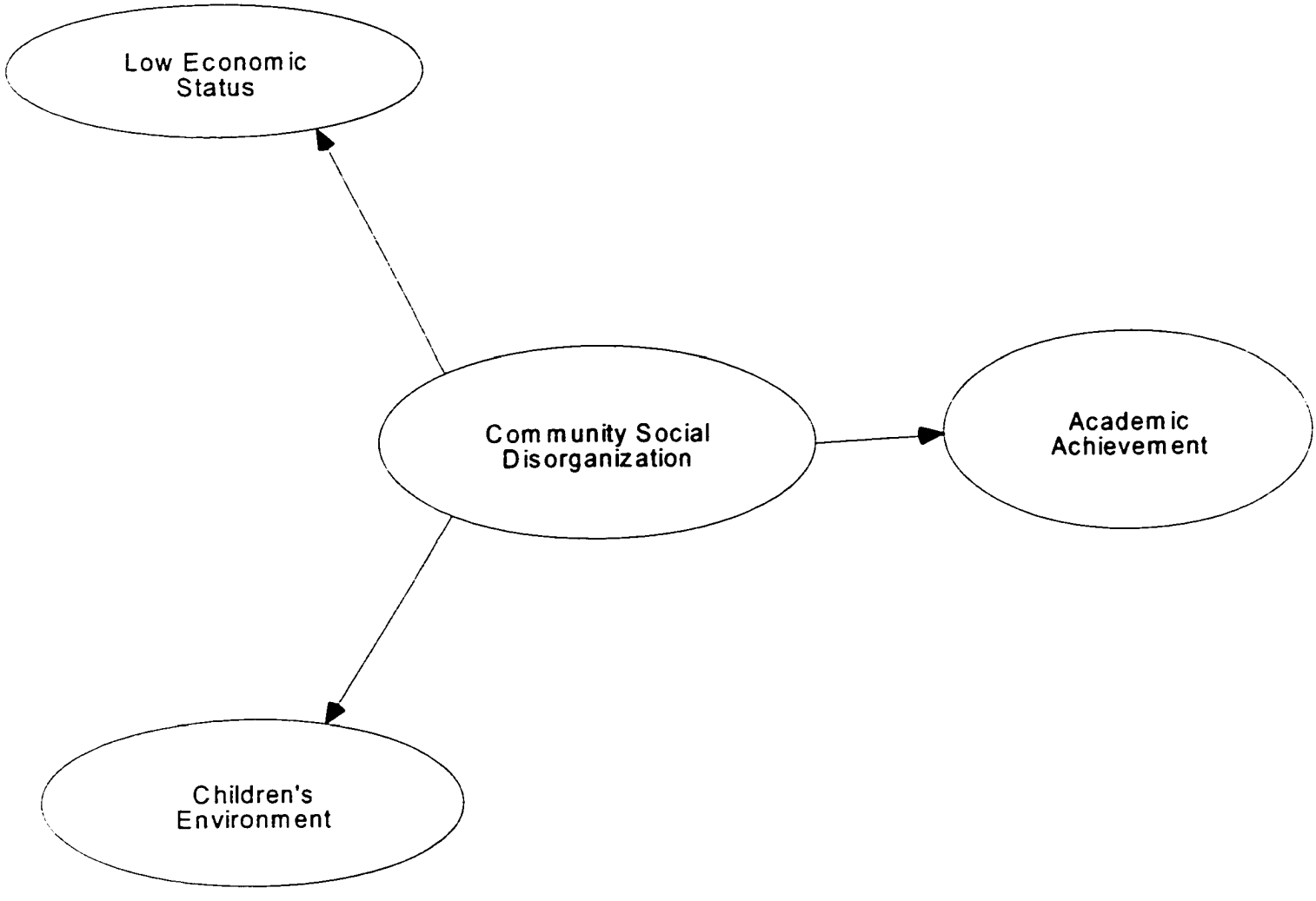
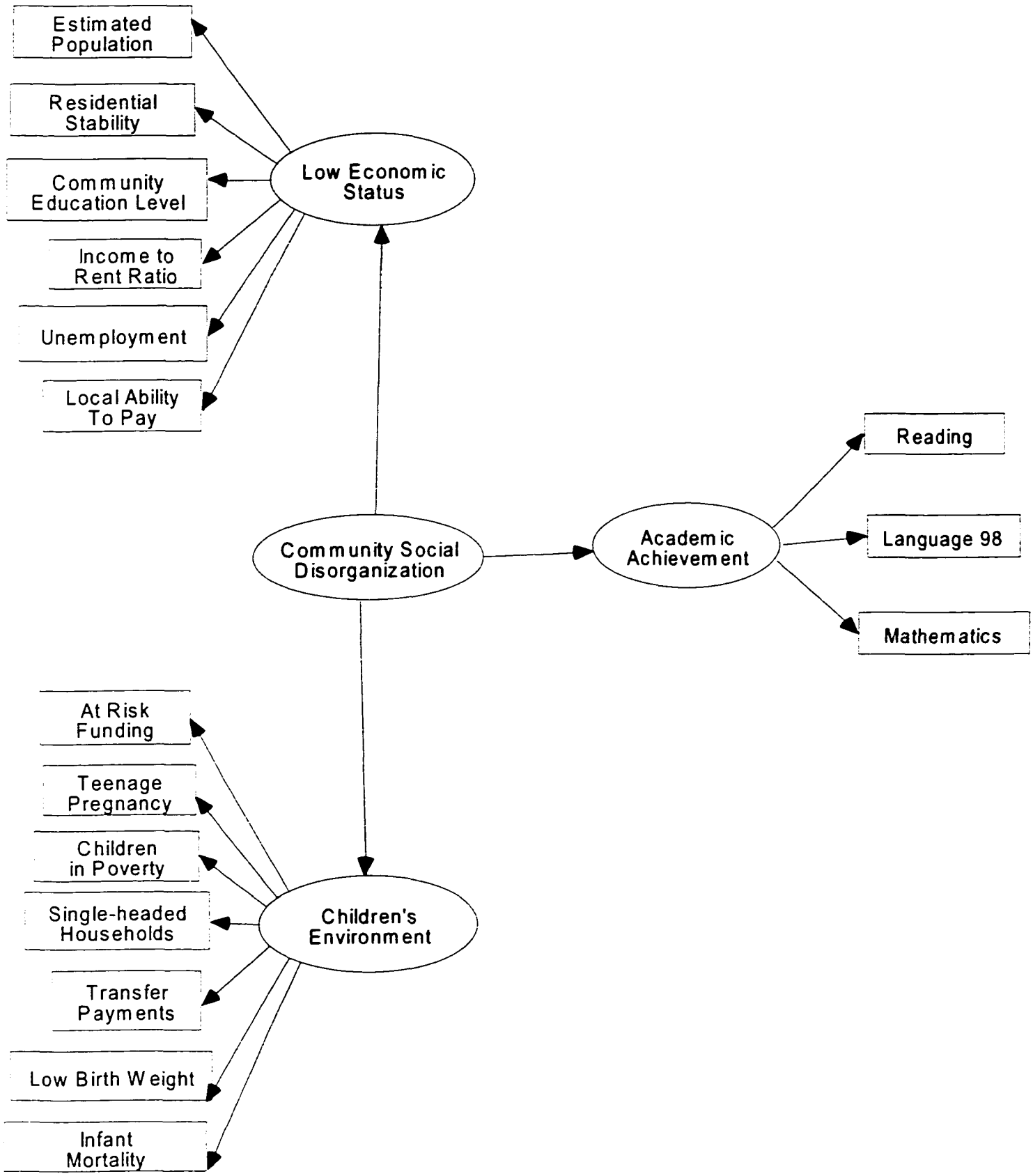


Figure 3
School District with Indicator Variables Model



index will measure the latent independent variable of low economic status. As previously cited, the poverty rate within a community may not be the best indicator of an impoverished community. Thus, these multiple indicators may provide a better indication of low economic status and reduce the problem of measurement error.

In keeping with the theory of community social disorganization and the results of several studies, the indicator independent variable residential mobility was directly related to the community social disorganization theory. Residential stability was measured by the percentage of people who reside in the same house since 1985 at the time of data collection. All of the residential mobility data were collected from the U.S. Census Bureau using the 1990 Census. The estimated population was gathered from the U.S. Census Bureau for the year 1995 and is a proxy measure of urbanicity. The community education level is the percentage of people residing who received a high school diploma or an equivalent. These data were collected from the 1990 Census. The income to rent ratio identified the percentage of hours of work at minimum wage to pay the rent. These data were gathered from the Virginia Center for Housing Research. The unemployment rate was collected from the Virginia Employment Commission. The composite index was collected from VDOE for the years of investigation.

The latent independent variable of children environment was measured by the indicator variables of funding for at-risk pupils, single-headed households, percentage of children in poverty, teenage pregnancy rate, transfer payments, infant mortality rate, and low-birth weight. Teenage pregnancy, infant mortality, and low birth weight within the community have been investigated along with adolescent academic achievement and other indicators of community disorganization. These data were collected from the

Virginia Health and Human Services Office. Single parent family households and percentage of children in poverty have also demonstrated a relationship with adolescent academic achievement. These data were collected from the U.S. Census Bureau. Funding for at-risk pupils was collected for the year under investigation from VDOE. The total transfer payments were collected using the Consolidated Federal Funds Report for 1995.

A second order latent independent variable was hypothesized as Social Organization. This latent variable is formed from the common variance of Economic Status and Children's Environment. A negative relationship with adolescent academic achievement would signify Social Disorganization.

The complete battery of the Stanford Achievement Test, Ninth Edition (Stanford 9), Form TA Abbreviated measured the latent dependent variable of academic achievement. The battery of tests were Reading, Vocabulary, Comprehension, Mathematics, Problem Solving, Mathematics Procedures, Language, Prewriting, Composing, Editing, and a Partial Basic Score (VDOE, 1998b). The reported score for Reading was composed of Vocabulary and Comprehension subtests. The reported score for Language consisted of the subtests Prewriting, Composing, and Editing. The Mathematics score was composed of the subtests Problem Solving and Mathematics Procedures. These tests were multiple choice and abbreviated multiple choice and were normed on a national sample.

The reported development of the Stanford 9 was based on trends in education and the most recent state and district school curricula. Based on its intended use, the Kuder Richardson Formula 20 (K-R20) coefficients were in the acceptable range of the mid .80s

to .90s for most tests and subtests. All of the reliability evidence suggested that the multiple-choice and multiple-choice/open ended composite scores yield high levels of score reliability. Construct, content, and criterion-related validity were reported as satisfactory (Berk, 1997; VDOE, 1999). These tests were actually taken for the school year 97-98 by the 8th grade class cohort in the Fall of 1998 as 9th grade students. These data were collected from VDOE and are reported as mean scores by school district.

After these data were modeled and respecifications made, theoretical relationships were identified. In order to confirm that the model fits well to the theory, a replication was performed on a different school year, 1996-97. Where required, additional data were collected for latent variables from the previously discussed sources. The 8th grade students were administered the Stanford 9 during the Spring of 1997. These two test scores, Stanford 9 administered in Spring 1997 and Stanford 9 administered Fall 1998, should not be compared for gain scores because the separate testing periods were normed on different cohorts. This replication lends additional support to the findings of the theorized relationships.

School Effects

The school was hypothesized to be a community within itself and also affect adolescent academic achievement. Using procedures previously identified, a theorized model of school effects was examined (Figure 4, path model). In Figure 5, the structural model, the latent independent variable of school disadvantage was measured by the dropout rate, ethnic heterogeneity, and the total safety and violence incidents reported by the school. Baker et al. (1998) found the dropout rate had a statistically significant relationship with adolescent academic achievement. School Dropout Rate is a

Table 4

School Latent Variables with Indicators Variables Model

Latent Independent	Indicators	Latent Dependent	Indicators
School Disadvantage	Incidents	Academic Achievement	Total Reading
	Dropout Rate		Total Writing
	Ethnic Heterogeneity		Math Total
			Science Total
Observable			History Total
Low Economic Status			
Urbanicity			

Figure 4
School Model

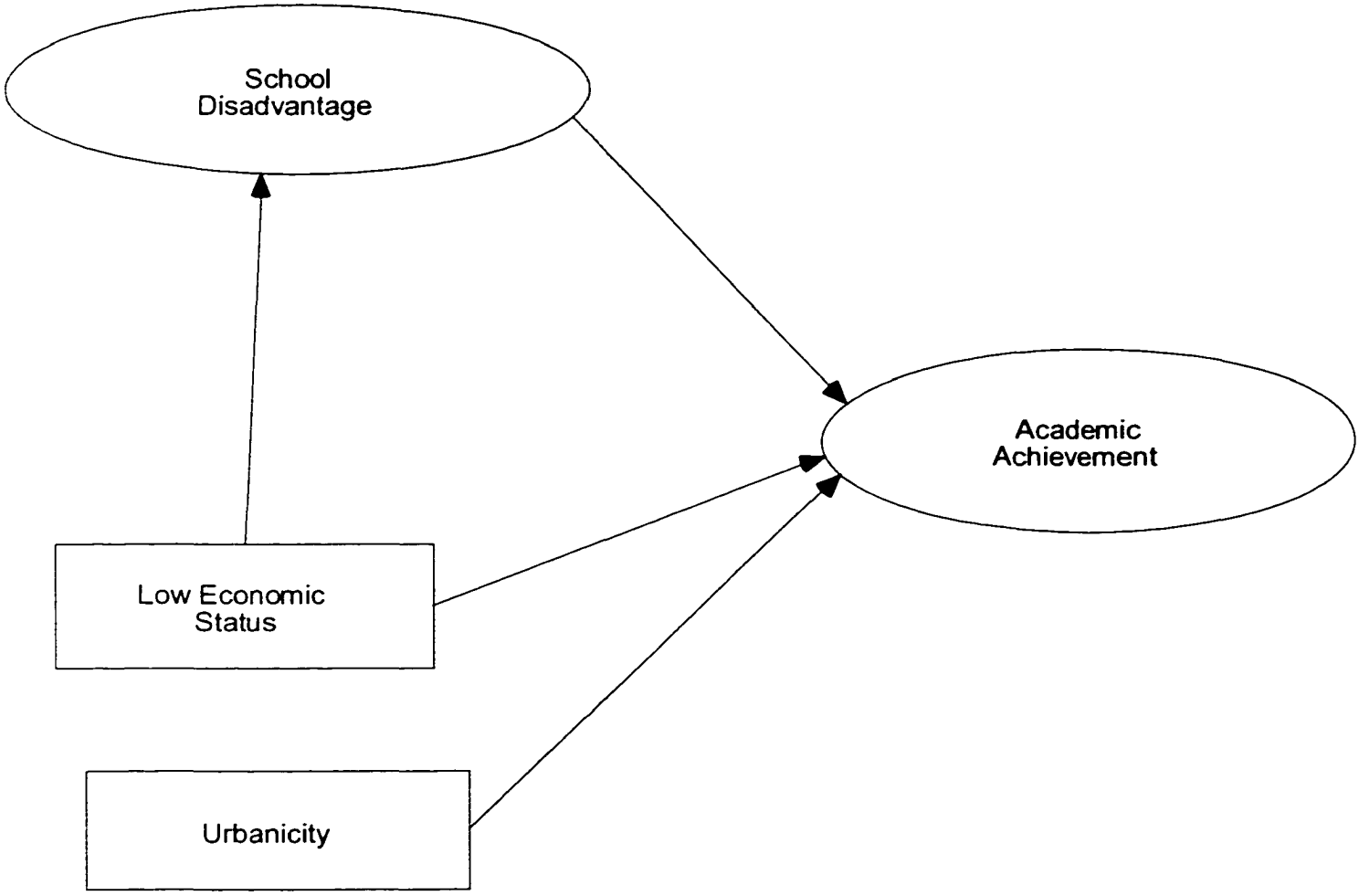
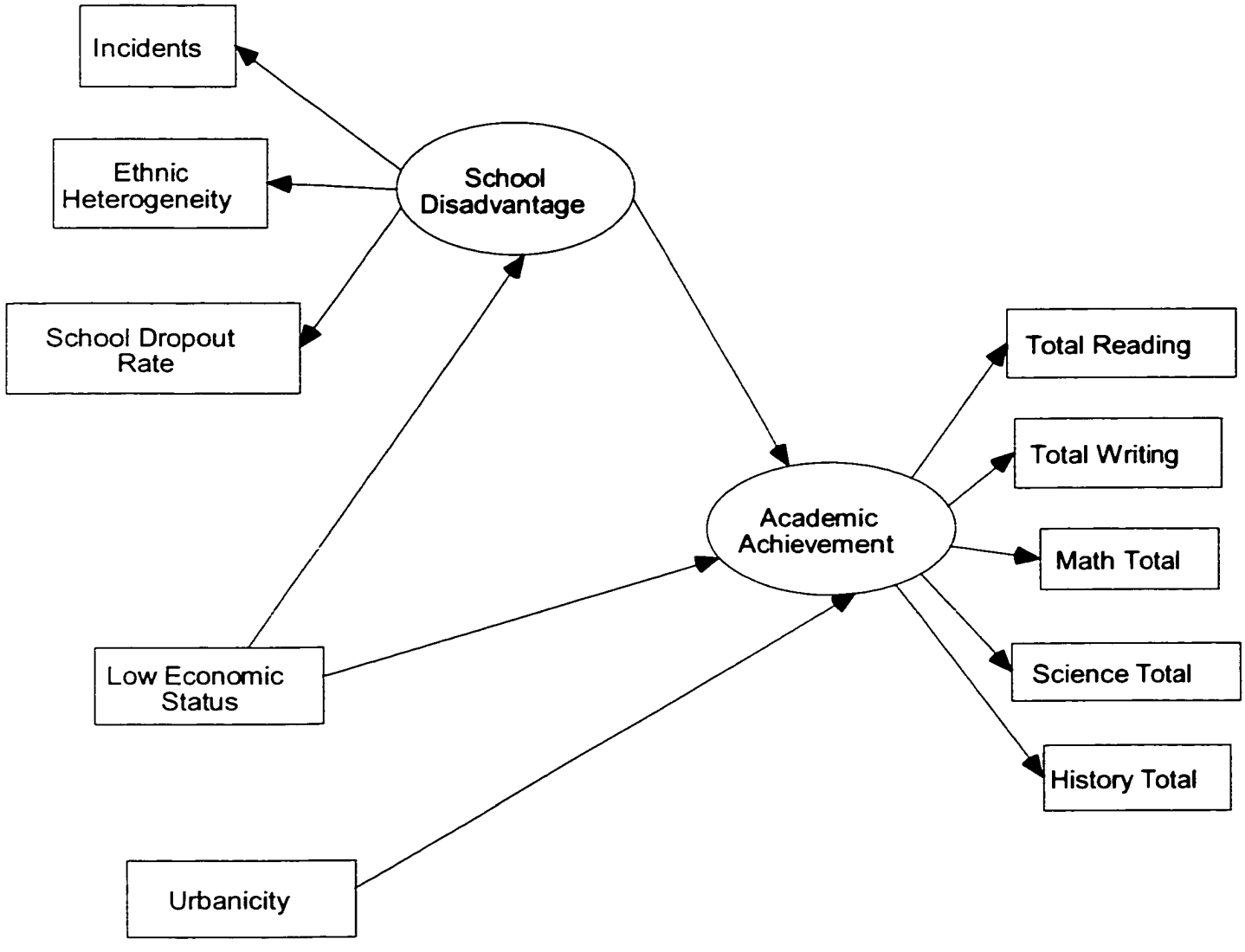


Figure 5
School with Indicator Variables Model



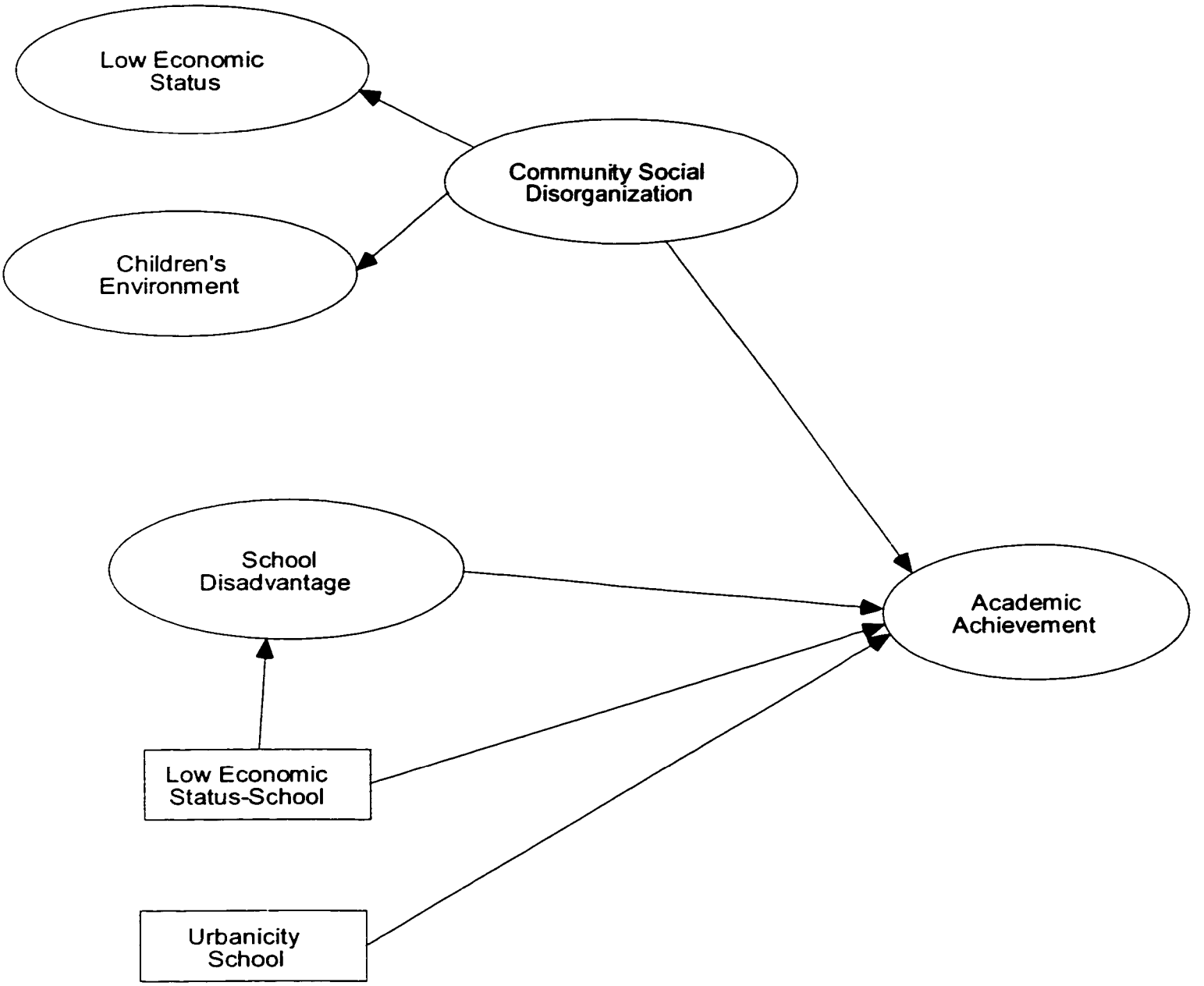
comprehensive variable because it provided an indication of social deviancy and some aspects of school policy and funding. Safety and violence incidents within the school were hypothesized to be indicators of the school effects. These data were collected from VDOE through their web page. These were all indicators of social control and deviance. Pepler and Slaby (1994) reported that these indicators of social control and deviance affect academic achievement through interference with attending to lessons and completion of assignments and are predictors of future academic failure. Ethnic heterogeneity was measured by the percentage of students other than the majority culture within the school. Based on the community social disorganization theory, the diversity of the school will demonstrate a relationship with academic achievement.

The single observed variables of low economic status and urbanicity are all consistent with the community social disorganization theory. Low economic status was measured by the percentage of students receiving free or reduced lunches. In previous research (NCES, 1996a; Baker et al., 1998), the percentage of students receiving free or reduced lunches demonstrated a strong relationship with academic achievement. Urbanicity was measured by the U.S. Census locale identification of rural or urban environment. The seven locale code categories are: (1) large city, a central city of a consolidated metropolitan statistical area (CMSA) or metropolitan statistical area (MSA) with a population greater than or equal to 250,000; (2) mid-size city, a central city of a CMSA or MSA with a population less than 250,000; (3) urban fringe of a large city, any incorporated place or Census designated place and defined as urban; (4) urban fringe of a mid-size city, any incorporated place or Census designated place and defined as urban; (5) large town, an incorporated place with a population greater than or equal to 25,000;

(6) small town, an incorporated place with a population less than 25,000; and, (7) any incorporated place designated as rural (U.S. Department of Education, 1999). Shaw and McKay (1969) theorized that urbanicity was an underlying factor in the rates of juvenile delinquency.

All these data were collected from the U.S. Department of Education Common Core Data report, which included information from the U.S. Census Bureau. The variable was coded similar to the codes used by the U. S. Census Bureau to understand the relationship between variables. The latent dependent variable of academic achievement was measured by a battery of criterion referenced tests. In Virginia, this battery of tests is commonly referred to as the Standards of Learning (SOLs) because the tests were developed to meet the SOL requirements for a high stakes testing program. The battery of tests include History and Social Science, Science, Mathematics, English (Writing), and English (Reading/Literature). VDOE (1999) reported high content validity, high criterion validity, and acceptable reliability for high stakes tests. The reliability using K-R20 values ranged from a low of .82 for English (Writing) to a .92 for Mathematics. Unlike the Stanford 9 used at the school district/neighborhood level, the reported test scores are mean scores for 8^{th} grade students at the school building level. These data were collected from VDOE's web page. In Figure 5, the variable low economic status is hypothesized to have a direct effect on the latent dependent variable academic achievement and an indirect effect through the moderator latent variable school disadvantage. Urbanicity was hypothesized to have a direct effect on academic achievement.

Figure 6
Multilevel analysis - School District and School



School District and School Effects Comparison

After the separate analyses of school district and school effects were conducted, a comparison was made of their effects upon academic achievement (Figure 6). Using multilevel analysis procedures, school district and school effects were again examined using the latent dependent variable (academic achievement as measured by SOL test scores) for school effects. While conducting this multilevel analysis, the latent variables were entered into a structural equation model (Figure 6). Without the multilevel analysis, these latent variables could not be adequately compared because of the different levels of analysis. The latent dependent variable of academic achievement is at the school level with the variables that form school effects. However, these school variables are nested within school districts at a higher level of analysis where other variables were measured. A failure to use this approach would result in biased parameter estimates.

LIMITATIONS, DELIMITATIONS, AND CAUSALITY

Although they have minimal affects on this dissertation, there are limitations and delimitation that must be discussed. Along with these limitations and delimitation, procedures will be discussed to minimize their influence. After the discussions of limitation and delimitation, a review of causality in respect to structural equation modeling is provided to clarify inferences made in this current investigation.

Limitations

Aggregate Data and Measurement

The first limitation was the use of aggregate data. With aggregate data, the characteristics of the individual students are lost. However, the unit of analysis is not the individual student and inferences were not made at this level. The units of analyses were

the school district and the school. Only existing statistics as reported by state and federal agencies were used. This data were gathered from several sources and multiple indicators of each latent variable were used. These procedures reduced common method variance and reduce measurement error in the latent variable. Common method variance occurs when data are gathered using the same procedure or the same mode of data collection (Spector, 1981). The latent variable reduced measurement error, more specifically random error, because of the multiple indicators used to identify it. Each indicator has its own random error and, when their scores are averaged or used to measure the latent variable, the random error is reduced (Spector, 1981). Using this statistical approach, relationships among variables were investigated.

Data Collection

The next limitation was the use of existing statistics from census data, school, police, health and welfare agency records. The first concern was the time period when the data were collected. As seen in Tables 1 and 2, the latest available data were used for each variable. However, these data came from different periods that correspond with different periods of development for these adolescents. Several arguments could be used to identify the most opportune time periods of adolescence to collect data influencing academic achievement. Hanushek (1997) conducted a meta-analysis of studies over the past 30 years similar to this one and found that these studies routinely used available data collected during different periods. Also, Hanushek (1997) noted that student achievement at a point in time is related to the primary inputs of family influences, peers and schools; and, that the educational process was cumulative in that both historical and contemporaneous inputs influence current performance of students. This supports the use

of the employed methodology of this dissertation. In addition, these data may contain errors in measurement and reduced reliability (Elliott & Wilson, 1996). Although Elliott and Wilson (1996) identified this collection of data as a limitation, 1990 U. S. Census data was used to develop a latent variable of social disadvantage in their study. Funding constraints will not allow the collection of self-report surveys.

Data Transformation

There were expectations that the data will be skewed and have problems with kurtosis. To investigate the relationships among variables, some data required transformation to reduce skewness and kurtosis. In addition, extreme values of data (outliers) may be removed as an alternative to transformation or in addition to. These actions will make interpretation of transformed variables more difficult. All transformations are reported to allow for duplication of the analyses.

Operationalization and Structural Equation Modeling

Throughout the related literature, different definitions were used for terms that were consistently used; i.e., neighborhood, social deviance, poverty, etc. This study used prominent measures found in the literature to identify latent constructs to synthesize the literature. However, some terms, such as neighborhood, were defined from a small inner city Census tract to a city. This study will minimize the confusion by referring to the school district throughout the report while referring to studies using alternate terms such as community and neighborhood.

In addition, the small sample size used for analyses was a limitation in using structural equation modeling. The data analyses procedure structural equation modeling is routinely used with a large sample size. With a reduced sample size, the number of

variables used and the complexity of the model must be limited and parsimony adhered to. The number of measured variables for latent constructs and the number of latent constructs were influenced by the sample size. With a smaller sample size, the number of variables used should be smaller and the model less complex (Bollen, 1987).

Multilevel Analyses

The statistical software (Structural Equation Modeling Made Simple) used for multilevel analyses is an "implementation of Muthen's solution of the two-level modeling problem" (Gustafsson & Stahl, 2000, p. 126) and should make for more powerful and interesting analyses of phenomena. Hox (1997) discussed limitations with the Muthen model and identified the underestimation of the standard errors for parameters as an area of caution. If the standard errors are small, the statistical significance of parameter estimates would be overestimated and, when standardized, the parameter estimate could exceed 1.00.

Gustafsson and Stahl (2000) cautioned "that there is only limited experience how to fit and interpret two-level models, and it also must be realized that the estimation techniques are approximate only" (p. 126). Problems with these new procedures included unequal sample sizes between levels, which caused difficulties in interpreting goodness of fit statistics, and the estimation technique is a large sample technique. Hox (1997) reported similar results and cited specific investigations where there would be a preference for a large level 2 sample (group) over level 1 (individual), while other investigations would require a larger sample at level 1, specifically more individuals in each group.

Hox (1997) identified the importance of understanding multilevel analysis when model assumptions are not fully met. Hox found that the effects of the sample size at different levels influenced the accuracy and power of statistical tests. Acknowledging these limitations, Gustafsson and Stahl (2000) called for further application of the two-level modeling techniques to a wide range of empirical data in order to gain experience of the possibilities and problems.

Delimitation

Selection

The first is selection, which is considered to be the action taken by parents when they select the neighborhood to live in. The neighborhood selected is associated with a particular school zone that determines where children will attend school. This selection process place more economically advantaged and homogeneously grouped children in the same schools and should effect aggregated measurement of adolescent academic achievement. Pedhazur (1982) stated "it is well known that one of the most important determiners of the choice of a place of residence, particularly among middle-class parents, is the quality of its school system. There is therefore a high correlation between student background characteristics and school quality" (p. 191).

However, Massey and Denton (1993) identified the limited choices of residential locations with better schools available to minorities even with money. Kozol (1991) and Orfield and Yun (1999) supported the fact that our schools have re-segregated. To control for the selection process, the variables indicative of the process were included in the models. Indicators of both ethnic heterogeneity and low socioeconomic status were investigated at the school level.

Causality within Structural Equation Modeling Procedures

Discussions about cause and effect relationships are central to any probabilistic and statistical inference from data analyses (Pearl, 2000). For structural equation modeling, Bollen (1989) discussed causality and causal modeling with focus on three conditions. These three conditions of causality were isolation, association, and direction of causation. Bollen stated that a dependent variable couldn't be isolated from all influences but a single explanatory variable, so it is impossible to make definitive statements about causes. In structural equation modeling, Bollen stated that we replace perfect isolation with pseudo isolation by assuming the disturbance of the dependent variable (the composite of all omitted determinants) is uncorrelated with the exogenous (latent and manifest) variables of the equation.

Once the condition of pseudo isolation is satisfied and all parameters are identified (unique values are found for each parameter), the condition of association must be determined. Bollen stated that a bivariate association is neither a necessary or sufficient condition for a causal relationship. "Rather, association net of other influences is necessary to establish causality" (Bollen, 1989, p. 57). Many problems, i.e., multicollinearity, heteroscedascity, sampling error, and autocorrelations complicate association. The condition of direction of causation is the final condition to be met. Bollen identified temporal priority as key in the literature when identifying direction of causation. The cause must occur before the effect. Bollen (1989) found that "knowing that one variable precedes another in time is probably the single most effective means of" (p.67) establishing a causal relationship.

Schumacker and Lomax (1996) identified the same three conditions to determine causality and argued for using terms for influencing rather than causing the dependent variable in structural equation modeling. However, Bollen (1989) argued cogently for evaluating structural equation models with two broad, relevant standards. One is whether the model is consistent with the data and the other is whether the model is consistent with the real world. Similar to hypothesis testing, one cannot prove a model is valid, but models can be rejected based on statistical testing. Bollen concluded with:

> Isolation, association, and direction of causality are the three conditions used to establish a causal relation. Each condition is difficult to meet, but it is perhaps impossible to be certain that a cause and an effect are isolated from all other influences. We must regard all models as approximations to reality. The statistical tests can only disconfirm models; they can never prove a model or the causal relations within it . . . Finally, we should realize that the problems of demonstrating isolation, association, and direction of causation are age-old issues (Bollen, 1989, p. 79).

Pearl (2000) reported that the background of structural equation modeling was dominated by causal analyses in economics and the social sciences since 1950. Pearl found that "the prevailing interpretation of SEM [structural equation modeling] differs substantially from the one intended by its originators . . . Instead of carriers of causal information, structural equations are often interpreted as carriers of probabilistic information . . ." (p. 133). Contrary to Bollen (1989), Pearl did not support the conditions for supporting causality and stated:

> The word cause is not in the vocabulary of standard probability theory. It is embarrassing yet inescapable fact that probability theory, the official mathematical language of many empirical sciences, does not permit us to express sentences such as "Mud does not cause rain"; all we can say is that the two events are mutually correlated, or dependent – meaning that if we find one, we can expect to encounter the other. Scientists seeking causal explanations for complex phenomena or rationales for policy decisions must therefore supplement the language of probability with a vocabulary for causality, one in which the symbolic representation for the causal relationship "Mud does not cause rain" is distinct from the symbolic representation for "Mud is independent of rain." Oddly, such distinctions have yet to be incorporated into standard scientific analysis (p. 134).

In multilevel analyses using structural equation models, each of these same conditions exists and the arguments are the same. Several researchers and software developers (du Toit, du Toit, & Cudek, 1999; Goldstein, 1999; Hox, 1993, 1995, 1997; Rowe, 1999) have discussed the increased use of multilevel analyses over the past 20 years and interpretations of causality. The same interpretations for structural equation models apply to interpreting these complex multilevel models especially with latent variables.

SUMMARY

Using existing statistics for the Commonwealth of Virginia's communities and public education system, this dissertation examined school district and school effects

on adolescent academic achievement. Through advances in technology and statistical methods, it is now possible to separate school districts and school effects to determine how each influences adolescent academic achievement. Structural equation modeling provided a statistical method to explore both direct and indirect effects of school districts and schools on academic achievement. A priori establishment of theoretical models based on community social disorganization theory and the reviewed literature provided a statistical method to explore both direct and indirect effects of neighborhoods and schools on academic achievement and guided this analysis. And, with multilevel analysis, a more precise measurement of these effects was possible from aggregated data at two levels of analysis.

This chapter and Chapter II provided an overview of why structural equation modeling and multilevel analysis provides a better understanding of relationships among variables. Previous data analyses conducted using the educational production function analysis provided mixed results. Educational production functional analysis used ordinary least squares and weighted least squares regression analysis, which did not provide precision in measuring actual effects, both direct and indirect, and used aggregated data from multiple levels. The results of these analyses have been mixed with the prominent impression that schools do not matter in adolescent academic achievement. Recently, investigators using advanced statistical techniques have found that schools do matter.

The formation of independent cities and counties in Virginia provided an enhanced methodological location to conduct a study of school district and school effects. Collected data from various state and federal sources were applied to both school districts

and independent cities and counties. Adequate data was available to conduct this study. First, school district effects on academic achievement were modeled and investigated for a relationship with academic achievement. A replication was conducted using a previous school year. Then, school effects on academic achievement were modeled to determine if there was a relationship. Finally, using both multilevel analysis and structural equation modeling, neighborhood and school effects were statistically compared to determine the strengths of their effects.

These methods and procedures established to what extent, if any, community social disorganization theory explained the variance in academic achievement of adolescents. Also, these methods and procedures allowed an exploration of school district and school effects on adolescent academic achievement to determine if either has a significant influence on academic achievement.

CHAPTER IV

FINDINGS

Chapter III, Methods, identified the sample population, procedures used in collecting data, all measures used, definitions of all latent variables, and the unit of analysis for each procedure performed. Also, theoretical models were introduced with associated variables for both the school district and the school. Chapter III concluded with the limitations and a delimitation of the current investigation along with a discussion of causality in structural equation modeling. These methods and procedures within limitations established the guidelines for this explanatory investigation into what extent, if any, community social disorganization theory explained the variance in adolescent academic achievement. Also, these methods and procedures provided an exploration of school district and school influences on academic achievement as measured by standardized achievement tests to determine if either shared a significant relationship with adolescent academic achievement.

While the structural equation modeling analyses were conservative interpretations, the multilevel analyses findings should be interpreted cautiously based on limitations of the current study and comments provided (Bollen, 1989; Joreskog 1996a & b) on the size of parameter estimates when using structural equation modeling and multilevel analysis procedures. A more in-depth discussion of these issues follows in this Chapter.

This dissertation's findings revealed a confounding of family income with other variables at different levels of analyses. This confounding of variables influencing adolescent academic achievement were not reported in other studies (APA, 1993;

Grissmer et al., 1994; NCES, 1996a, 1997). These variables of Teenage Pregnancy, Infant Mortality, and Single-headed households were used as indicators of social organization within the communities of adolescents. In the school district model and the multilevel analyses, Teenage Pregnancy, Infant Mortality, and Single-headed households moderated the effects of low economic status at the school district level. In the school district model, even the observed variable of Graduation Percentage added a different dimension to the model beyond that of the economic status of families as demonstrated by the change in the model parameters between school years. These additional variables within the model provide a better understanding of the complex function of adolescent academic achievement within the social context of the school and the school district.

This current study investigated these variables and found significant results in the amount of variance accounted for in the latent variable of academic achievement. For the 1997-98 school year, the school district model accounted for 68% of the variance. This model was replicated for the school year 1996-97 and accounted for 75% of the variance in academic achievement. In the school model, 65% of the variance was accounted for in academic achievement. In the multi-level analysis model, 80% of the relative variance was accounted for in academic achievement within school districts and 97% of the relative variance between school districts. Compared to other studies' findings, normally 30% to 37% of the variance could be accounted for when investigating adolescent academic achievement (Gustafsson & Stahl, 2000). The current findings of accounted variance surpass previous studies' findings in every analysis. Although Joreskog (1999b) cautioned about the interpretation of relative variance accounted for in structural equations and both Gustafsson and Stahl (2000) with Hox (1997) expressed concerns for

standard errors of parameter estimates and sample sizes across levels, these relative amounts of variance accounted for warrant further investigation.

OVERVIEW OF CHAPTER

After preliminary discussions on structural equation modeling and multilevel data analyses, this chapter is segmented into the three hypothesized structural equation models and their data analyses procedures. Within structural equation modeling and multilevel analyses, there are several indexes provided as indicators of how well the theoretical model fits the data. For each model, this study reported those conservative indexes that were recommended and researched by prominent investigators (Bentler, 1990; Bollen, 1989; Hatcher, 1994; Marsh, Balla, & Hau, 1996; Marsh, Balla, McDonald, 1988). These indexes were chi-square, the ratio of chi-square to degrees of freedom, Comparative Fit Index (CFI), Tucker Lewis Index (TLI) (also known as the Non-normed Fit Index (NNFI)), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). For the multilevel analyses, the Goodness of Fit Index (GFI) was reported in addition to the previous ones. These indexes are discussed in detail.

The hypothesized models in Figures 2, 4, and 6 in Chapter III served as the starting point for generating an acceptable model, which fits the samples' data. This procedure is referred to as model generating and is common throughout the research literature using structural equation modeling (Joreskog & Sorbom, 1996). In the model generating procedure, a tentative initial model is established. If the initial model does not fit the data, the model is modified, based on theory, and tested again using the same data. Once a meaningful model is found, the hypothetical model is tested on a new data set.

Using these procedures, an investigation was conducted into school district effects on adolescent academic achievement as measured by standardized achievement tests. The final reduced model was replicated using a separate school year and, with three exceptions, different collected data. The data that were the same for both models were Single-headed households, Unemployment, and Children in Poverty because new data were not available at the source. Then, the hypothesized school model (Figure 4) was investigated. Finally, the hypothesized model for multilevel analysis (Figure 6) was investigated. Replications of the school model and the multilevel analyses required data that were not yet available.

Within structural equation modeling and multilevel analyses, total, direct, and indirect effects are terms used to discuss relationships of variables with other variables and are common conventions. Bollen (1989) identified these effects as "influences of one variable on another" (p. 376). These effects are used throughout this Chapter to discuss the influences of variables on other variables.

DATA ANALYSES SOFTWARE, ASSUMPTIONS, AND PROCEDURES

The school district and school models were investigated using structural equation modeling procedures with the Analysis of Moment Structures (AMOS) 4.01 statistical software package with maximum likelihood estimation (Arbuckle & Wothke, 1999). The multilevel analyses were conducted using Structural Equation Modeling Made Simple (Streams) 2.5 (Gustafsson & Stahl, 2000) with Linear Structural Relationships (LISREL) 8.30 (Joreskog, Sorbom, du Toit, & du Toit, 1999). The multilevel analyses were validated using AMOS to support the findings of the first analysis.

In structural equation modeling, parameters are estimated. Bollen (1989) defined these structural parameters as the links between the variables (the straight and curved lines in the figures) and stated "structural parameters may describe the causal link between unobserved variables, observed variables, or between unobserved and observed variables" (p.11). These parameters to be estimated will not be constrained. Constrained parameters have fixed values. If there is no line from a variable to another variable, the parameter is constrained to 0. The error terms (identified in figures with an "e" prefix) and disturbance terms (identified in the figures with a "d" prefix) are unaccounted for variance and their parameters linking them to variables are constrained to 1. These error and disturbance terms contain systematic and random error variance as well as other unaccounted for variance. In order to fix the measurement scale of the structural equation models' latent variables, the variance of the latent variables are fixed at 1 (Bollen, 1989). For the multilevel analyses, a parameter from one of the observed variables to the latent variable was fixed at 1 causing the latent variable to take on measurement qualities of that observed variable. Fixing a parameter to 1 is a specification requirement of multilevel analyses (Rowe, 1999). Within the multilevel analyses, the observed variable demonstrating the strongest correlation with the unobserved latent construct had its path to the latent variable fixed to 1.

The identification of each model was determined a priori and by computer statistical software (either AMOS 4.0.1 or LISREL 8.30). All variables were measured at the interval or ratio scale with the exception of the Census location in the School Model. Data reported as percentages or proportions were transformed using an arc sine transformation. This procedure reduced the relationship between the mean and the

variance and stabilized the variances (Stevens, 1996, p. 257). Cases containing missing values were deleted listwise. Cases with multivariate outliers beyond two standard deviations from the mean were deleted. For each hypothesized model, the full model was estimated initially. No initial measurements were calculated to avoid capitalization on chance.

Interpretation of Parameter Estimates and Multiple R^2 or Variance Accounted For

Over the years, several cautions have been provided about interpretations of parameter estimates in both multilevel analyses and structural equation modeling. Raudenbush (1988) reported on the advance in multilevel linear model estimation through the method of iterative generalized least squares and with incorporating measurement error into multilevel models. Raudenbush cautioned the reader on interpreting the results because "the method may produce covariance estimates outside the parameter space" (p. 109).

Joreskog (1999b) argued that multiple $\underline{R^2}$ calculated from structural equations did not have a clear interpretation and that it was not similar to that of a regression equation. The multiple $\underline{R^2}$ in structural equations overestimate the proportion of variance accounted for in the latent dependent variable. Joreskog (1999b) stated that $\underline{R^2}$ in structural equations could be interpreted as the relative variance of the dependent variable explained or accounted for by all explanatory variables jointly.

Bollen (1989) expressed similar cautions. Bollen demonstrated that standardized regression coefficients that ignore error in variables (similar to multiple regression procedures) differ from the corresponding standardized coefficients in the models with

the error separated from the variable (structural equation modeling). Bollen (1989) went further and demonstrated that this difference held for latent variables.

The interpretation of the amount of variance accounted for and parameter estimates within structural equation models and multilevel analyses have been discussed extensively over the years and especially on the LISTSERV dedicated to structural equation modeling issues (SEMNET). Joreskog (1999b) implemented a reduced form calculation of Multiple $\underline{R^2}$ for the LISREL statistical software program. Wothke (personal communication, September 15, 2000) reported that AMOS calculates a Multiple $\underline{R^2}$ by subtracting the residual variable from the total variance and dividing by the total variance. AMOS marks the solution as inadmissible if the parameter estimate falls outside the 0 to 1 range. Although the interpretations have been discussed and are common, caution should still be taken with interpreting the results of multilevel analyses. With these cautions in mind, when referring to amount of variance accounted for in multilevel analyses, the current findings identified the relative amount of variance accounted for and they should be interpreted cautiously. Other parameter estimates that appear out of the parameter space (e.g., standardized parameter estimates exceeding absolute one) were discussed when they occurred.

Procedures Determining Adequacy of Model - Fit Indexes and Other Indicators

Kenny (1999) reported that there were literally hundreds of measures of fit for structural equation modeling. Kenny identified the chi-square as a reasonable measure of fit for models with 75 to 200 cases. If the chi-square is not statistically significant, the model fits the data. For models with more than 200 cases, the chi-square is almost always statistically significant. Along with sensitivity to sample size, the chi-square is

affected by the size of correlations in the model: the larger the correlations, the poorer the fit. The ratio of the chi-square to the degrees of freedom is generally acceptable under 2.

In structural equation modeling, adding parameters to be estimated without theory or justification can provide a better fit of the model to the data. The TLI or NNFI penalizes the model for the number of parameters or complexity of the model to be estimated and is not as sensitive to sample size. The CFI is also sensitive to the number of parameters estimated and is not as sensitive to sample size. If the TLI and the CFI have values between .85 and .90, the model is minimally acceptable. Between .90 and .95, the model is acceptable. Above .95, the model is good (Kenny, 1999). The RMSEA is based on the square root of the chi-square and degrees of freedom ratio minus one divided by the sample size. Good models have values of .05 or less and models with .10 or more have poor fit (Kenny, 1999; McDonald & Marsh, 1990). The RMSEA is point estimation. The RMSEA 90% confidence interval was reported in the current study to provide support of adequate model fit (Steiger, 2000). A valid confidence interval indicative of a good fit is one that includes .05 within the interval or the entire confidence interval is below .05.

In the multilevel analyses, three sets of measures were provided to indicate how well the model fits the data. Two separate analyses are conducted in using these multilevel procedures. One analysis was conducted determining variance within the school district (level 1) and the other analysis was conducted between school districts (level 2). The GFI was reported for these two multilevel analyses. The GFI has similar measurements as the CFI and TLI. The SRMR compares the residuals of the sample's and the model's covariance matrices. The residuals should be centered on 0 and should

not exceed an absolute value of 2. The SRMR provides a measure of the standardized residuals where the smaller (.05 or less desired) the index the better the fit (Tabachnick & Fidell, 1996). The spread of the residuals was discussed for all analyses and the SRMR was reported for all analyses.

As previously stated, along with the GFI fit indexes of model fit to the data, the same measures previously cited for the structural equation models were presented. All of these reported measures of fit are conservative measures. The chi-square, the ratio of chi-square to the degrees of freedom, CFI, TLI, SRMR, and RMSEA were reported for all analyses. The covariance matrix for all analyses was reported for replication of the analyses by other investigators.

FIRST ANALYSIS - SCHOOL DISTRICT LEVEL MODEL

Overview

The first analysis was to determine whether or not variables that were consistent with community social disorganization theory explained variance within adolescent academic achievement as measured by standardized tests. This first analysis was conducted using variables measured at the school district level only. The initial model was very complex (see Figure 7) with both latent variables of Low Economic Status and Children's Environment measured by several indicator variables.

Low Economic Status was identified by the Estimated Population, Residential Stability, Community Education Level, Income to Rent Ratio, Unemployment, and Local Ability to Pay. Children's Environment was identified by At Risk Funding, Teenage Pregnancy, Children in Poverty, Single-headed Households, Transfer Payments, Low Birth Weight, and Infant Mortality. The school district's mean score on the Stanford 9

TA Reading, Language, and Mathematics standardized test scores measured the dependent latent variable of Academic Achievement. Each of these variables was defined in Chapter III of this dissertation.

The initial model required reduction to achieve parsimony. This reduction was only made using theoretical concerns and the stability of the variables in the model. A more consistent variable identified in the literature was used to identify the new latent variable Economic Condition. This indicator variable of students' socioeconomic status (SES) as measured by the concentration of students eligible for free and reduced lunch programs replaced the indicators that may not have adequately identified the latent variable Economic Condition. Students' SES along with Unemployment and Children in Poverty (moved from Children's Environment), all indicators of the community's financial condition, were hypothesized to form the latent variable Economic Condition.

The latent variable Children's Environment maintained the indicators of Teenage Pregnancy, Single-headed Households, and Infant Mortality Rate. A new current variable of graduation percentage rate was used as an indicator of residential mobility and added to the variable Children's Environment. This indicator variable of graduation percentage rate also captures the environment of the school based on its policies. After reducing the model, the analysis was replicated using another school year, which provided strong support for the model.

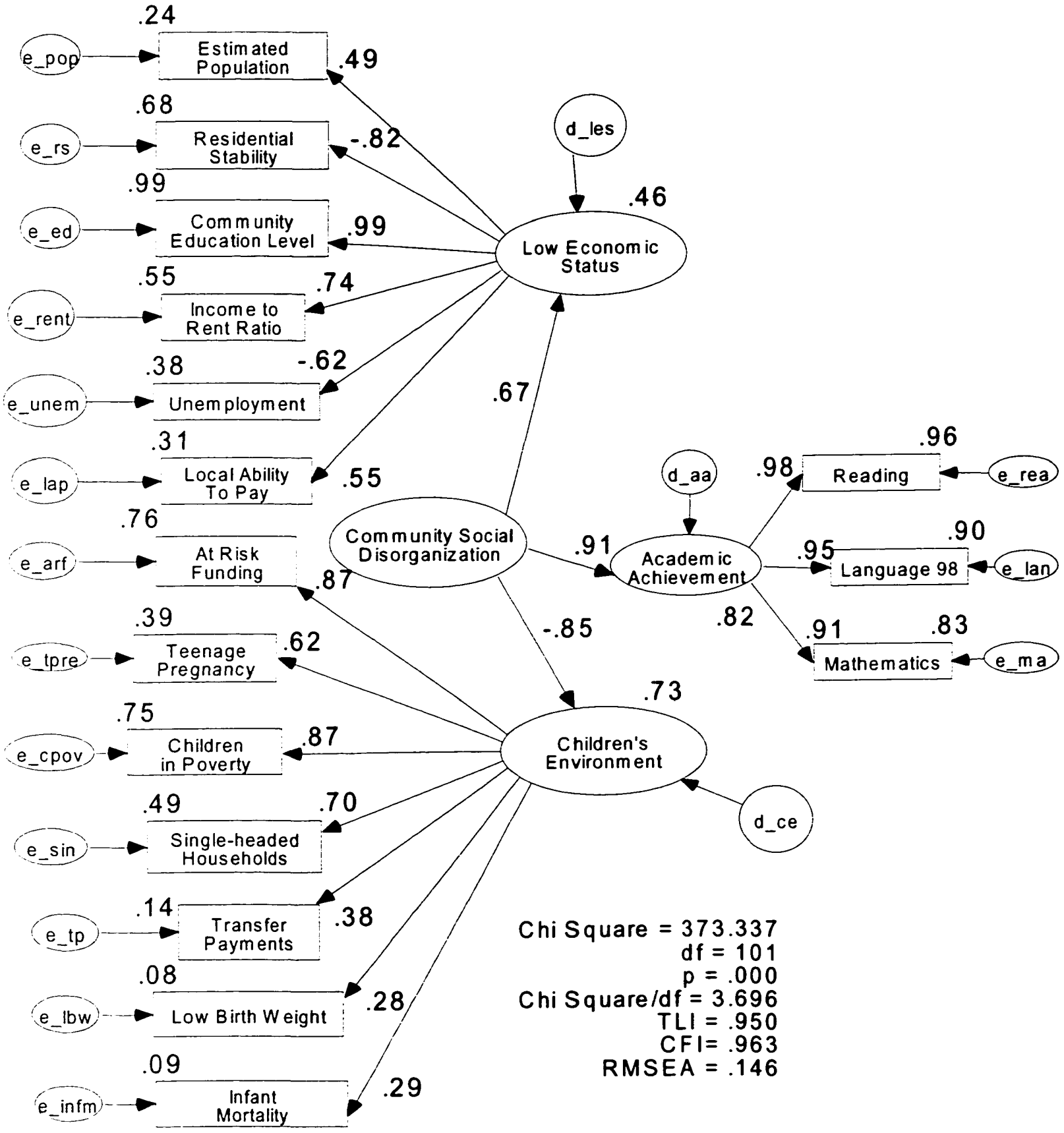
Data Analyses – Community Social Disorganization at the School District Level

The results of the first data analysis are identified in Figure 7. This figure depicts the full structural model and does not indicate an adequate fit of the model to the data. The fit indexes to determine adequacy of the model fit to the data are located in the lower

right segment of the diagram. The chi-square is statistically significant at the .01 level and the ratio of the chi-square to degrees of freedom exceeds 2. The RMSEA is high at .146 and above the .10 level. Based on these fit indexes, the model was rejected. However, the TLI and the CFI, .950 and .963 respectively, indicate a good fit of the model to the data. A previously identified limitation of sample size and strong correlations possibly affected these results along with the complexity of the model. The next step was to increase parsimony of the model to achieve an adequate fit. Although this model (Figure 7) was rejected, the values of the CFI and TLI warrant additional investigation of this model with a larger sample size to achieve an adequate fit. The model was revised only to the extent of reducing the number of parameters to be estimated and not to capitalize on chance (MacCullum, Roznowski, & Necowitz, 1992).

Based on a review of the model, theoretical concerns, and the literature review, the model was reduced. The latent variable Low Economic Status was initially used to identify the financial status of the school district. The latent variable was renamed to more adequately capture what the variable identifies. The variable was renamed Economic Condition. To reduce the number of indicator variables to achieve parsimony for Economic Condition, the variables frequently used in the literature were used as indicators. The variable Children's Environment was reduced to achieve parsimony. The indicator variables retained were consistent with community social disorganization theory and identified by Sampson (1997). The second order latent variable of Community Social Disorganization was renamed to Social Organization. These changes in the model capture the changes over the years to the community social disorganization

Figure 7. School District with Indicator Variables Model



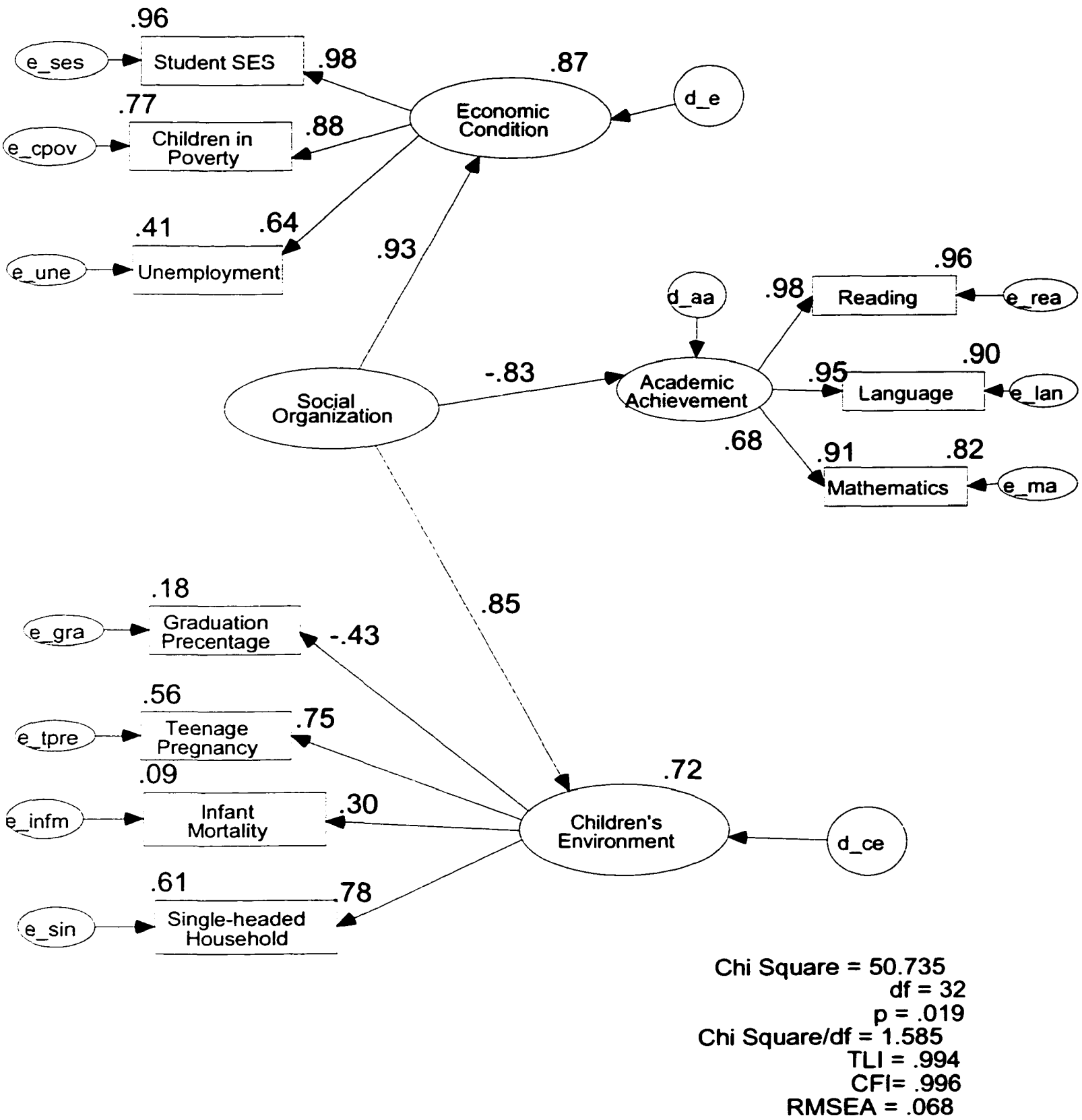
theory. This model demonstrated that social organization could be viewed on a continuum.

Figure 8 depicts the reduced model for the same data in Figure 7, 1997-98 school year. This model provided an impressive good fit to the data and warrants further investigation. The chi-square is not statistically significant at the .01 level but is at the .05 level. The ratio of chi-square to degrees of freedom was below 2 and the RMSEA was .068 with a confidence interval of .028 to .102. The TLI and CFI values, .994 and .996 respectively, were indicators of excellent fit of the model to the data. In Table 5, the covariance matrix along with the means and standard deviations used for the data analysis are identified.

The variables used for the 1997-98 School District reduced model (Figure 8) were consistent with community social disorganization theory and represents the overall model (Figure 7) well. The sample size was 128 after deleting two cases as multivariate outliers. Multivariate normality is an essential assumption of all multivariate analyses. In this current model, two cases were close to three standard deviations from the mean, which would provide biased parameter estimates and results (Arbuckle & Wothke, 1999; Stevens, 1996).

The latent variable, Economic Condition, had three indicator variables. These observed indicator variables were Student Socioeconomic Status (SES), the percentage of children in poverty, and the unemployment rate for the school district. The Student SES was measured by the percentage of students within the school district eligible for free or reduced lunch program (VDOE personal communication, June 20, 2000). The percentages of children in poverty and unemployment rate within the district were

Figure 8. 1997-98 School District Model



Chi Square = 50.735
df = 32
p = .019
Chi Square/df = 1.585
TLI = .994
CFI= .996
RMSEA = .068

Table 5. 1997-98 School District Covariance Matrix, Means, and Standard Deviations

	1	2	3	4	5	6	7	8	9	10
1	0.001									
2	0.000	0.000								
3	0.000	0.000	0.000							
4	-0.001	-0.000	-0.000	0.012						
5	0.000	0.000	0.000	-0.000	0.000					
6	-0.059	-0.102	-0.098	0.247	-0.021	121.397				
7	-0.058	-0.077	-0.076	0.289	-0.017	81.743	74.173			
8	-0.066	-0.090	-0.084	0.283	-0.019	91.723	75.108	88.035		
9	0.000	0.000	0.000	-0.001	0.000	-0.174	-0.157	-0.176	0.001	
10	0.000	0.000	0.000	-0.002	0.000	-0.276	-0.259	-0.300	0.001	0.004
Means	6.53	.36	5.11	75.76	.18	47.19	44.98	54.34	35.97	.11
SD	4.49	.15	2.71	9.35	.09	11.06	8.65	9.42	13.05	.04

Note. 1 – Infant Mortality; 2 – Student SES; 3 – Unemployment; 4 – Graduation Percentage; 5 – Children in poverty; 6 – Mathematics; 7- Language; 8 – Reading; 9 – Teenage Pregnancy; 10 – Single-headed households

discussed in Chapter III. The latent variable, Children's Environment, had four indicator variables. These indicator variables of teenage pregnancy rate, infant mortality rate, and percentage of single-headed households were discussed in Chapter III. The graduation percentage was the percentage of students graduating within the school district during 1997-98 as a percentage of the 9th grade entering freshmen four years prior. This variable provided an indication of residential mobility or stability. If the percentage was above 100, then possibly more students had moved into the area. If the percentage was below 100, then students possibly had moved out of the area or dropped out. This variable also gives an indication of the school district's environment and policies.

These two latent variables, Economic Condition and Children's Environment, were hypothesized to form a Social Organization latent variable that had a direct relationship with adolescent academic achievement. The latent variable, Academic Achievement, remained the same as depicted in the original model with the Stanford 9 standardized test scores for Reading, Language, and Mathematics.

In Figures 7 and 8, the complete models were depicted along with error and disturbance terms. Error terms are ovals located to the left or right of their affected manifest variables, which are identified in rectangles. As previously stated and for easy identification, the error terms are named beginning with an "e." The disturbance terms are circles and are associated with the latent variables and are named beginning with a "d." The error and disturbance terms represent the systematic and random error of the variable and have lines with arrows indicating the variable that it affects. The numbers identified on top of the rectangle of the manifest variable is the variable's lower bound estimate of reliability, similar to Cronbach alpha, in this model. The numbers along lines

between variables is the factor loading for the manifest variable to the latent variable. For latent variable to latent variable, the number represents the regression coefficient. The number closest to the latent variable is the amount of variance accounted for in that latent variable. These numbers are referred to as parameter estimates.

Figure 9 depicted the 1996-97 School District model, which was used for replication of the model and provide support for the model's fit to the data. The sample size was 127 after deleting three cases as multivariate outliers. These three cases were almost three standard deviations from the mean and possibly would have provided biased parameter estimates.

Initial review of the model provided strong evidence that the model fits the data. The chi-square was statistically significant at the .05 level but was close at $p = .047$. The ratio of chi-square to degrees of freedom was below 2 at 1.452. The TLI and CFI were excellent values, .995 and .997 respectively. RMSEA was .060 with a confidence interval of 0.007 to 0.096. This model demonstrated an excellent fit to the data. Table 6 identified the covariance matrix used for the analysis. The 1997-98 School District Covariance Matrix, Means, and Standard Deviations (Table 5) and the 1996-97 School District Covariance Matrix, Means, and Standard Deviations (Table 6) were extremely similar in patterns and figures suggesting that they were close to being the same. The distribution of standardized residuals covariance matrix for both models were symmetrical and centered on zero. No standardized residuals were greater than 2.0 in absolute magnitude. The SRMR for the 1997-98 school year model was .040 and for the 1996-97 school year model .036. This replication provided strong support for the theoretical model (Figures 8 & 9) fitting the data.

Figure 9. 1996-97 School District Model

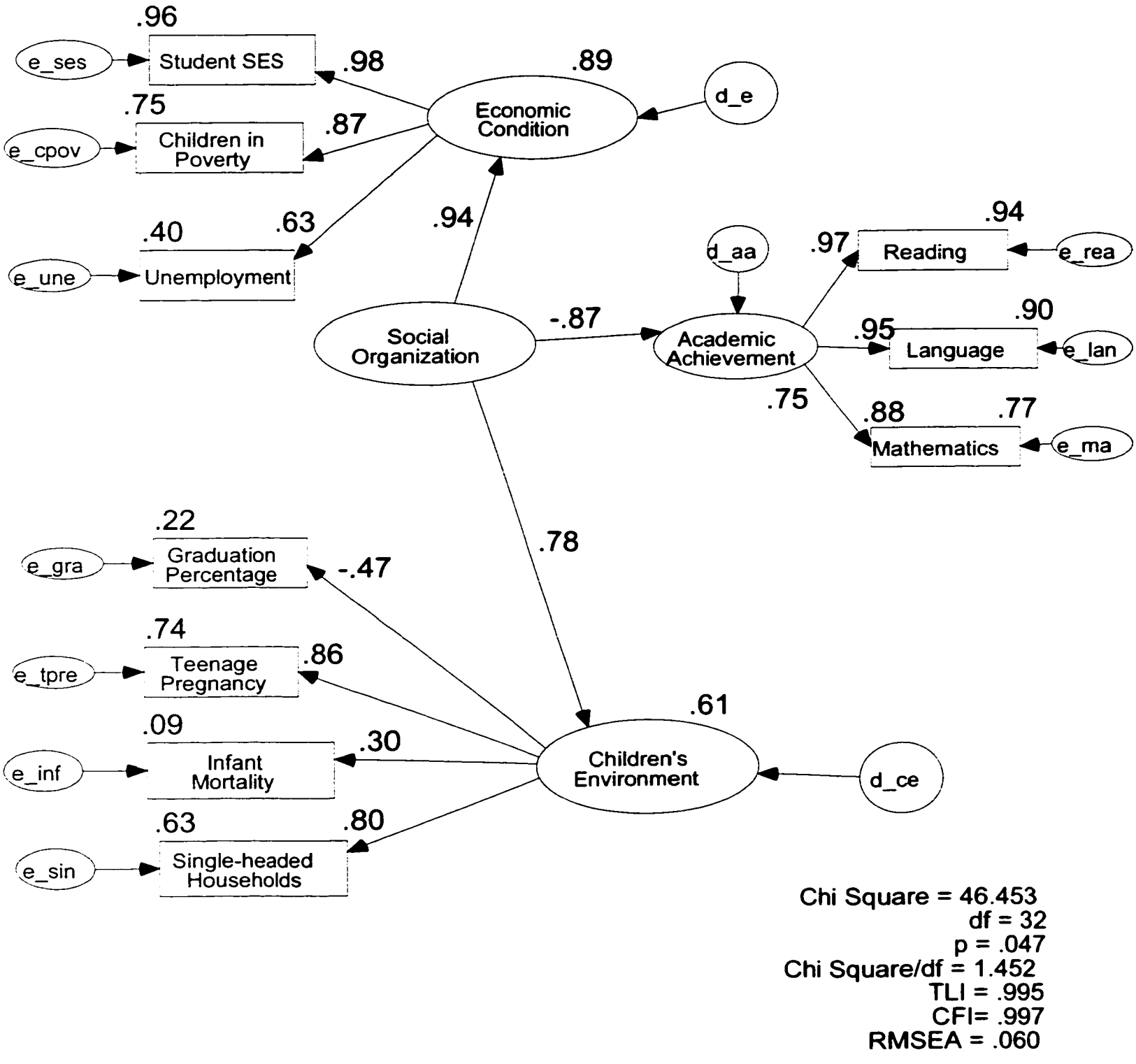


Table 6. 1996-97 School District Covariance Matrix, Means, and Standard Deviations

	1	2	3	4	5	6	7	8	9	10
1	0.000									
2	0.000	0.000								
3	0.000	0.000	0.000							
4	-0.000	-0.000	-0.000	0.012						
5	0.000	0.000	0.000	-0.000	0.000					
6	-0.034	-0.091	-0.084	0.348	-0.019	113.978				
7	-0.036	-0.084	-0.082	0.230	-0.018	78.053	75.178			
8	-0.034	-0.088	-0.076	0.269	-0.018	78.265	69.058	74.890		
9	0.000	0.000	0.000	-0.002	0.000	-0.201	-0.184	-0.192	0.001	
10	0.000	0.000	0.000	-0.002	0.000	-0.270	-0.243	-0.274	0.002	0.003
Means	6.39	.35	5.02	76.42	.18	49.25	48.50	57.48	36.70	.11
SD	3.51	.15	2.52	8.77	.08	10.72	8.71	8.69	14.34	.04

Note. 1 – Infant Mortality; 2 – Student SES; 3 – Unemployment; 4 – Graduation Percentage; 5 – Children in poverty; 6 – Mathematics; 7- Language; 8 – Reading; 9 – Teenage Pregnancy; 10 – Single-headed households

Table 7. Comparison of 1997-98 and 1996-97 School District Models – Standardized Path Coefficients

Variable	1997-98	1996-97
Independent		
Economic Condition	.93 (.87)	.94 (.89)
Student SES	.98 (.96)	.97 (.93)
Children in Poverty	.88 (.77)	.87 (.75)
Unemployment	.64 (.41)	.63 (.40)
Children's Environment	.85 (.72)	.78 (.61)
Graduation Percentage	-.43 (.18)	-.47 (.22)
Teenage Pregnancy	.75 (.56)	.86 (.74)
Infant Mortality	.30 (.09)	.30 (.09)
Single-headed households	.78 (.61)	.80 (.63)
Social Organization	-.83	-.87
Dependent Variable		
Academic Achievement	(.68)	(.75)
Reading	.98 (.96)	.97 (.94)
Language	.95 (.90)	.95 (.90)
Mathematics	.91 (.82)	.88 (.77)

Note. Latent variables were identified aligned to the left margin in the Variable column. The amount of variance accounted for is identified in parenthesis. For observable variables (aligned on right margin, Variable column) the figure in parenthesis is a lower bound estimate of reliability.

In Table 7, a comparison of the parameter estimates is provided. These parameter estimates are the figures representing factor loadings, amount of variance accounted for, and regression coefficients. In Table 7, the latent variables were aligned to the left margin and the amount of variance accounted for is identified in parenthesis as a decimal. For the 1997-98 school year, the amount of variance accounted for in Economic Condition was 87%; Children's Environment was 72%; and, Academic Achievement was 68%. The decimal figures identified in parenthesis for the observable variables (e.g., Student SES, Children in Poverty, etc.) were the lower bound estimates of reliability in this model, similar to Cronbach alphas. All parameter estimates were statistically significant at the .01 level. These statistically significant parameters add additional support to the theoretical model. The observed variables identified the latent variables well. The observed variables Graduation Percentage and Infant Mortality have lower bound reliabilities that appear low. However, these indicators strengthen the overall model and were good indicators of the latent variable Children's Environment (Little, Lindenberger, & Nesselroade, 1999).

All of the structural parameters in the model were in the expected direction. The observed variable Graduation Percentage, which was a proxy indicator for school policies and high residential mobility, loaded negatively on the latent variable Children's Environment. Possible cause for this loading included the promotion rates and policies of the schools, which should be negatively associated with Teenage Pregnancy, Infant Mortality, and Single-headed households and positively related to adolescent academic achievement. Also, in contrast to the original community social disorganization theory, Graduation Percentage, as an indicator of a lack of residential stability, does not possess

the same influence of loose community friendship ties on juvenile delinquency. In fact, residential stability now suggests that the area is predominantly occupied by the stagnant economically deprived (Wilson, 1991). This negative loading of Graduation Percentage on Children's Environment would then suggest that economically advantaged families are mobile. This negative loading also indicated a positive relationship between Graduation Percentage and Academic Achievement.

Teenage Pregnancy and Single-headed households were the strongest indicators of the latent variable Children's Environment. Although Infant Mortality was consistent in both models, the other variables' lower bound reliabilities and factor loadings increased in the 1996-97 model. A dramatic increase .11 occurred in the factor loading for Teenage Pregnancy. Yet, the amount of variance accounted for by Children's Environment decreased .11 and its factor loading for Social Organization decreased. A possible reason would be the increased negative loading of Graduation Percentage. The number of students graduating for 1996-97 school year or the increased number of economically advantaged mobile families influenced the amount of variance accounted for in Children's Environment beyond the increased influence of Teenage Pregnancy and Single-headed households.

The latent variable Economic Condition performed similarly across models. The variable's strongest indicator was consistently Student SES as measured by the percentage of students eligible for free or reduced lunch program. Economic Condition was the strongest indicator of the latent variable of Social Organization. Both Children's Environment and Economic Condition had factor loadings that were positive to Social Organization, which explained the negative loading on Academic Achievement. The

difference in the two models was the loading of Children's Environment on Social Organization. More specifically, the increase in Graduation Percentage possibly caused the increase in the amount of variance accounted for in Academic Achievement. Both models were similar in pattern with factor loadings, lower bound reliabilities, and amount of variance accounted for. The observable variables that were invariant across models are Children in Poverty, Unemployment, and Single-headed households. More recent data were not available.

The 1997-98 School District model accounted for 68 percent of the amount of variance in adolescent academic achievement and the 1996-97 model accounted for 75 percent of the variance. These are substantial amounts of variance especially when compared to the findings of Coleman et al. (1966) and those of Caldas and Bankston (1997). Coleman et al. (1966) using the educational production function analysis accounted for 12% to 18% of the variance in adolescent academic achievement. Caldas and Bankston (1997) using hierarchical linear regression accounted for approximately 19.5% of the variance in adolescent academic achievement. Table 8 provides a comparison of the three models, the original hypothesized model and the two reduced models, overall fit indexes. This comparison provides substantial support for the fit of the reduced model to the data. Table 9 provides the standardized direct effects of the latent variable, Social Organization, on the indicators of academic achievement. These patterns of effects are similar with Reading with the highest factor loading and Mathematics with the lowest factor loading.

Table 8. Fit Indexes for 1997-98 and 1996-97 School District Models

Model	χ^2	df	p	χ^2/df	TLI	CFI	RMSEA
Original	373.337	101	.000	3.696	.950	.963	.146
1997-98	50.735	32	.019	1.585	.994	.996	.068
1996-97	46.453	32	.047	1.452	.995	.997	.060

Table 9. Comparison of Standardized Total Effects

	Mathematics		Language		Reading	
	97-98	96-97	97-98	96-97	97-98	96-97
Social Organization	-0.75	-0.76	-0.78	-0.83	-0.81	-0.84

Summary – School District Level

The data analyses provided strong support for the first hypothesis that community social disorganization theory explains variance in adolescent academic achievement as measured by standardized tests. After reducing the model (Figure 7) to achieve parsimony, the model (Figure 8) fit the data well. To provide support for the hypothetical model, the model (Figure 9) was replicated using a different school year. The replicated model fitted the data extremely well. Using conservative fit indexes also lend support that the model explained the variance in adolescent academic achievement and should be used during future investigations.

SECOND ANALYSIS - SCHOOL MODEL

Overview

The second analysis was conducted using variables measured only at the schoolhouse level. This analysis was conducted to determine if indicator variables of social organization, low economic status, and urbanicity measured at the schoolhouse level explained variance in adolescent academic achievement as measured by standardized tests. The initial model was complex and, as indicated in Figure 10, not a good fit to the data.

Based on theory and stability of the initial model, this model was reduced to achieve parsimony. In the initial model, a latent construct of Social Organization was hypothesized and consisted of Incidents, Ethnic Heterogeneity, and School Dropout Rate. In the school district model, community social disorganization theory led to the exclusion of criminal activity and ethnic heterogeneity. Incidents within this model paralleled the measurement of criminal activity. In the reduced model (Figure 11), both Incidents and

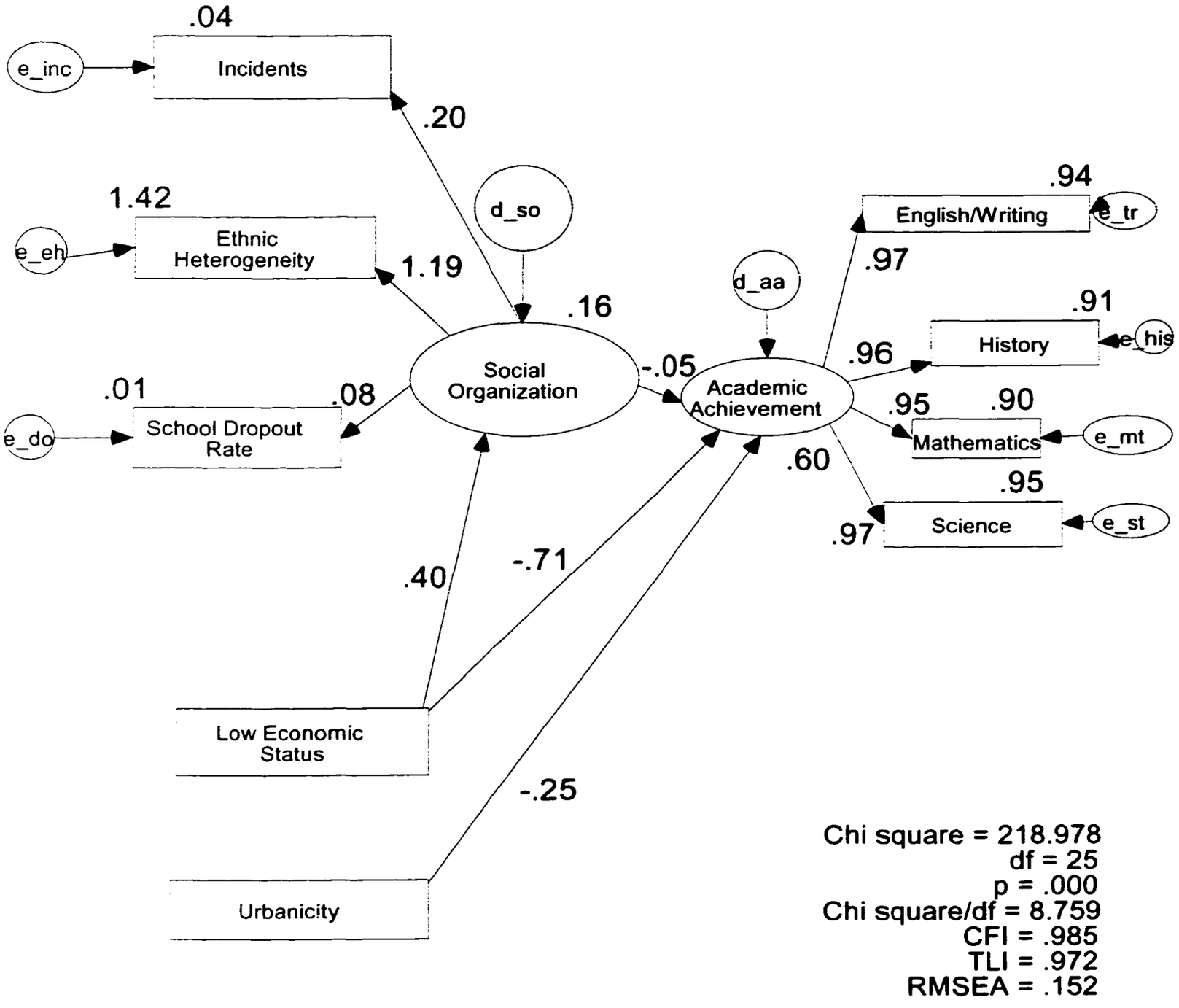
Ethnic Heterogeneity were dropped from the model along with the latent construct of Social Organization. School Dropout Rate was used as an indicator of school policies and deviant behavior. Economic Condition was measured as the percentage of students eligible for free or reduced lunch programs and the Census Location was the measure of the location based on urbanicity or rural area. Academic Achievement was measured by standardized tests to meet the Virginia Standards of Learning requirements. These standardized tests were History, Mathematics, Science, and a combined English and Writing tests scores. School Dropout Rate along with Economic Condition and Census Location were used to predict Academic Achievement. School Dropout Rate and Economic Condition were allowed to covary with each other.

The model was a good fit to the data and explained a substantial amount of variance in adolescent academic achievement as measured by standardized tests. This model provided some support that these indicators of community social disorganization theory explained variance in the adolescent academic achievement. The results of this model aided in deciding what variables to use in the multilevel analyses.

Second Analysis – *Community Social Disorganization at the School Level*

The school model identified in Chapter III was used as a starting point for this data analysis. Figure 10 identifies the results of the model. The chi-square is statistically significant at the .05 level and the ratio of chi-square to degrees of freedom well exceeds the limit of 2. Although the TLI and CFI are in the excellent range, .972 and .985 respectively, the RMSEA is beyond .10 at .152. From the loadings of Ethnic Heterogeneity, a negative error variance is apparent and makes the solution inadmissible. As previously identified as not currently relevant in the community social disorganization

Figure 10. 1997-98 School Effects with Indicator Variables

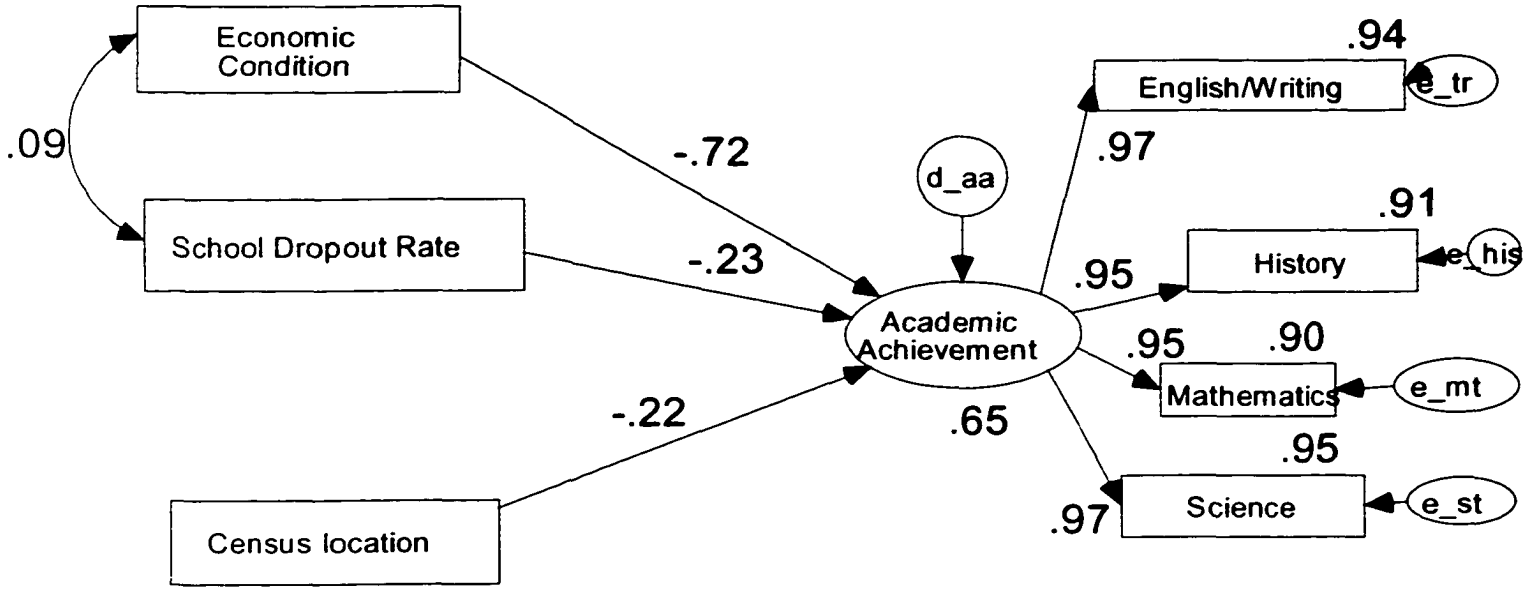


theory, Ethnic Heterogeneity was dropped from the model (Bursik & Grasmick, 1993; Sampson, 1997). The same procedures to reduce the model in the previous analysis were used to achieve parsimony in this model.

This model was reduced to three variables (Figure 11). The sample size was reduced to 338 after listwise deletion for missing variables and deletion of cases for multivariate outliers. These variables of Economic Condition (termed Low Economic Status in the original model), School Dropout Rate, and Census Location (termed Urbanicity in the original model) were discussed in Chapter III. The model fits the data well. The chi-square is statistically significant at the .05 level at .042. However, this was expected based on the sample size. The ratio of chi-square to degrees of freedom is 1.770 and under 2. The TLI and CFI, .998 and .999 respectively, are close to unity. The RMSEA is .048 with a confidence interval of 0.009 to 0.079. The covariance matrix along with means and standard deviations for this analysis are depicted in Table 10. The distribution of the standardized residual covariance matrix was symmetrical and centered on zero. There were no standardized residuals greater than 2.0 in absolute magnitude. The SRMR was .0277.

The standardized path coefficients are identified in Figure 11. All of these structural parameters are significant at the .01 level with the exception of the covariance between the observed variables of Economic Condition and School Dropout Rate. Similar to the School District Models, economics appears to be the strongest factor loading. These explanatory variables together accounted for 65% of the variance in academic achievement. The standardized direct effects of the three observed variables on the latent variable Academic Achievement observed indicators are in Table 11.

Figure 11. 1997-98 School Model



Chi square = 23.008
df = 13
p = .042
Chi square/df = 1.770
CFI = .999
TLI = .998
RMSEA = .048

Table 10. School Model Covariance Matrix

	1	2	3	4	5	6	7
1	0.006						
2	-0.006	4.387					
3	0.001	-0.034	0.049				
4	-0.463	-8.105	-3.853	599.643			
5	-0.426	-5.710	-3.221	455.926	405.187		
6	-0.532	-10.563	-3.745	567.071	470.552	649.679	
7	-0.829	-13.938	-6.289	908.617	767.287	939.590	1634.678
Means	.99	4.83	.61	369.17	422.51	400.91	827.56
SD	2.34	2.10	.22	24.52	20.16	25.53	40.49

Note. 1 – School Dropout Rate; 2 – Census Location; 3 – Economic Condition; 4 – History; 5 – Science; 6 – Mathematics; 7 – English and Writing Total Score

Table 11. School Model Standardized Total Effects

	English Writing	Mathematics	Science	History
Dropout Rate	-.221	-.216	-.222	-.218
Census Location	-.216	-.211	-.218	-.213
Economic Condition	-.696	-.681	-.700	-.686

Economic Condition as measured by the percentage of students eligible for free and reduced lunch program had the strongest factor loading on each of the tests as expected and supported by the literature. This finding was similar to Baker et al. (1998) when they discovered that the same measurement was the second strongest predictor after community education level. Economic Condition had a consistent strong standardized total effect on each of the criterion tests of combined English and Writing (-.696), Mathematics (-.681), Science (-.700), and History (-.686). Census Location demonstrated a statistically significant effect on adolescent academic achievement. This variable was measured on a scale from 1 to 7 with 1 as a large city to 7 as a rural area. Census Location factor loading was negatively associated with increases in adolescent academic achievement. In essence, higher adolescent academic achievement as measured by standardized achievement tests is associated with denser urban environments where the school was located. Several possibilities exist to explain this finding to include concentrations of funding, technology, and more experienced teachers in the urban environment. School Dropout Rate is a comprehensive variable because it provided an indication of social deviancy and some aspects of school policy and funding. This variable was negatively associated with adolescent academic achievement and affected all tests similarly.

Summary – School Level

The results of this model demonstrated that the standardized tests to meet the requirements of the Virginia Standards of Learning compose a latent construct of Academic Achievement. Economic Condition, School Dropout Rate and Census Location explained a substantial amount of variance in adolescent academic achievement.

These variables of Economic Condition, School Dropout Rate, and Census Location were consistent with community social disorganization theory. This model added more support to employing community social disorganization theory to explain variance in adolescent academic achievement as measured by standardized tests. This model also aided in selecting variables to use in the multilevel analyses.

THIRD ANALYSIS - SCHOOL DISTRICT (LEVEL 2) AND SCHOOL (LEVEL 1) MODEL – MULTILEVEL ANALYSES

Overview

These analyses of both school level and school district level variables were employed to determine which of these variables had a stronger relationship with adolescent academic achievement as measured by standardized tests. To reduce bias in parameter estimates, multilevel analyses using STREAMS and both LISREL and AMOS statistical software were employed. The contextual variables used in the multilevel analyses were measured at different levels. Using STREAMS, the variables at the school level are identified as within the school district. This within school district (level 1) measurement was the same as using the schools as units of analysis. The variables at the school district level are identified as between school district levels. This between school district (level 2) measurement was the same as using the school district as units of analysis. The within school district level analysis was the level 1 analysis and the between school district level was the level 2 analysis. In these analyses, the latent constructs were named consistent with the conventions of the statistical procedure. Latent variables at level 1 were named with "Within" preceding the descriptive title and latent variables at level 2 were named with "Between" preceding the descriptive title.

The exception to these naming conventions was the latent variable Social Organization because it was measured at level 2 only.

To accomplish the analyses, the models from the first two analyses were reduced again based on theory and parsimony. Multivariate normality was essential to identify the model. Particular attention was given to skewness and kurtosis and the overall sample size was reduced to allow analyses. The results of the analyses added support to the finding that community social disorganization theory explained relative variance in adolescent academic achievement as measured by standardized tests. Also, these multilevel analyses provided support for school variables explaining more relative variance in adolescent academic achievement that those variables measured at the school district level.

Further Discussion of Variables and Initial Analyses

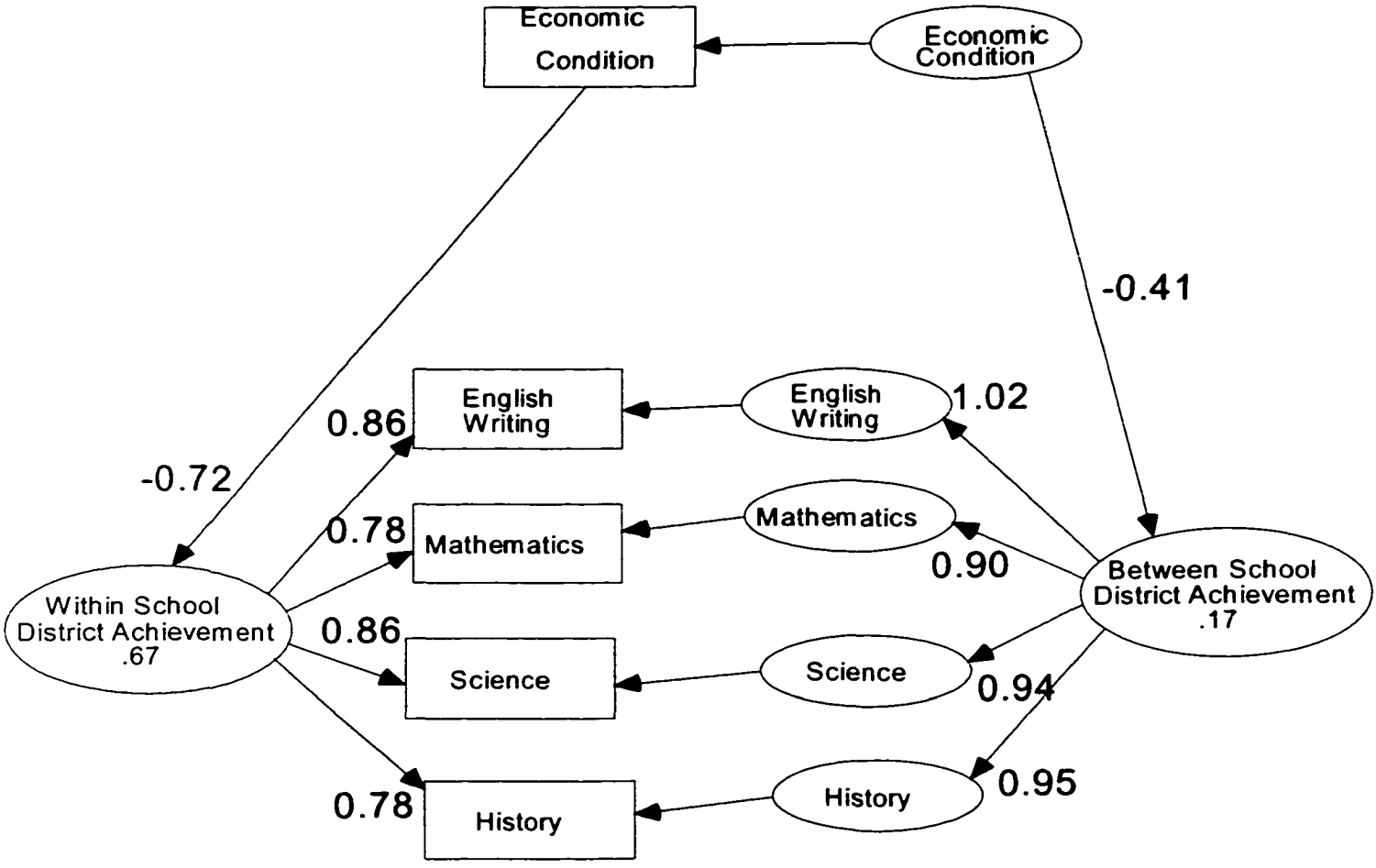
As a result of the first two analyses using the School District (Figure 8) and the School (Figure 11), a revised, reduced model was developed to capture the essence of the hypothesized model (Figure 6). This reduced model did not include the Census Location variable because it was a nominal measurement and possibly would bias the parameter estimates. Also, the reduced model used the manifest variable Economic Condition identified at the School Model level (Figure 11) to capture the latent variable Economic Condition at the School District level (Figures 8 & 9) for parsimony. Economic Condition as measured by the percentage of students eligible for free or reduced lunch program demonstrated the strongest influence on adolescent academic achievement in all analyses conducted.

The variable of School Dropout Rate was retained in the model. Goldschmidt and Wang (1999) reported the characteristics of dropouts in the areas of ascriptive, family, student, and school. These characteristics included gender, ethnicity, family structure, income, parent education, students held back at least once, and school level factors. The school-level factors were class size, school size, commonality of work among students, proportion of students who were of minority status, average socioeconomic status, school discipline climate, average amount of homework, and percentage of students being held back. These characteristics suggest that Dropout Rate and Economic Condition should be adequate indicators of the within school environment.

The School District level observable variable of Graduation Percentage (Figures 8 & 9) was not included from the model for parsimony. In the full model, the manifest variables of Economic Condition and School Dropout Rate were hypothesized to form a latent variable of Within, at level 1, and Between, at level 2, School District Effects. Due to the complexity of the model, the strongest indicator of adolescent academic achievement, Economic Condition, from the previous analyses was placed in the model first (Figure 12) for explanatory purposes prior to introducing the full models (Figures 13 and 14). These analyses are two separate analyses for each model identified in Figures 13 and 14. One analyses used the data for the full model and at both levels (within and between). The other analyses used data from only level 1 (within).

To familiarize the reader with the figures, the first analysis used only Economic Condition at both the within and between school district levels. In Figure 12, the latent variable of academic achievement measured at the school level is depicted on the left as the Within School District Achievement. This latent variable consisted of the same four

Figure 12. Socioeconomic Status Within and Between School District



Chi square = 19.86
df = 10
p = .031
Chi square/df = 1.98
TLI = .99
CFI = 1.00
RMSEA = .081

observed achievement tests in the School Model (Figure 11). In order to represent the aggregated observed variables at the school district level (level 2), there are ovals to the right of the rectangles with arrows from the ovals to the rectangles. These ovals of the four achievement tests yielded a latent variable at the school district level (level 2) depicted in the figure as Between School District Achievement. The relative amount of variance accounted for in each latent variable is identified as a decimal under the name of the latent variable within the oval. The decimal figures within the rectangles and ovals of observed variables were the lower bound reliabilities of the measurements for this model. This same convention of depicting variables was used for all variables in these multilevel analyses. The parameters to be estimated were the parameters to the latent variables at both levels. The sample size for these analyses were 208 cases level 1 (school level) and 124 cases at level 2 (school district level).

The overall model in Figure 12 fits the data well. The chi-square is statistically significant at the .05 level as expected by the sample size and complexity of the model. However, the p value of .031 was indicative of a suitable fit to the data. The ratio of chi-square to the degrees of freedom was under 2.0 at 1.986. The RMSEA was acceptable at .081 and below .10 with a confidence interval of .029 to .13. The TLI and CFI were .99 and 1.00, respectively, demonstrating an excellent fit of the model to the sample data.

In Figure 12, the common metric, completely standardized parameter estimates are identified. At first inspection, the parameter leading from the latent variable Between School District Achievement to the observed variable English Writing was identified as 1.02 giving concern of how can it be above 1.00. Joreskog and Sorbom (1996) and Joreskog (1999a) mathematically demonstrated that these parameter estimates over 1.00

were feasible and acceptable. These parameter estimates were identified as not having a top range and were still acceptable because they are based on regression coefficients and not correlation coefficients (Joreskog, 1999a; Joreskog & Sorbom, 1996). Rigdon (personal communication, Sep 14, 2000) reported that this occurs in the common metric when standardization is averaged across groups. As these correlation coefficients approach unity (1.00), the regression coefficient exceeds unity (1.00).

These current parameter estimates from the observable variables to the latent variables of Within and Between School District Achievement were large, statistically significant beyond the .01 level, and consistent with the initial two analyses. Yet, there were consistent larger estimates of the parameters to the latent variable Between School District Achievement from its indicator variables of Mathematics, Science, History and English and Writing total test scores. The observed variable Economic Condition was measured at the school level and demonstrated a strong negative relationship with the latent variable Within School District Achievement. This negative relationship was -.72 identical to the measurement in the School Model (Figure 11) and accounted for 67% of the relative amount of variance in the Within School District Achievement latent variable. The aggregated variable of Economic Condition depicted as an oval to the left in the figure demonstrated a reduced negative relationship with the Between School District Achievement latent variable. This reduced negative relationship was -.41 and accounted for a drastically reduced amount of variance, 17%, in the Between School District Achievement. This suggests that the concentration of poverty within the school has a more dramatic influence on adolescent academic achievement than the aggregated

concentration of poverty in the school district. Coleman (1966) alluded to this same fact that provided impetus to mass school busing.

The Multilevel Analyses

The full Between School District multilevel model is depicted in Figure 13 and the Within School District model is depicted in Figure 14. To achieve multivariate normality, the sample size for the full models in Figures 13 and 14 was 117 school districts for level 2 and 184 schools for level 1. Figure 13 depicts the structural equation model conducted at both levels simultaneously. Figure 14 depicts the structural equation model conducted at level 1 only. These analyses were conducted using the software package LISREL and then AMOS for validation.

First, Figure 13 is discussed. In this figure, the model is the same as Figure 12 with the addition of the school level variable of Dropout Rate, which was joined with Economic Condition to form latent variables of Within and Between School District Effects. The school district level latent variable of Social Organization covaried with the latent variable Between School District Effects only at the school district level. The latent variable Social Organization was measured by the observed variables of Single-headed households, Infant Mortality Rate, and Teenage Pregnancy Rate. The overall model fit to the sample data was excellent. The chi-square was statistically significant at the .05 level but not at the .01 level with $p = .028$. The chi-square to degrees of freedom ratio was 1.53 and under 2.0. The TLI and CFI were .98 and .99, respectively, and RMSEA was .058 with a confidence interval of 0.0159 to 0.0898. Using AMOS, the TLI increased to .99 and RMSEA reduced to .042 with a confidence interval of .014 to .065.

Figure 13. School District and School - Between School Districts

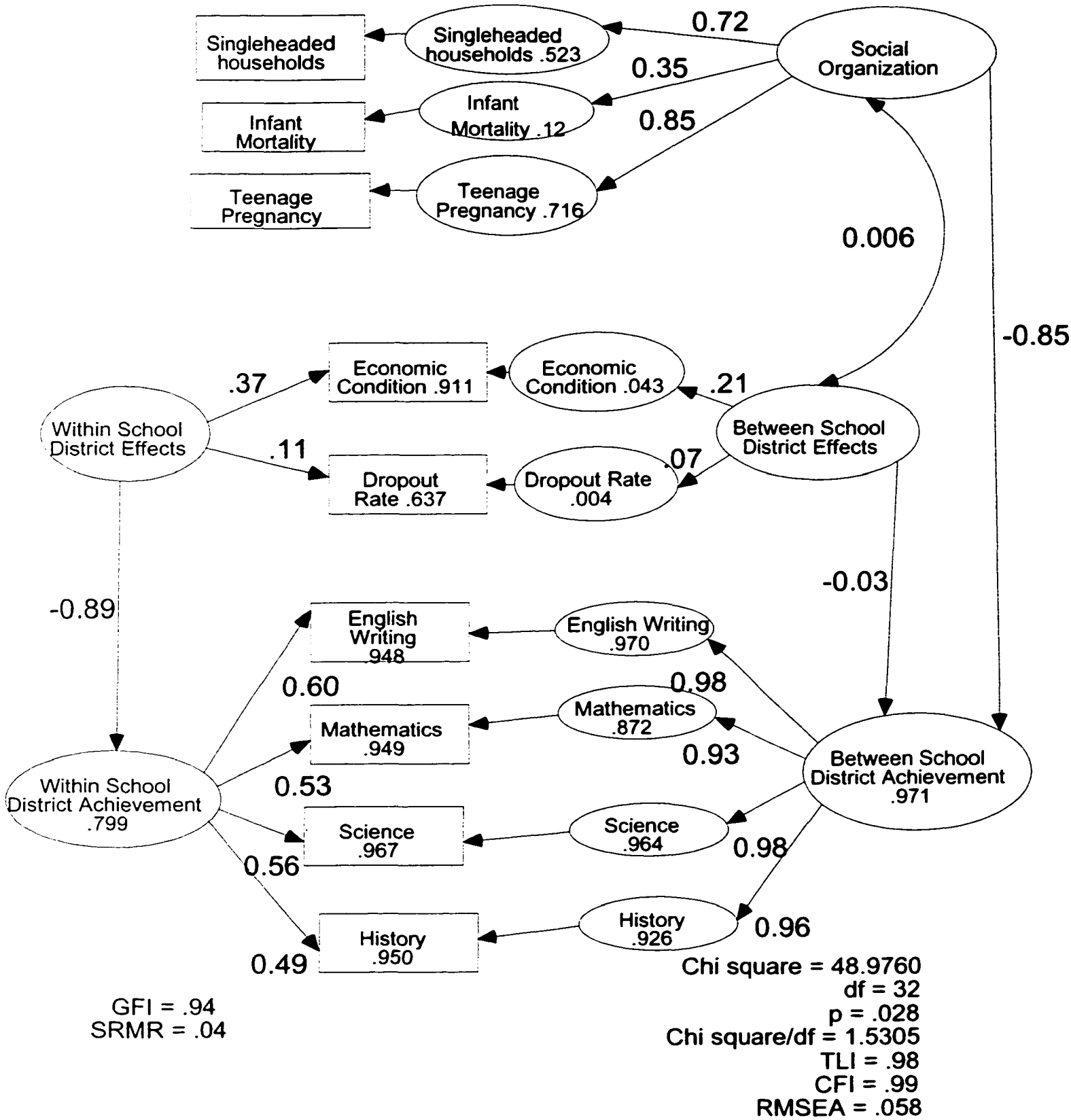
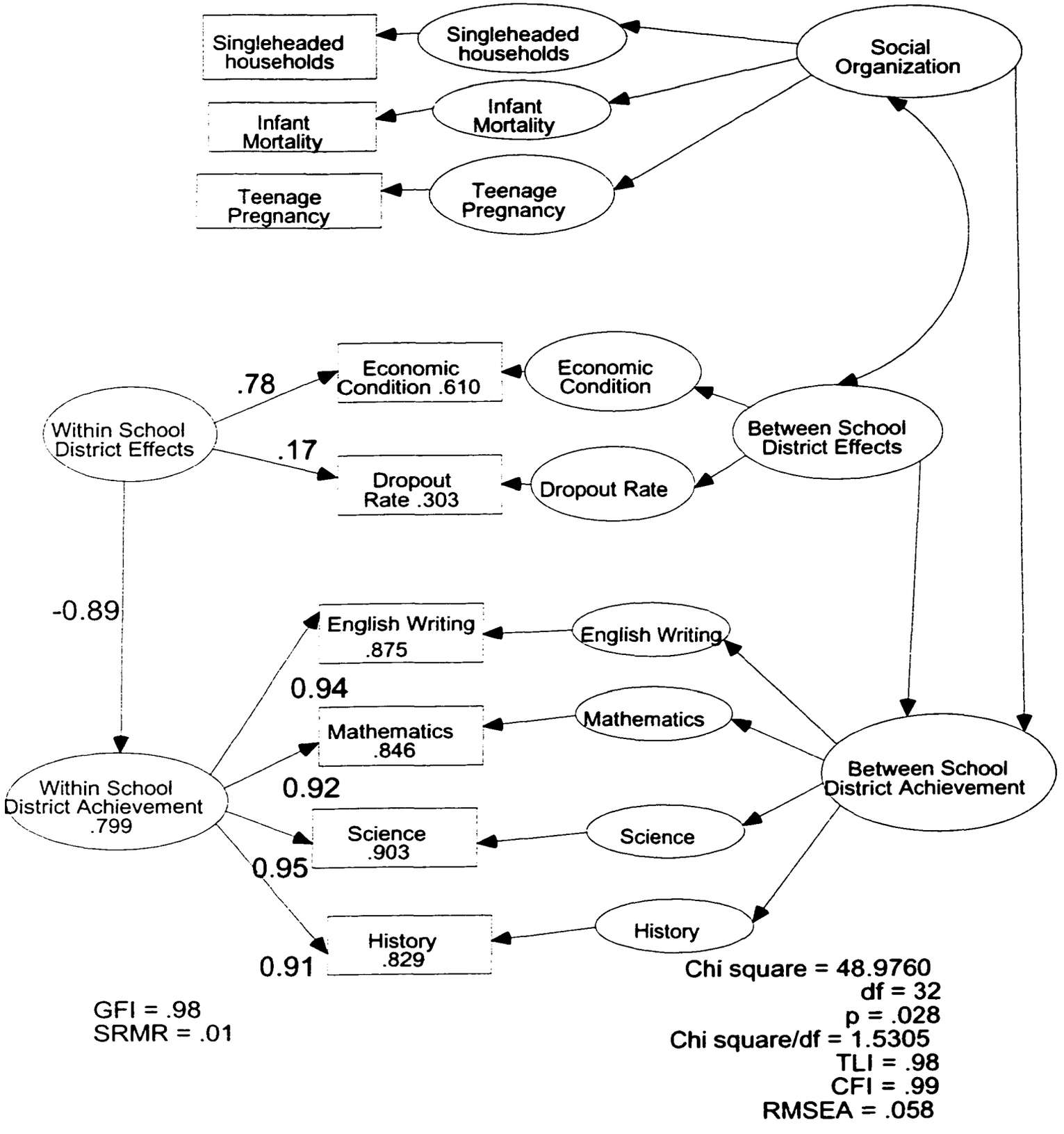


Figure 14. School District and School - Within School Districts



All parameter estimates were statistically significant beyond the .01 level with the exception of one. This non-significant statistically parameter was the factor loading for Between School District Effects to Between School District Achievement (-.03). This finding would suggest that a combination of the school dropout rate and concentration of students eligible for free and reduced lunch programs explained more relative variance within school districts (level 1) than across school districts (level 2). This pattern is similar to the one in Figure 12 where Economic Condition explained more variance at the within school district level that at the between school district level. Bryk and Raudenbush (1988) identified a similar phenomenon with variables taking on different meanings at different levels and could occur because of the aggregation of data. The common metric, completely standardized covariance associated with Between School District Effects and Social Organization exceeded 1.00 similarly to previous discussion on completely standardized parameter estimates (Joreskog, 1999a; Joreskog & Sorbom, 1996; Rigdon, 2000). For clarity, the correlation was reported in Figure 13.

The standardized residuals were reviewed and their range was from –2.4 to 2.9 but centered on 0. The SRMR was .04 indicating that the residuals were not too far from expectations and the GFI was .94 indicating a good fit of the model to the data. In AMOS, only one standardized residual exceeded the absolute value of 2 and the covariance matrix remained centered around 0. The covariance matrix for the Between School District Analysis is depicted in Table 12 and the Within School District in Table 13. In Table 12, all variables were used in the full model and identified (Figure 13). In Table 13, the empty cells represented zeros to the analyses for those variables were not

Table 12. School District and School Model Between Covariance Matrix

	1	2	3	4	5	6	7	8	9
1	766.72								
2	549.17	485.60							
3	670.68	551.69	745.18						
4	1045.10	860.28	1027.60	1746.10					
5	-0.42	-0.29	-0.24	-0.53	0.01				
6	-5.35	-4.90	-5.83	-8.94	0.00	0.08			
7	-1.05	-0.88	-1.10	-1.60	0.00	0.01	0.00		
8	-0.21	-0.17	-0.24	-0.27	0.00	0.00	0.00	0.00	
9	-1.20	-1.11	-1.43	-1.92	0.00	0.02	0.00	0.00	0.01

Note. 1- Mathematics Score; 2 – Science Score; 3 - History Score; 4 – English and Writing; 5 – School Dropout Rate; 6 – Economic Condition; 7 – Teenage Pregnancy; 8 – Infant Mortality; 9 – Single-headed Households

Table 13. School District and School Model Within Covariance Matrix

	1	2	3	4	5	6	7	8	9
1	242.42								
2	176.35	166.86							
3	196.89	163.41	220.91						
4	346.49	309.23	338.78	709.08					
5	-0.13	-0.10	-0.12	-0.18	0.00				
6	-1.37	-1.09	-1.29	-2.29	0.00	0.02			
7							1.00		
8								1.00	
9									1.00

Note. 1- Mathematics Score; 2 – Science Score; 3 - History Score; 4 – English and Writing; 5 – School Dropout Rate; 6 – Economic Condition; 7 – Teenage Pregnancy; 8 – Infant Mortality; 9 – Single-headed Households

measured or used at the school level (Figure 14). These matrices were provided for replication of this study.

The common metric, completely standardized parameter estimates are identified in Table 14. The latent variable Social Organization, as measured by Single-headed households, Infant Mortality Rate, and Teenage Pregnancy, demonstrated a strong negative relationship with Between School District Achievement. A reduction in single-headed households, infant mortality rates, and teenage pregnancy rates should influence a significant increase in adolescent academic achievement. The remaining variables were measured for both levels. The latent variables of Within and Between School District Effects demonstrated a strong influence on the latent variable Within School District Achievement but not at the between school district level, level 2. As the concentration of students eligible for free and reduced lunch program decreased, adolescent academic achievement at the schoolhouse level increased. The school Dropout Rate was discussed earlier as a variable representative of adolescent deviance as well as school policy and funding. As the dropout rate decreased, an increase was observed in adolescent academic achievement at the schoolhouse level. Although these variables accounted for a significant relative amount of variance in the latent variable Within School District Achievement, the factor loadings of the latent variable was greatly reduced for the Between School District Achievement latent variable. This pattern was expected based on the initial findings in Figure 12. In this overall model at the school district level, all equations were executed simultaneously.

The cautions of Bollen (1989) and Joreskog (1999b) were especially relevant in reviewing the relative amount of variance accounted for in the latent dependent variables

Table 14. School District and School Model - Common Metric, Completely Standardized Solution of Parameter Estimates

Variable	Level 2	
	Within	Between
Independent		
Social Organization		-.85
Single-headed household		.72 (.52)
Infant Mortality		.35 (.35)
Teenage Pregnancy		.85 (.85)
Between and Within School Effect	-.89	-.03
Economic Condition–2	.51 (.91)	.21 (.43)
Dropout Rate–2	.14 (.64)	.07 (.004)
Dependent		
Achievement–2	(.80)	(.97)
English/Writing – 2	.75 (.95)	.99 (.97)
Mathematics – 2	.69 (.95)	.93 (.93)
Science – 2	.72 (.97)	.98 (.96)
History – 2	.65 (.95)	.96 (.93)

Note. Two latent variables (Social Organization and School Effects) were identified aligned to the left in the Variable column with their observable variables aligned to the right. The variables with a 2 designator were variables measured at both levels. For the latent dependent variables of Achievement, the number identified in parenthesis is the relative variance accounted for. For other variables, the number in parenthesis is a lower bound estimate of the variable's reliability.

of Academic Achievement as measured by standardized tests. Those variables designated with a 2 and at the Between District Level were measured simultaneously with the school level variables accounted for a dramatic 80% of the variance while at the between school district level a greater 97% of the variance was accounted for.

Although these relative amounts of variance accounted for appear large, these amounts of variance have been consistent throughout this investigation. When modeling only the school district, the estimate of the amount of variance accounted for was 68% and this model was replicated for a different school year and accounted for 75% of the variance. Then at the schoolhouse level, the model accounted for 65% of the variance. During the multilevel analyses, the amount of relative variance accounted for rose dramatically when the indicator variables of Social Organization were added to model (see the increase between Figure 12 to Figure 13). These figures when compared to previous investigations' findings of 30% to 37% of the variance accounted for are large and significant (Gustafsson & Stahl, 2000). These consistent large results demand replication, as data become available. An alternative explanation was offered by Gustafsson and Stahl (2000) when they identified that school quality shares variance with these currently investigated explanatory variables and adolescent academic achievement. The school dropout rate was used as an indicator of school quality but more adequate indicators of school quality must be used for future investigations.

At the Within School District Level, Figure 14, the variables measured at the school level demonstrated different loadings on the latent variable than at the school district level. These different measurements stemmed from the additional variables included at the between school district level providing a more complete picture of the

relationships among the variables. Economic Condition at the district level was .37 and at the school level .78. The Dropout Rate demonstrated a similar pattern. At the district level, Dropout Rate was measured at .11 but at the school level .17. At the Within School District Level, the factor loadings of the observed variables (Mathematics, Science, History, and English and Writing total test scores) to Within School District Achievement were higher than the ones at the Between School District Level. These figures are still significant because normally an average 30% correlation coefficient (9% of the variance accounted for) between adolescent academic achievement and measures of SES were found in previous studies (Gustafasson, personal communication, July 30, 2000). These findings are supported by the previous two analyses in this dissertation when at the school district level 68% of the variance was accounted for in adolescent academic achievement and at the school level 65% of the variance was accounted for.

HYPOTHESIS 1 – The community social disorganization theory explains significant variance in adolescent academic achievement of Virginia 8th grade students as measured by standardized tests

In each conducted analyses (Figures 8, 9, 11, 13, &14), indicators of community social disorganization consistently accounted for significant variance in adolescent academic achievement as measured by standardized tests. Considering each of these analyses, the most complicated analyses were the multilevel with latent variables. These analyses used the naming conventions of the statistical procedure and identified latent variables at level 1 with "Within" and level 2 with "Between." Figure 13 was the result of simultaneous modeling at both levels of analyses. Figure 14 was the result of modeling at level 1 only. Within the multilevel analyses, level 1 (within) was the

variance accounted for at the school building level across 184 schools and level 2 (between) was the variance accounted for at the school district level across 117 school districts. In Table 15, the standardized total effects of the latent variables on the manifest, dependent variables are depicted.

The top of Table 15 identifies the model at the school district level specifically five latent variables (Figure 13). First was Within School District Achievement, which is the shared common variance of the Observable Dependent Variables of Mathematics, Science, History, and a combined English and Writing. Next was Within School District Effects consisting of manifest variables Economic Condition and Dropout Rate. Between School District Achievement was the aggregated measurement of the Observed Dependent Variables at the school district level (level 2). Social Organization consisting of the shared common variance of manifest variables Teenage Pregnancy, Infant Mortality, and Single-headed households was measured only at the school district level (level 2). Finally, Between School District Effects was the aggregated measurement of Economic Condition and Dropout Rate at the school district level (level 2). The lower portion of Table 15 consisted of two latent variables measured at the school level only (Figure 14). These latent variables were Within School District Achievement and Within School District Effects.

The latent variable of Social Organization demonstrated a stronger relationship with Mathematics, Science, History, and English Writing than Within School District Effects (measured by Economic Condition and Dropout Rate) or Between School District Effects (measured by an aggregated Economic Condition and Dropout Rate). Examining the lower part of Table 15, the school level model only is depicted. The Within School

District Effects latent variable demonstrated a strong relationship with Mathematics, Science, History, and English Writing (Figure 14) when measured alone without the latent variable Social Organization. These analyses suggest that the latent variable Social Organization mediates or confounds the effects of the latent variables Within and Between School District Effects when the complete model is analyzed. In past analyses, similar results at the school level may have occurred when investigating only variables associated with Economic Condition and Dropout Rate and not including those variables associated with Social Organization. The omission of these variables possibly biased parameter estimates and misled investigators and policy makers about how to influence adolescent academic achievement. These results should be investigated further.

The results of these multilevel analyses were supported by previous analyses conducted in this dissertation at the school district level (Figures 8 & 9) and the school building level (Figure 11). Significant amounts of variance were accounted for in adolescent academic achievement in each of these models. The multilevel analyses along with the analyses conducted at the school district and school levels identified the apparent influence of indicators of community social disorganization theory on adolescent academic achievement. The strong and consistent relationship of the indicators of the hypothetical construct, Social Organization, in all analyses provided strong support for the hypothesis that community social disorganization theory explained significant variance in adolescent academic achievement of Virginia 8th grade students as measured by standardized tests.

Table 15. Completely Standardized Total Effects – Between and Within School Districts

Between Latent Variables (Level 2)	Observable Dependent Variables			
	Mathematics	Science	History	English/Writing
Within School District Achievement	.53	.56	.49	.60
Within School District Effects	-.47	-.50	-.44	-.54
Between School District Achievement	.76	.80	.81	.75
Social Organization	-.65	-.68	-.69	-.64
Between School District Effects	-.03	-.03	-.03	-.02
Within Latent Variables (Level 1)				
Within School District Achievement	.92	.95	.91	.94
Within School District Effects	-.82	-.84	-.81	-.84

HYPOTHESIS 2 – Of school district effects and school effects, school effects will explain more of the variance in adolescent academic achievement of Virginia 8th grade students as measured by standardized tests.

In Table 16, comparisons of estimated amounts of variance accounted for by the model of within school districts (level 1) across 184 schools and between school districts (level 2) across 117 school districts were made. The STREAMS statistical software was used for these estimates. The separate indicator variables of Academic Achievement were the standardized tests of Mathematics, Science, History, and a combined English and Writing score. When comparing the separate indicators of Academic Achievement, the table indicated a consistent pattern of more relative variance being accounted for at the within school district level as compared to the between school district level.

Similar to the discussion regarding Hypothesis 1, the latent variable of Within School Effects demonstrated different properties at different levels of the analyses. Table 16 indicated the estimated amount of variance for the indicator variables of Economic Condition and Dropout Rate. The manifest variable Dropout Rate followed a similar pattern as the other variables at level 1 and 2. However, a different pattern was indicated for Economic Condition. The model accounted for more relative variance in the variable Economic Condition at the between school district level than at the within school district level. This finding added support to previous comments that the measure of Economic Condition means different things at different levels (Bryk & Raudenbush, 1988).

Table 16. Comparison of Estimates of Percentage of Variance Accounted For

Observed Variable	Estimated Variance – Between (Level 2)	Estimated Variance – Within (Level 1)
Mathematics	44.1%	55.9%
Science	42.5%	57.5%
History	48.6%	51.4%
English/Writing	35.6%	60.5%
Dropout Rate	39.5%	60.5%
Economic Condition	57.3%	42.8%

Although the amount of variance in Economic Condition at the between school district level is large, 57.3%, the amount accounted for at the within school district level was also significant, 42.8%. Dropout Rate continued the previous pattern of the larger amount of relative variance accounted for at the within school district level demonstrating the influence of school policies.

This larger amount of relative variance being accounted by the full model at level 1 provided some support for the second hypothesis that these indicators of community social disorganization theory have a stronger influence on adolescent academic achievement at the school building level than at the school district level.

SUMMARY OF FINDINGS

The strongest, consistent influence on adolescent academic achievement as measured by standardized test throughout this investigation was a measurement of students eligible for free and reduced lunch program. This was especially evident at the school level and the school district level. These schools and school districts with higher concentrations of students eligible for free and reduced lunch programs demonstrated lower adolescent academic achievement as measured by standardized tests. However, this indicator takes on a different meaning and the degree of relationship is reduced when measured at the school district level (Figure 12) and especially when other variables are added to the model (Figure 13).

In addition, the contextual variables of the school district consistently demonstrated their influence over adolescent academic achievement. These variables of teenage pregnancy rates, infant mortality rates, and single-headed households demonstrated that they must be considered when discussing adolescent academic

achievement. In the first analyses using only the school district model, these variables consistently demonstrated a significant relationship with adolescent academic achievement. When these variables of teenage pregnancy, infant mortality, and single-headed households are added to the multilevel analyses model, they confound the effects of variables at the school district level from the school level and add explanatory value to the model (Figures 13 & 14). These contextual variables demonstrated in the multilevel analyses that they share variance with adolescent academic achievement measured at the school level.

This dissertation identified strong support for the hypothesis that community social disorganization theory explains a significant amount of variance in adolescent academic achievement as measured by standardized testing. These community variables suggested by Sampson (1997) of teenage pregnancy, infant mortality, single-headed households, and community economic status demonstrated a strong, consistent relationship with adolescent academic achievement.

In addition, this dissertation provided some support for the hypothesis that school effects share variance with adolescent academic achievement significantly more than the school district effects. When compared together, those internal variables within the school, concentration of students eligible for free and reduced lunch program and higher dropout rates, accounted for 80% of the variance in adolescent academic achievement. When contextual variables indicative of community social disorganization theory were added to the model, the amount of variance accounted for increased dramatically to 97%. The influences of the school level variables are depicted more clearly in Table 16.

The results of this investigation must be viewed with caution based on the peculiarities of the structural equation modeling with multilevel analysis procedures. This investigation answered the need to use multilevel analyses for greater understanding of the possibilities of this data analyses procedure.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY OF CURRENT RESEARCH

Background of Investigation

Since the U. S. Supreme Court decision in Brown v. Topeka, Kansas Board of Education, investigations were conducted to determine ways to improve the equality of opportunity to an adequate education. This equality of opportunity to an adequate education was eventually quantified by student performance as commonly measured by adolescent academic achievement on standardized tests (Hanushek, 1986). A host of social programs were implemented to improve adolescent academic achievement and provide equality of educational opportunity for all students (Grissmer et al., 1994). As a result, the public education system was transformed by outside societal and economic forces in attempts to answer perceived social ills and improve the educational process (Ravitch, 1983).

This transformation was provided direction by several inquiries into the educational system (Coleman et al., 1966; Grissmer et al., 1994; Hanushek, 1986; Mayer, 1991; NCES, 1996a, 1997; Payne & Biddle, 1999; The National Commission on Excellence in Education, 1983). These inquiries sought to find the key constructs such as school funding, students' backgrounds, and school quality, which could be enhanced to improve the educational process as measured by academic achievement. Across these studies, these constructs of school funding, students' backgrounds, and school quality were operationalized differently, which possibly caused biased results (Hanushek, 1986). Also, these inquiries' data analyses were across different levels of analyses causing

biased results (Raudenbush, 1988). These inquiries' biased results were further complicated because most investigators failed to use theory in guiding the data analyses and drawing inferences (Pedhazur, 1982, 1997).

No comprehensive, integrated theory was reported that would provide an approach to investigate students' performance on standardized tests and community contextual factors (Hanushek, 1978; Pedhazur, 1982, 1997). Reviews of educational, sociological, psychological, and economic literature reveal separate approaches to understanding students' performance. In this literature, several separate theories have been offered from psychological, sociological, or educational perspectives to explain specific aspects of cognitive development as measured by adolescent academic achievement (Sampson, 1997).

After conducting a meta-analytic review of over 400 studies, Hanushek (1997) concluded that the studies' divergent results did not allow a determination of whether additional school resources or which school resource mattered in student performance. Hanushek's findings disagreed with the findings of others (e.g., Grissmer et al., 1994) and reported that student performance appeared to remain essentially unchanged between 1970 and 1990. Hanushek (1997) reported that effective decisions should be made locally and:

> This is consistent with a widely held view that "what works" is known. For example, Smith, Scoll, and Link (1996) unequivocally assert just that. (At the same time, they are totally unsurprised and unconcerned that what works is unrelated to the resources devoted to schools, simply noting that "How money is spent is far more important than how much is spent" (p.

> 23).) This statement about knowing what works is consistent with the myriad of articles and policy prescriptions that promote this or that plan as the panacea. If one believes this perspective, however, it implies that local school administrators are either uncaring or simply don't know what works because otherwise they would use available resources more effectively. It also suggests that just providing better dissemination of information will effectively correct the problems. In reality, this is a scathing indictment of today's schools because it implies rather widespread malfeasance (pp. 154-155).

Although a determination could not be made of what works, most studies of the public education system found that the key indicator to improve the educational process was an indicator not under public control, the students' background (Coleman et al., 1966; Hanushek, 1986, 1989). However, Grissmer et al. (1994) found that improvements were made in academic achievement as measured by standardized tests in the public education system and specifically with minorities whom most of the public educational policies were directed at. Grissmer et al. (1994) found that standardized test scores had improved based on improved scores of those who were minorities or economically disadvantaged. NCES (1997) and Hauser and Huang (1996) identified these same findings.

Explanatory Theory for Adolescent Academic Achievement

During an extensive review of the literature, this current study found a pervasive indication in the literature that contextual variables identified in the community social disorganization theory to explain juvenile delinquency also had explanatory value in

investigating adolescent academic achievement. Throughout the extant literature, these contextual variables of the community social disorganization theory demonstrated a concomitant relationship with adolescent development and adolescent academic achievement. These community contextual variables were indicators of economical disparities and social inequalities. Within the commonwealth of Virginia while investigating poor school performance of adolescents as measured by standardized tests, these same community contextual variables were identified as influencing adolescent academic achievement (Governor's Commission on Educational Opportunity for All Virginians, 1991; Virginia Commission on the Future of Public Education, 1997, 1998). These reports found the Virginia public education system replete with economic disparity and social inequalities between schools and school districts and that these factors affected academic achievement.

The community social disorganization theory has demonstrated its ability to explain variance in adolescent deviant behavior in the urban environment (Sampson & Graves, 1988). Adolescent deviant behavior is related to adolescent development and academic achievement (Sampson, 1977). Sampson (1997) suggested the employment of the community social disorganization theory to explain variance in adolescent academic achievement. The community social disorganization theory was employed in this current study to explain the variation in adolescent academic achievement. In addition, using more exacting statistical procedures, the influences of students' backgrounds (school district level effects) and those influences attributed to the school were explored. One of the current investigation's goals was to find ways to direct public policy and actions by legislators, educators and counselors to improve the educational process by

understanding the relationships between variables that influence adolescent academic achievement.

This review of the literature traced the development and validation of the community social disorganization theory to explain juvenile delinquency. The community social disorganization theory was developed with three structural factors, low economic status, ethnic heterogeneity, and residential mobility. Other investigators have found valid sociological perspectives using these factors to study juvenile delinquency. Crane (1991) applied this sociological theory to investigate neighborhood effects on the probability that an individual would develop a social problem. Crane could not segregate the effects of the neighborhood or of the school but elected to view them together as a social context effect and found these effects to be significant. Sampson (1997) extended the number of factors as indicators/markers of community social disorganization.

Theorists from child developmental fields searched for an integrative approach to study adolescent development. Ogbu (1981) proposed a cultural-ecological model to study adolescent development in the ghetto. In 1994, Bronfenbrenner and Ceci proposed a bioecological model to answer the question of how nature and nurture contribute to adolescent development. Coll et al. (1996) supported a need for an integrative approach to study child development and argued that schools and neighborhoods are crucial components. Gonzales et al. (1996) based their investigation of child development on the community social disorganization theory. Gonzales et al. found that neighborhood risk and the extrafamilial influences of peer support did explain a significant proportion of the variance in students' grade point averages.

Many of these studies and others demonstrate how the community social disorganization theory can be used to investigate juvenile delinquency, deviant behavior, and adolescent problem behavior outside of immediate family influences. This theory has been adapted in various forms to investigate adolescent development and those social environments, school districts and schools, where this development occurs. These social problems and the development of the adolescent have demonstrated a relationship with adolescent academic achievement but have not been investigated to understand the relationships between the variables.

Prior and Future Research Data Analyses

In conjunction with an integrated theory, appropriate statistical methods must be used to analyze the data at several levels simultaneously. The primary method used by investigators of school quality has been the educational production function analysis, an economics input-output analysis (Hanushek, 1986). This educational production function analysis identifies the output of the educational process, the achievement of individual students, as directly related to a series of inputs. Policy makers directly control some of these inputs—the characteristics of schools, teachers, and curricula. Other inputs, those of families and friends plus innate endowments or learning capacities of students, are generally not controlled by public officials. This method of analysis has not adequately quantified teacher characteristics and other critical inputs. Due to possible biased parameter estimates, results from these analyses were mixed (Hanushek, 1978, 1986).

In past research, statistical procedures such as ordinary least squares, weighted least squares, analysis of variance, and hierarchical or logit regression modeling were used to analyze aggregate data. These statistical procedures may prove of limited value

based on possible bias of parameter estimates from using least squares regression and the aggregation or disaggregation of data (Hanushek, 1978, 1986). Structural equation modeling and multilevel analysis provide more precise methods for analyzing aggregate data from multiple levels of analysis.

Hox (1995) identified the need for conducting multilevel analyses using structural equation modeling because of the social context effect on the individual and the group and the cross-level interaction effects. The internal structure of groups is important as well as the contextual environment. These variables interact with each other across levels and must be investigated in totality and not just at one level. Hox stated:

> If there are effects of the social context on individuals, these effects must be mediated by intervening processes that depend on characteristics of the social context. Multilevel models so far require that the grouping criterion is clear, and that variables can be assigned unequivocally to their appropriate level. In reality, group boundaries are sometimes fuzzy and somewhat arbitrary, and the assignment of variables is not always obvious or simple . . . When the number of variables at different levels are large, there is an enormous number of possible cross-level interactions. Ideally, a multi-level theory should specify which variable belongs to which level, and which direct effects and cross-level interaction effects can be expected (p. 7).

The Current Study

Using a cross-sectional correlational design, this dissertation investigated community contextual variables influences on adolescent academic achievement. This

dissertation used structural equation modeling and multilevel analysis statistical procedures to provide a better understanding of factors effecting school performance as measured by adolescent academic achievement. The investigated latent variables with their observable measured indicators, sources for the data, and dates of collection were identified in Table 1. The dissertation used separate modeling of school district and school effects to determine to what extent, if any, the community social disorganization theory explained academic achievement of adolescents. In addition, the investigation modeled both school district and school effects to determine which, if either, had a significant impact on academic achievement.

Findings

The findings of this study were grounded in theory and used advanced statistical procedures to demonstrate the influence of the community social disorganization theory on adolescent academic achievement. The fit of the school district model using conservative indicators was good and demonstrated an excellent fit to the data when replicated. The school model provided an excellent fit to the data with an interesting finding. The Census location of the school, by itself, did not appear to negatively influence academic achievement for the school model. In each of the analyses, the current study did find strong support for the negative influence of the concentration of students eligible for free and reduced lunch programs on the academic achievement of adolescents. This variable demonstrated consistent strong negative influences in both school district models and in the school model.

As a result in the third analysis, the concentration of students eligible for free and reduced lunch programs was used to indicate an observed variable, Economic Condition,

to achieve parsimony in the multilevel analyses at the between (level 2) and within (level 1) school districts levels (Figures 13 & 14). The school dropout rate was added to the multilevel model with Economic Condition and formed latent variables Within School District Effects (level 1) and Between School District Effects (level 2). The Within School District Effect accounted for a significant amount of variance in academic achievement as measured by standardized test at level 1. The completely standardized total effects for this combined latent variable with each of the outcome indicator variables, Mathematics, Science, History, and English/Writing were strong negatively with each above .80 (Table 15).

However, these same measures of Economic Condition and school dropout rate did not indicate the same pattern at the between district level. When contextual variables measured at the school district level were added to the model, they moderate the effects of variables measured at the school level. This measure of socioeconomic status has consistently been aggregated in other studies and yielded possibly biased parameter estimates and outcomes. The regression coefficient for the latent variable of both Economic Condition and dropout rate demonstrated a drastic reduction from -.89 to -.03. It may be possible that these measures, Economic Condition and dropout rate, account for no additional variance beyond that identified by the latent variable Social Organization at the between school district level. Another possible answer is that these variables influence adolescent academic achievement through the latent variable Social Organization at the between school district level. Another possible explanation would be that when these variables were aggregated at the between school district level, SES and

dropout rate could not explain variance in academic achievement simultaneously at both levels.

This study found support for the hypothesis that the community social disorganization theory explains variance in adolescent academic achievement. Through the data analyses, it was demonstrated that the indicators of social disorganization at both the school and school district level influence adolescent academic achievement. This study also found support for the hypothesis that schools and school districts do account for a substantial amount of the variance accounted for in adolescent academic achievement in the overall model. There was support for the premise that indicators of the community social disorganization theory within the school have more of a significant relationship than those indicators identified at the school district level (Table 16).

CONCLUSIONS

This dissertation accomplished two purposes. First, this dissertation extended the community social disorganization theory from explaining variance in juvenile delinquency to explaining variance in adolescent academic achievement as suggested by Sampson (1997). Second, this dissertation extended the understanding of multilevel analyses using structural equation models to investigate community contextual variables and their influences on adolescent academic achievement as measured by standardized achievement tests.

In the first analysis of the school district model, the variables of concentrations of students eligible for free or reduced lunch programs (Student SES), Children in Poverty, and Unemployment formed the latent variable of Economic Condition. These variables formed a strong indicator of the economic condition of the community. The variables of

Teenage Pregnancy, Infant Mortality, and Single-headed households previously demonstrated that they were indicators of community social disorganization in separate reports (Sampson, 1997). These same contextual variables have demonstrated a relationship with the community's socioeconomic status. This current investigation modeled these contextual variables along with the Graduation Percentage to identify a latent variable of Children's Environment. Children's Environment demonstrated a strong negative relationship with adolescent academic achievement as measured by standardized achievement testing.

In the second analysis of the school, the concentration of students eligible for free and reduced lunch programs was used as the only measure of the observed variable Economic Condition. This variable Economic Condition along with the School Dropout Rate and the school's Census Location were used to explain variation in Academic Achievement as measured by Mathematics, History, Science, and a composite English and Writing tests scores. This school model accounted for 65% of the variance in adolescent academic achievement as measured by standardized tests. The variable Economic Condition again demonstrated the strongest relationship with adolescent academic achievement.

In the final analyses, a within (level 1) and between (level 2) school district multilevel analyses with structural equation models were used to explain variation in adolescent academic achievement as measured by standardized tests. This model was very complex and, in order to gain parsimony, only the minimum variables were used in the model. The full model accounted for 80% of the relative variance in adolescent academic achievement at the within school district level and 97% of the relative variance

at the between school district level. Based on the limited use of multilevel analyses and cautions on yielded parameter estimates, these multilevel findings were interpreted cautiously.

School District Model Analysis

In previous reports, an average accounted variance in adolescent academic achievement has been 30% using indicators of socioeconomic status, community variables, school variables, and family status variables. Using structural equation modeling at the school district level, a significant 68% of variance was accounted for. This model was replicated for a different school year and accounted for 75% of the variance in adolescent academic achievement. The amount of relative variance accounted for using different statistical procedures provided strong support for employing structural equation modeling. These analyses demonstrated that adolescent academic achievement must be viewed within social context of the community where the school is located.

The economic condition of the community demonstrated a significant relationship with adolescent academic achievement. This finding was found repeatedly in the literature but this construct was primarily measured by the concentration of students eligible or receiving free or reduced lunches. This study's construct of economic condition was the shared variance of three factors providing a better indicator of those school districts that are economically disadvantaged. These three factors were the number of students eligible for free or reduced lunch programs, the percentage of children in poverty, and the unemployment rate. Although these factors are not under the

direct control of public policy, social programs are ongoing attempting to minimize the conditions and indicators of economic disadvantage.

This social context where adolescent academic achievement is measured has several policy implications. Several community programs exist that address the social ills of the community. These programs focused on reducing teenage pregnancies and infant mortality rates should have an effect on the number of single-headed households and the economic condition as measured by the number of students eligible for free and reduced lunch programs, the number of children in poverty and the unemployment rate. Sawhill (1998) called for more attention to teen pregnancy and called for more education and strengthening social norms against early sex and out of wedlock pregnancy. Sawhill (1998) found "the only way to permanently reduce poverty and its associated expense is to stem the longer-term trends, such as more out-of-wedlock childbearing, that have historically pushed child poverty and caseloads up. Unless the states invest their surplus funds in programs aimed at preventing poverty, success may be short-lived or purchased at the expense of the children it was designed to help" (p. 1). Increased emphasis in these programs would effect adolescent academic achievement over the long term.

School Model Analysis

After analyses at the school district level, structural equation modeling was used to explain variance in adolescent academic achievement at the schoolhouse level. Using the variable of economic condition as measured by the number of students eligible for free and reduced lunch program, U. S. Census location of the school, and the school's dropout rate, 65% of the variance in adolescent academic achievement was accounted for. Of the variables used in this model, the variable school's dropout rate is a complex

variable under policy control requiring further investigation. The school policies and environment to reduce dropout rates may be the areas to improve to increase adolescent academic achievement.

Again, the variable Economic Condition, this time only measured by concentration of students eligible for free and reduced lunch program, demonstrated the strongest relationship with adolescent academic achievement. The U. S. Census location of the school indicated that the urban environment was more conducive to adolescent academic achievement. The Census location was identified numerically with lower numbers indicating urban dense areas. The Census location variable had a negative factor loading with adolescent academic achievement. In essence, higher adolescent academic achievement as measured by standardized achievement tests is associated with denser urban environments where the school was located. Several possibilities exist to explain this finding to include concentrations of funding, technology, and more experienced teachers in the urban environment.

Within (Level 1) and Between (Level 2) School Districts Multilevel Analyses

The complex analyses of the school level variables and school district level variables allowed a substantial investigation into adolescent academic achievement. It appeared from the analyses that the community contextual variables had an interaction effect on adolescent academic achievement measured at the school level. The concentration of students eligible for free and reduced lunch programs along with the school dropout rate served as indicators of the latent variable Within School District Effects. The Within School District Effects latent variable was a strong predictor of adolescent academic achievement at the within school district level. However, this same

variable was mediated at the between school district level and its relationship was drastically reduced. This pattern was expected based on the initial model using only Economic Condition (Figure 12) as an explanatory variable between the levels. As previously stated, the contextual latent variable of Social Organization may moderate the Between School District Effects latent variable or the Between School District Effects works through Social Organization. Another more plausible explanation is that these two variables, Economic Condition and School Dropout Rate, mean different things at each level and this pattern is simply clarifying the aggregation bias of parameter estimates.

Each variable in the models was analyzed simultaneously and their functions cannot be overlooked. Although the Between School District Effect latent variable was moderated at the between school district level, it still strongly influenced academic achievement at the within school district level as the Within School District latent variable. In the full model, at the within school district level 80% of the relative variance was accounted for and at the between school district level 97% of the relative variance accounted for.

These findings demonstrate that the latent variable Social Organization consisting of external factors of Teenage Pregnancy, Infant Mortality, and Single-headed households had a significant impact adolescent academic achievement. However, the Within School District Effects latent variable still accounted for the majority of the variance in adolescent academic achievement (see Table 16). Public policy approaches to reduce teenage pregnancy may provide an additional benefit of increased adolescent academic achievement. The school's policies on reducing dropout rates and their

implementation of school district policies hold some promise of improving adolescent academic achievement at the within school district level.

The results of the multilevel analyses should be interpreted cautiously until more research is accomplished using similar procedures. However, the results of other analyses add substantial support to the validity of the multilevel analyses.

Equivalent or Alternative Models

Possible equivalent models to those proposed by this dissertation are germane to any discussion involving structural equation modeling (Lee & Hershberger, 1990; MacCallum, Wegener, Uchino, & Fabrigar, 1993). These equivalent models are alternative hypotheses to the ones supported by this dissertation. These models are statistically equivalent when their model-implied fitted variance-covariance matrices are identical and can only be assessed after analyses. These models proposed in this dissertation were reviewed and alternative models attempted (Gustafsson, personal communication, August 13, 2000). Gustafsson attempted models with correlated error terms and models with different compositions for the latent variables and at different levels. The correlated error term alternative model was acceptable based on empirical fit indexes but was rejected based on acceptability fit standards and theoretical basis established by the researcher in Chapter IV of this dissertation. Correlated error terms were not acceptable because of no theoretical justification. Future research should include additional variables to improve identification of the latent variable of Between School District Effects in the multilevel analysis model.

RECOMMENDATIONS

Shaw and McKay (1969), during their investigation of community social disorganization, outlined their recommendations to address the effects of the primarily low economic areas where juvenile delinquency thrived. Shaw and McKay suggested an integrated approach to healing communities that suffered from multiple social ills that appeared to cause high rates of juvenile delinquency. This integrated approach would reduce juvenile delinquency. Shaw and McKay (1969) made three recommendations:

1. Any great reduction in the volume of delinquency in large cities probably will not occur except as general changes take place which effect improvements in the economic and social conditions surrounding children in those areas in which the delinquency rates are relatively high.
2. Individualized methods of treatment probably will not be successful in a sufficiently large number of cases to result in any substantial diminution of the volume of delinquency and crime.
3. Treatment and preventive efforts, if they are to achieve general success, should increasingly take the form of broad programs which seek to utilize more effectively the constructive institutional and human resources available in every local community in the city. Tannenbaum states this point vividly: "The criminal is a product of the community, and his own criminal gang is part of the whole community, natural and logical to it; but it is only part of it. In that

lies the hope that the rest of the community can do something with the gang as such." (p. 441).

Shaw and McKay (1969) laid the groundwork for recommendations of integrated approaches that were identified in several later reports (Barnett, 1995; Stagner & Duran, 1997; Talley & Short, 1999). Their call for community involvement by the residents can be traced through several current social programs and are still valid. This dissertation did not find resolution of how to improve adolescent academic achievement that has alluded other investigators (Hanushek, 1997). However, a better understanding has been achieved explaining how community contextual variables influence academic achievement as measured by academic achievement tests, such as the Stanford 9 TA and assessment tests required by the Virginia State Assessment Program. An integrated approach to resolve multiple social ills holds promise for improving the community social organization and adolescent academic achievement.

Integrated Approaches

Barnett (1995) identified several integrated approaches of early childhood programs to enhance academic achievement. Among these studies were High/Scope Perry Preschool Project, 1962 – 1967, Philadelphia Project, 1963 – 1964, and Verbal Interaction Project, 1967 – 1972. Each of these projects demonstrated some success in increasing academic achievement. Stagner and Duran (1997) reviewed these comprehensive community initiatives that were designed to improve the lives of children and families in neighborhoods characterized by concentrations of poverty. They reported that for these programs to succeed they should possess a new collaborative organization

within the community, a delicate balance of long-term and short-term goals and flexible funding.

Talley and Short (1999) recommended a broader approach to delivery of integrated services to include health, educational, and social arenas. Talley and Short reported on how historically American service providers and service agencies partitioned clients along the lines of their service domains and professional expertise. Clients who had problems outside the domain and expertise of particular agencies were either referred or their problems were not addressed. Talley and Short (1999) reported:

> The location and context for services have also been reconsidered in recent thinking about service delivery. In a manner related to the previously discussed ideas about the nature of clients, traditional services maintained loci of delivery that typically were determined by the agency or unit that housed the service. Schooling was provided in schools; health care in hospitals, clinics, and doctors' offices; therapy in psychologists' offices. To receive services, clients were often required to relocate themselves from their homes and neighborhoods to the appropriate locus of service (e.g., schools, clinics). Services were scheduled mostly for the convenience of the providers, and accommodations for clients sometimes were less important than working conditions for service providers. These characteristics often resulted in perceptions of clients as caseloads, or work materials, instead of active partners in service planning and implementation (p. 195)

Talley and Short (1999) reported that recent legislation, writing, and policy have reconceptualized services toward viewing clients as whole units, with interrelated needs. This comprehensive service delivery has been emphasized through their relationship to academic achievement. In a special issue of Journal of Educational and Psychological Consultation, support was abundant for the integrated delivery of comprehensive services.

Implications for Counselors

Illback, Cobb, and Joseph (1997) identified the crucial roles of mental health professionals, especially counselors, in the promotion of systems that "ensure the healthy development of children and the strengthening and empowerment of families" (p xii). Talley and Short (1995) reported that the emphasis on educational achievement and whole-child development currently driving social reforms in education and health care offers optimism for role expansion for psychologists/counselors in educational achievement and whole-child development. Integrated service models increase the number of broad-based services available for children and families. Decisions about service delivery are more likely to be oriented to outcome measures and be the focus of the public policy and funding.

The counselor will be required to be competent in a broad number of skills and approaches and maintain a collaborative team capability. Systemic approaches appears to support the integrative approach of service delivery. Several studies (Ascher, 1990, Holtzman, 1997, Reschly, 1995, and Tally & Short, 1995) supported the view of an integrative service delivery model with the counselor as the focal point and using the school as the point of delivery. Dryfoos (1997) reported that schools are where most

adolescents are and where families can establish contact. These programs are community-based efforts demanding the talents, training and skills of professional counselors as leaders and collaborators. APA (1998) supported this view with their comments in an issue of the American Psychologist.

The successes of the integrated approaches identified by Barnett (1995) were considered short term but many are still on going. These approaches were targeted toward certain grade levels. A more effective intervention would span the entire school district to optimize educational opportunities.

Community Approaches

This dissertation demonstrated that community variables explain a unique amount of variance in adolescent academic achievement. Investigations are ongoing in Chicago by U. S. Department Of Justice (DOJ) (1998, 1999) and in other cities by U. S. Department of Housing and Urban Development (1999) that can provide much needed information about adolescent academic achievement. The National Institute of Justice (NIJ) and the Executive Office of Weeds and Seeds (EOWS) (DOJ, 1998) have adapted the basic tenets of the recommendations by Shaw and McKay (1969) to establish a community approach to reduce crime and revitalize communities. This community approach is integrative and includes family structure, unemployment, school expulsion and suspension policies, asset building and designing programs and policies to engage fathers as positive economic and social agents in families.

Avakame (1999) conducted research using a focus on neighborhood social disorganization and family social capital as influences on the incidence of youth violence.

Avakame's findings further support an integrative approach to addressing social problems of the individual within their social context.

Other Approaches

Duncan and Ludwig (2000) reported that "despite good news about recent trends in test scores, high-school completion, and crime rates, social problems among youth remain distressingly widespread in many urban areas" (p.1). Duncan and Ludwig supported housing vouchers to help poor children move into community environments where these indicators of social organization are more positive.

Ellwood (1999) found that federal policy had finally taken note of the working poor with efforts to make a major positive impact on the economic prospects of many families at high risk of financial collapse. He reported on increased government support for low-income workers and their families to increase their financial stability. These initiatives will also aid in academic achievement.

Sawhill (1999) reported on three major federal programs to fund childcare and early childhood education. She reported that "the Child Care and Developmental Block Grant provides money to states to subsidize child-care expenses for families with working parents earning less than 85% of the state median. The Child and Dependent Care Tax Credit is a nonrefundable credit for expenses for the care of a dependent child less than thirteen years old. Head Start provides early childhood education and development services to low-income preschool children" (p.1).

Each of these targeted programs could possibly provide similar gains as reported by Grissmer et al. (1994) in adolescent academic achievement. Grissmer et al. reported that the social programs of the 60s, 70s, and 80s had worked to improve the academic

achievement of adolescents within the programs' targeted populations. These cited programs ((Duncan & Ludwig, 2000; Ellwood, 1999; Sawhill, 1999) aid in stabilizing the low-income worker's financial status and increase the academic achievement of adolescents in families at high risk of financial collapse.

Funding

Each of the programs cited is a facet of the integrated approach. Funding of this integrated approach utilizing several programs is always a crucial issue. This funding could be provided locally if federal mandates within schools and communities were fully funded. Ravitch and Loveless (2000) warned against further federal involvement into elementary and secondary education but call on the federal government to fully fund the mandates for special education, which would release local funds for these projects. Ravitch and Loveless (2000) reported that the special education "program serves 5.2 million students at a cost of about $43 billion, but the federal government puts up only about $5.3 billion" (p.1). Ravitch (2000) edited a book that also addressed several fundamental questions about the federal role in education and how this involvement does not reach children. Ravitch stated:

> These papers raise fundamental questions about how to improve the federal role in education. A theme that runs through several of these papers is that powerful interest groups can protect an ineffective program, regardless of poor evaluations. This rigidity guarantees that federal programs cannot be changed unless those who receive dollars from them are protected in the future. Even if evaluations show that federal dollars have not made a difference, it does not matter when it comes time for

> reauthorization. The losers are the children who were supposed to be the beneficiaries of federal programs and, indirectly, the nation, which thought that it was investing in needy children, not the status quo (p. 7)

Ravitch suggests that we should prematurely withdraw from some projects prior to positive results. In contrast, Grissmer et al. (1994) provided evidence that social programs that were considered failures do affect adolescent academic achievement. Grissmer et al. (1994) reported that the gains in adolescent academic achievement could be attributed to the gains made by minority and economically disadvantaged youth who were targeted by the programs.

Future Research

The results of this study suggest that integrated strategies within the community are necessary to continue increases in the levels of academic achievement among economically disadvantaged and minority youth. Additional research is necessary to examine the importance of social status indicators and their influence on children of color, especially with long-term developmental outcomes. As McLoyd (1998) argued, the effect of social position is often mediated through additional structural factors, including racism, prejudice, and discrimination. The intersection of these and other indicators of stratification can severely impact the cognitive, social, and academic development of economically disadvantaged children, particularly in terms of the transition from childhood to adolescence. The current investigation went beyond a focus on minority children and provided further areas of investigation for all economically disadvantaged youth. Thus, integrative approaches to increase academic achievement

and other outcomes seem most appropriate to answer complex questions involved in the study of socioeconomic background, social context, and educational outcomes.

These integrative approaches would focus on adolescent deviant behavior, adolescent development, and adolescent academic achievement. The outcomes of these integrative approaches would be to optimize the full development of the human potential. Bronfenbrenner (1979), after reviewing the research on human development from several disciplines, wrote:

> Species Homo sapiens appears to be unique in its capacity to adapt to, tolerate, and especially to create the ecologies, in which it lives and grows. Seen in different contexts, human nature, which I had once thought of as a singular noun, turns out to be plural and pluralistic; for different environments produce discernible differences, not only across but within societies, in talent, temperament, human relations, and particularly in the ways in which each culture and subculture brings up the next generation. The process and product of making human beings human clearly varies by place and time. Viewed in historical as well as cross-cultural perspective, this diversity suggests the possibility of ecologies as yet untried that hold a potential for human natures yet unseen, perhaps possessed of a wiser blend of power and compassion than has thus far been manifested. (p. xiii)

Wentzel (1999) supported a broader view of human development. Wentzel reported that "social contexts influence the development of different outcomes in children and that certain qualities of these contexts can explain why some competencies develop more fully than others. Perspectives on what develops and why have specific

implications for how we think about family, peer, neighborhood, and cultural influences on school adjustment" (p. 60) and in turn those same influences on adolescent academic achievement.

A larger study using the original models of this dissertation with existing data may prove beneficial in how we think about Wentzel's (1999) influences and their implications on school adjustment. The original hypothesized models (see Figures 7 and 10) did not fit the data well as evidenced by the fit indexes. The small number of school districts under investigation possibly caused this ill fit. Using this same model with a larger number of school districts will provide a better understanding of the complex variables involved in adolescent academic achievement. This larger study could be conducted in areas where ongoing projects are demonstrating successful outcomes in reducing juvenile crime and teenage pregnancies. This would allow a comparison of the effects of these programs on adolescent academic achievement in a longitudinal fashion.

In addition to increased sample size, a more focused investigation that provides a better understanding of the individual's academic achievement in social context would be warranted. Such longitudinal investigations would entail using the individual student as the level one unit of analyses with them nested within classrooms and the classrooms nested within schools and school districts. This would allow a validation of the current study and allow further study of the community assets and family social capital. These types of studies would enhance the understanding of individual differences within adolescent academic achievement, provide reliable and valid measures of the social organization of neighborhoods, and clarify the effects of nonrandom selection of parents and children into their natural occurring contexts (Duncan & Raudenbush, 1999). Such

investigations would bring Wentzel's (1999) influences into even closer focus for understanding.

Final Comment

The results of this study were consistent with the findings of several other studies (Grissmer et al., 1994; NCES, 1996a, 1996b, 1997; The Governor's Commission on Educational Opportunity for all Virginians, 1991). Several studies (Coll et al., 1996, Lovaglia and Lucas, 1997, Leung, 1994, and NCES, 1996a) have identified the need to conduct research using an integrative approach with complex variables in determining impact on academic achievement. In addition to students' socioeconomic status, the findings of the current study extends the literature by demonstrating that cumulative effects of community and school variables are significant when used to explain academic achievement of adolescents.

The consistent indicators of community social disorganization used across statistical analyses in this dissertation were Teenage Pregnancy, Infant Mortality, and Single-headed households. These indicators were used to form latent variables that demonstrated strong influences on adolescent academic achievement. The concentrations of students eligible for free and reduced lunch programs served as an indicator of latent or observed variables in all analyses. In the multilevel analyses, the concentration of students eligible for free and reduced lunch programs operated differently at the two levels investigated. The indicators of community social disorganization mediated this indicator of student socioeconomic status.

Although the controversy surrounding academic achievement will not be resolved soon, it is clear that state and federal policies must continue to address issues of social ills

to optimize the educational opportunities for youth. National and state economic policies and support programs have a proven significant effect on the number of children and adolescents living in poverty and with community social ills. The existence of poverty and its subsequent impact on youth development suggests that additional efforts must be made to eradicate the problems faced by youth, particularly during the early years (e.g., see McLoyd, 1998; National Research Council, 2000). Research continues to indicate that policies designed to improve the socioeconomic status and well being of poor families will enhance child development, including cognitive functioning and educational achievement (Brooks-Gunn & Duncan, 1997). Persistent cutbacks in welfare assistance and support programs can only result in increased poverty among many families and their children. As a result, academic, economic, and other outcomes will be drastically effected.

This study has demonstrated that contextual variables influence adolescent academic achievement and possibly furthers the process of answering how genetics and environment interact to shape human development and in what environment these proximal processes can be enhanced to influence human development as well as adolescent academic achievement (Bronfenbrenner & Ceci, 1994). These links between adolescent development, adolescent academic achievement, and social deviancy remain inextricably interwoven.

REFERENCES

American Psychological Association (1998). American Psychologist, 53, (6). Washington DC: Author.

American Psychological Association (1997). Intelligence and lifelong learning [Special issue]. American Psychologist, 52, (10).

American Psychological Association, National Research Council, Commission on Behavioral and Social Sciences and Education (1993). Losing generation: Adolescents in high-risk settings. Washington DC: National Academy Press.

American Psychological Association, Task Force, Board of Scientific Affairs of the American Psychological Association (1995). Intelligence: Knowns and unknowns. Retrieved March 24, 1997 from the World Wide Web: http: cycad.com/cgi.bin/Upstream/Issues/psychology/IQ/apa.html

Anson, A. R. (1994). Risk and protection during the middle school transition: The role of school climate in early adolescent development (Doctoral dissertation, Northwestern University, 1994). Dissertation Abstracts International, 56-03B, 1716.

Arbuckle, J. & Wothke, W. (1999). Amos 4.0 User's Guide. Chicago, IL: Smallwaters Corporation.

Armstrong, T. (1993). 7 Kinds of smart: Identifying and developing your many intelligences. NY: Penguin Books.

Ascher, Carol (1990). Linking schools with human service agencies. (ERIC Document Reproduction Service No. ED 319 877)

Asher, H. B. (1983). Causal modeling. In M. S. Lewis-Beck (Ed.), Series: Quantitative applications in the social sciences (Series / Number 07-003). Iowa City, IA: Sage Publications.

Avakame, E. F. (1999). Social disorganization, social capital, and the epidemic of youth violence. Unpublished manuscript.

Baker, S. R., Mitchell, W., McGee, Z., & Stiff, H. R. (1998). Community structural effects on adolescent academic achievement. Unpublished manuscript.

Barnett, W. (1995). Long-term effects of early childhood programs on cognitive and school outcomes. The Future of Children, 5, (3) 25-50.

Bartley, N. V. (1969). The rise of massive resistance: Race and politics in the South during the 1950's. Baton Rouge, LA: Louisiana State University Press.

Bentler, P. (1990). Comparative fit indexes in structural models. Psychological Bulletin, 107, (2), 238-246.

Berk, R. A. (1998). Review of the Stanford Achievement Test, Ninth Edition. In J. J. Kramer & J. C. Conoley (Eds.), The thirteenth mental measurements yearbook, (pp. 925-928).

Berne, R., & Stiefel, L. (1999). Concepts of school finance equity: 1970 to the present. In H. F. Ladd, R. Chalk, & J. S. Hansen (Eds.), Equity and adequacy in education finance: Issues and perspectives (pp. 7-33). Washington DC: National Academy Press.

Berube, M. (1994). American school reform: Progressive, equity, and excellence movements, 1883-1993. Westport, CT: Greenwood Publishing Group, Inc.

Black, M., & Krishnakumar, A. (1998). Children in low-income, urban settings: Interventions to promote mental health and well being. American Psychologist, 53, (6), 635-646.

Bollen, K. A. (1989). Structural equations with latent variables (Wiley Series in Probability and Mathematical Statistics). New York: John Wiley & Sons.

Bracey, G. W. (1995). Final exam: A study of the perpetual scrutiny of American education. Bloomington, IA: Metropolitan Printing Services.

Bracey, G. W. (1998). The eighth Bracey report on the condition of public education. Phi Delta Kappa International. Retrieved August 23, 1999 from the World Wide Web: http://www.pdkintl.org/kappan/kbra9810.htm

Bronfenbrenner, U. (1979). The ecology of human development. Cambridge, MA: Harvard University Press.

Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-nurture reconceptualized in developmental perspective a bioecological model. Psychological Review, 101, (4), 568-586.

Brooks-Gunn, J. & Duncan, G. (1997). The effects of poverty on children. Children and Poverty, 7, 55-71.

Brooks-Gunn, J., Duncan, G. J., Klebanov, P. K., & Sealand, N. (1993). Do neighborhoods influence child and adolescent development? American Journal of Sociology, 99, (2), 353-395.

Bryk, A. S., & Raudenbush, S. W. (1988). Toward a more appropriate conceptualization of research on school effects: A three-level hierarchical linear model. American Journal of Education, 97, 65-108.

Bursik, R. J., Jr. & Grasmick, H. G. (1993). Economic deprivation and neighborhood crime rates, 1960-1980. Law & Society Review, 27, (2), 263-283.

Caldas, S., & Bankston, C. (1997). Effect of school population socioeconomic status on individual academic achievement. Journal of Educational Research, 90, (5), 269-275.

Coleman, J. (1972). The evaluation of Equality of Educational Opportunity. In F. Mosteller & P. Moynihan (Eds.), On equality of educational opportunity (pp. 146-167). NY: Random House.

Coleman, J. S. (1976). Community disorganization and urban problems. In R. K. Merton & R. Nisbet (Eds.), Contemporary Social Problems, (pp. 557-602). NY: Harcourt Brace Jovanovich, Inc.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1966). Equality of educational opportunity. Washington DC: US Department of Health, Education, and Welfare.

Coll, G., Lamberty, G., Jenkins, R., McAdoo, H., Crnic, K., Wasik, B., & Garcia, H. (1996). An integrative model for the study of developmental competencies in minority children. Child Development, 67, 1891-1914.

Crane, J. (1991). The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing. American Journal of Sociology, 96, (5), 1226-1259.

CT-105: Federal policy options for improving the education of low-income students: Hearings before the Subcommittee on Elementary, Secondary, and Vocational

Education of the Committee on Education and Labor, 103rd Congress, (1993) (testimony of Iris C. Rotberg).

Dryfoos, J. (1997). School-based youth programs: Exemplary models and emerging opportunities. In R. Illback, C. Cobb & H. Joseph Integrated Services for Children and Families: Opportunities for Psychological Practice, 23-52.

Duncan, G. J., Brooks-Gunn, J., & Klebanov, P. K. (1994). Economic deprivation and early childhood development. Child Development, 65, 296 – 318.

Duncan, G. & Ludwig, J. (2000). Can housing vouchers help poor children? Children's Roundtable Report #3. Retrieved July 28, 2000 from the World Wide Web: http://brookings.edu/comm/childrensroundtable/issues3/issue3.htm

Duncan, G. & Raudenbush, S. (1999). Assessing the effects of context in studies of child and youth development. Educational Psychologist, 34, (1), 29-41.

du Toit, S., du Toit, M., & Cudek, R. (1999). Introduction to the analysis of multilevel models with LISREL 8.30. Chicago, IL: Scientific Software International.

Edelin, K. C. (1998). An achievement goals perspective on the educational trajectories of early adolescents: The role of race and contexts (Doctoral dissertation, The University of Michigan, 1994). Dissertation Abstracts International, 59-02A, 416.

Education Week (1999, August). Quality Counts '99. Education Week on the Web. Retrieved August 23, 1999 from the World Wide Web: http://www.edweek.org/sreports/qc99/states/indicators

Edwards, J. D. (1992). Neighbors and sometimes friends: Municipal annexation in modern Virginia. Charlottesville, VA: University of Virginia, Center for Public Service.

Elliot, D. S. & Wilson, W. J. (1996). The effects of neighborhood disadvantage on adolescent development. Journal of research in crime & delinquency, 33, (4), 389-427.

Elliott, M. A., & Merrill, F. E. (1961). Social Disorganization. NY: Harper & Brothers, Publishers.

Ellwood, D. (1999). The plight of the working poor. Children's Roundtable Report #2. Retrieved July 28, 2000 from the World Wide Web: http://www.brookings.edu/comm/ChildrensRoundtable?Issue2/issue2.htm

Ely, J. W. (1976). The crisis of conservative Virginia. Knoxville, TN: The University of Tennessee Press.

Etaugh, C. & Rathus, S. (1995). The World of Children. Orlando, FL: Harcourt Brace College Publishers.

Etzioni, A. (1996). The elements of a good society. The new golden rule: Community and morality in a democratic society. NY: Basic Books.

Executive Office for Weed and Seed, National Institute of Justice, U.S. Department of Justice (1998). What can the federal government do to decrease crime and revitalize communities? Washington DC: National Institute of Justice.

Faris, R. E. L. (1955). Social Disorganization. NY: The Ronald Press Company.

Fischer, C. S., Hout, M., Jankowski, M. S., Lucas, S. R., Swidler, A., & Voss, K. (1996). Inequality by design: Cracking the bell curve myth. Princeton, NJ: Princeton University Press.

Fisher, L. (1990). Constitutional rights: Civil rights and civil liberties, Volume 2 of American constitutional law. NY: McGraw-Hill Publishing Company.

Gardner, H. (1993). Multiple intelligences: The theory in practice. NY: Basic Books.

Goldharber, D. D., & Brewer, D. J. (1997a). Evaluating the effect of teacher degree level on educational performance. Developments in School Finance (NCES 97-535). Washington, DC: National Center for Education Statistics.

Goldharber, D. D., & Brewer, D. J. (1997b). Why don't schools and Teachers matter? Assessing the impact of unobservables on educational productivity. Santa Monica, CA: Rand. (Reprinted from The Journal of Human Resources, 32, (3), 505-523.)

Goldschmidt, P. & Wang, J. (1999). When can schools affect dropout behavior? A longitudinal multilevel analysis. American Educational Research Journal, 36, (4), 715-738.

Goldstein, H. (1999). An introduction to multilevel models. Retrieved December 4, 1999 from the World Wide Web: www.ioe.ac.uk/multilevel/

Gonzales, N. A., Cauce, A. M., Friedman, R. J., & Mason, C. A. (1996). Family, peer, and neighborhood influences on academic achievement among African-American adolescents: One-year prospective effects. American Journal of Community Psychology, 24, (3), 365-387.

Gould, S. (1981). The mismeasure of man. NY: W. W. Norton & Co., Inc.

Gould, S. (1994). Mismeasure by any measure. In R. Jacoby & N. Glauberman (Eds.), The bell curve debate: History, documents, opinions, (pp. 3-13). NY: Times Book.

Governor's Commission on Educational Opportunity for All Virginians (1991). Final report. Richmond, VA: Author.

Grissmer, D., Kirby, S., Berends, M., & Williamson, S. (1994). Student achievement and the changing American family. Santa Monica, CA: Rand.

Gustafsson, J. & Stahl, P. (2000). STREAMS User's Guide: Version 2.5 for windows 95/98/NT/2000. Goteborg University, Sweden: Multivariate Ware.

Hanushek, E. A. (1978). Conceptual and empirical issues in the estimation of educational production functions. The journal of human resources, XIV, (3), 351-388.

Hanushek, E. A. (1981). Throwing money at schools. Journal of policy analysis and management, 1, (1), 19-41.

Hanushek, E. A. (1986). The economics of schooling: Production and efficiency in public schools. Journal of Economic Literature, XXIV, 1141-1177.

Hanushek, E. A. (1989). Impact of differential expenditures on school performance. Educational Researcher, 18, (4), 45-51.

Hanushek, E. A. (1996). A more complete picture of school resource policies. Review of Educational Research, 66, (3), 397-409.

Hanushek, E. A. (1997). Assessing the effects of school resources on student performance: An update. Educational Evaluation and Policy Analysis, 19, (2), 141-164.

Hatcher, L. (1994). A step-by-step approach to using the SAS System for Factor Analysis and Structural Equation Modeling. Cary, NC: SAS Institute Inc.

Hauser, R. M. (1971). Socioeconomic background and educational performance. Washington DC: American Sociological Association.

Hauser, R. M., & Huang, M. (1996). Trends in black-white test-score differentials. Retrieved on January 18, 1999 from the World Wide Web: http://www.ssc.wisc.edu/irp

Herrnstein, R., & Murray, C. (1994). The bell curve: Intelligence and class structure in American Life. NY: The Free Press.

Hill, H., Soriano, F., Chen, S., & LaFromboise, T. (1994). Sociocultural factors in the etiology and prevention of violence among ethnic minority youth. In L. Eron, J. Gentry & P. Schlegel (Eds.), Reason to hope: A psychological perspective on violence and youth, (pp. 55-97). Washington DC: American Psychological Association.

Hirsch, E. D., Jr. (1987). Cultural literacy: What every American needs to know. NY: Random House, Inc.

Hoffman, L., Paris, S., Hall, E., & Schell, R. (1988). Developmental Psychology Today. NY: McGraw Hill.

Holtzman W. (1997). Community psychology and full-service schools in different cultures. American Psychologist, 52, (4), 381-389.

House, F. N. (1936). The development of sociology. NY: McGraw-Hill Book Company, Inc.

Hox, J. J. (1993). Factor analysis of multilevel data: Gauging the Muthen model. In J. H. L. Oud and R. A. W. van Blokland-Vogelesang (Eds.), Advance in longitudinal and multivariate analysis in the behavioral sciences, pp. 141-156. Nijmegen, Netherlands: ITS.

Hox, J. J. (1995). Applied multilevel analysis. Amsterdam, Netherlands: TT-Publikaties.

Hox, J. J. (1997). Multilevel modeling: When and why. In I. Balderjahn, R. Mathar & M. Schader (Eds.), Classification, data analysis, and data highways. New York: Springer Verlag.

Hudson, C. S. (1998). Psychosocial and ethnic factors leading to academic achievement in African-American adolescents (Doctoral dissertation, University of San Francisco, 1998). Dissertation Abstracts International, 59-11A, 4054.

Illback, R., Cobb, C., & Joseph, H. (1997). Integrated Services for Children: Opportunities for Psychological Practice. Washington DC: American Psychological Association.

Jencks, C. (1993). Rethinking social policy: Race, poverty, and the underclass. New York: HarperPerennial.

Joreskog, K. (1999a). How large can a standardized coefficient be? Retrieved from the World Wide Web on February 23, 2000 at http://www.ssicentral.com/lisrel/column2.htm

Joreskog, K. (1999b). Interpretation of R^2 revisited. Retrieved from the World Wide Web on February 23, 2000 at http://www.ssicentral.com/lisrel/column2.htm

Joreskog, K. & Sorbom, D. (1996). LISREL 8: User's Reference Guide. Chicago, IL: Scientific Software International.

Joreskog, K., Sorbom, D., duToit, S., & duToit, M. (1999). LISREL 8: New Statistical Features. Chicago, IL: Scientific Software International.

Kamin, L. (1995). Lies, damned lies, and statistics. In R. Jacoby & N. Glauberman (Eds.), The bell curve debate: History, documents, opinions, (pp. 81-105). NY: Times Books.

Kazdin, A. (1994). Interventions for aggressive and antisocial children. In L. Eron, J. Gentry & P. Schlegel (Eds.), Reason to hope: A psychological perspective on violence and youth, (pp. 342-381). Washington DC: American Psychological Association.

Kenny, D. A. (1999). Causal modeling: Measures of fit. Retrieved on December 25, 1999 from the World Wide Web at: http://nw3.nai.net/~dakenny/fit.htm

Kozol, J. (1991). Savage inequalities. NY: HarperCollins.

Kozol, J. (1995). Amazing grace. NY: Crown Publishers.

Kunjufu, J. (1990). The Conspiracy to destroy Black boys, Vol. III. Chicago, IL: African American Images.

Lee, S., & Hershberger, S. (1990). A simple rule for generating equivalent models in covariance structure modeling. Multivariate Behavioral Research, 25, 313-334.

Leung B. P. (1994). Culture as a contextual variable in the study of differential minority student achievement. The Journal of Education Issues of Language Minority Students, 13, 95-105.

Little, T., Lindenberger, U., & Nesselroade, J. (1999). On selecting indicators for multivariate measurement and modeling with latent variables: When "good" indicators are bad and "bad" indicators are good. Psychological Methods, 4, (2), 192-211.

Lovaglia, M. & Lucas, J. (1997). Group processes and individual scores on standardized tests: A theoretical note and basis for investigation. Current Research in Social Psychology, 2, (1).

MacCallum, R. C., Wegener, D. T., Uchino, B. N., & Fabrigar, L. R. (1993). The problem of equivalent models in applications of covariance structure analysis. Psychological Bulletin, 114, 185-199.

Marsh, H., Balla, J., & Hau, K. (1996). An evaluation of incremental fit indices: A clarification of mathematical and empirical properties. In G. A. Marcoulides and R. E. Schumacker (Eds.), Advanced Structural Equation Modeling: Issues and Techniques. NJ: Erlbaum.

Marsh, H., Balla, J., Hau, K., & McDonald, R. (1988). Goodness of fit indexes in confirmatory factor analysis: The effect of sample size. Psychological Bulletin, 103, (3), 391-410.

Massey, D. S., & Denton, N. A. (1993). American Apartheid, Chapter 1. Cambridge, MA: Harvard Press.

Mayer, S. (1991). How much does a high school's racial and socioeconomic mix affect graduation and teenage fertility rates? In C. Jencks & P. E. Peterson (Eds.), The urban underclass (pp. 321-341). Washington D. C.: The Brookings Institution.

McDonald, R. & Marsh, H. (1990). Choosing a multivariate model: Noncentrality and goodness of fit. Psychological Bulletin, 107, (2), 247-255.

McLoyd, V. (1998). Socioeconomic disadvantage and child development. American Psychologist, 53, (2), 185-204.

Merton, R. K. & Nisbet, R. (1976). Contemporary social problems. NY: Harcourt Brace Jovanovich, Inc.

Mosteller, F. & Moynihan, P. (1972). A path breaking report. In F. Mosteller & P. Moynihan (Eds.), On equality of educational opportunity (pp. 3-61). NY: Random House.

Moynihan, D. P. (1965). Employment, income, and the ordeal of the Negro family. Daedalus, 94, (4), 745-770. Richmond, VA: The American Academy of Arts and Sciences.

Mulkeen, P. (1992). Adolescent activities in school and the community: Patterns of participation (Doctoral dissertation, The Pennsylvania State University, 1992). Dissertation Abstracts International, 53-12A, 4488.

National Center for Education Statistics (NCES), U.S. Department of Education, Office of Educational Research and Improvement (1996a). Urban schools: The challenge of location and poverty (NCES 96-184). Washington DC: Author.

NCES, U.S. Department of Education, Office of Educational Research and Improvement (1996b). Do districts enrolling high percentages of minority students spend less? (IB-2-96). Washington DC: Author.

NCES, U.S. Department of Education, Office of Educational Research and Improvement (1996c). Do rich and poor districts spend alike? (IB-1-96). Washington DC: Author.

NCES, U.S. Department of Education, Office of Educational Research and Improvement (1997). Findings from the condition of education 1997: The social context of education (NCES 97-981). Washington DC: Author.

NCES, U.S. Department of Education, Office of Educational Research and Improvement (1998). Status of education reform in public elementary and secondary schools: Principals' perspectives (NCES 98-025). Washington DC: Author.

National Research Council, Commission on Behavioral and Social Sciences and Education, Panel on Poverty and Family Assistance: Concepts, Information Needs, and Measurement Methods (1995). In Citro, C. F., & Michael, R. T. (Eds.), Measuring poverty: A new approach. Washington DC: Author.

National Research Council, Institute of Medicine (2000). Early childhood intervention: Views from the field. Report of a workshop. Washington, D. C.: National Academy of Press.

Nezlek, J. B., & Zyzniewski, L. E. (1998). Using hierarchical linear modeling to analyze grouped data. Group Dynamics: Theory, Research, and Practice, 2, (4), 313-320.

Office of Policy Planning and Research, United States Department of Labor (1965). The Negro family: The case for national action. Washington DC: Author.

Ogbu, J. U. (1981). Origins of human competence: A cultural-ecological perspective. Child Development, 52, 413-429.

Orfield, G., & Yun, J. T. (1999). Resegregation in American schools. Harvard University, MA: The Civil Rights Project.

Paige, C. (2000, May 26). Bright kids show dim ethics. The Daily Press, p. A19.

Payne, K. J., & Biddle, B. J. (1999). Poor school funding, child poverty, and mathematics achievement. Educational Researcher, 28, (6), 4-13.

Pearl, J. (2000). Causality: Models, reasoning and inference. NY: Cambridge University Press.

Pedhazur, E. J. (1982). Multiple regression in behavioral science: Explanation and prediction (2nd ed.). New York: CBS College Publishing.

Pedhazur, E. J. (1997). Multiple regression in behavioral science: Explanation and prediction (3rd ed.). Fort Worth, TX: Harcourt Brace & Company.

Pepler, D. J., & Slaby, R. G. (1994). Theoretical and developmental perspectives on youth and violence. In L. Eron, J. Gentry & P. Schlegel (Eds.), Reason to Hope: A psychological perspective on violence and youth, (pp. 27-58). Washington DC: American Psychological Association.

Polinard, J., Wrinkle, R., & Meier, K. (1995). The influence of educational and political resources on minority students' success. Journal of Negro Education, 64, (4), 463-473.

Rainwater, L. (1965). Crucible of identity: The Negro lower-class family. Daedalus, 94, (4), 161-204. Richmond, VA: The American Academy of Arts and Sciences.

Raudenbush, S. W. (1988). Educational applications of hierarchical linear models: A review. Journal of Educational Statistics, 13, (2), 85-116.

Ravitch, D. (1983). The troubled crusade: American education 1945-1980. New York: Basic Books.

Ravitch, D. (1997). Student performance today. Brookings Institution, Policy Brief #23. Retrieved July 20, 1998 from the World Wide Web: http://www.brookings.edu/comm/policybriefs

Ravitch, D. (1998). A new era in urban education? Brookings Institution, Policy Brief #35. Retrieved February 24, 1999 from the World Wide Web: http://www.brookings.edu/comm/policybriefs

Ravitch, D. (Ed.) (2000). Brookings papers on education policy. Washington, D. C.: Brookings Institution Press.

Ravitch, D. & Loveless, T. (2000). A lesson in keeping promises already made to schools. Retrieved April 2, 2000 from the World Wide Web: http://www.brookings.edu/views/op-ed/Ravitch/20000324.htm

Renchler, R. (1993). Poverty and learning. ERIC Digest, 83. Retrieved March 25, 1997 from the World Wide Web: http://darkwing.uoregon.edu/~ericem/digest83.html

Reschly, D. (1995). Psychological practice in schools: System change in the heartland. (ERIC Document Reproduction Service No. ED 390 022)

Robertson, I. (1987). Sociology. NY: Worth Publishers, Inc.

Rowe, K. J. (1999). Multilevel structural equation modeling with MLN/MlwiN & LISREL 8.30: An integrated course (3rd ed). Victoria, Australia: The University of Melbourne.

Ryan, A. (1994). Apocalypse now? In R. Jacoby & N. Glauberman (Eds.), The bell curve debate: History, documents, opinions, (pp. 14-29). NY: Times Books.

Sampson, R. J. (1986). Effects of socioeconomic context on official reaction to juvenile delinquency. American Sociological Review, 51, 876-885.

Sampson, R. J. (1988). Local friendship ties and community attachment in mass society: A multilevel systemic model. American Sociological Review, 53, 766-779.

Sampson, R. J. (1997). The embeddedness of child and adolescent development. In J. McCord, Ed., Violence and childhood in the inner city, pp. 31-77. New York: Cambridge University Press.

Sampson, R. J., Castellano, T. C., & Laub, J. H. (1981). Juvenile criminal behavior and its relation to neighborhood characteristics. Analysis of national crime victimization survey data to study serious delinquent behavior, Monograph 5. NY: Criminal Justice Research Center, U.S. Department of Justice.

Sampson, R. J., & Groves, W. B. (1989). Community structure and crime: Testing social-disorganization theory. American Journal of Sociology, 94, (4), 774-802.

Sawhill, I. (1998). Teen pregnancy prevention: Welfare reform's missing component. Brookings Institution, Policy Brief #38. Retrieved July 28, 2000 from the World Wide Web: http://www.brookings.edu/comm/PolicyBriefs/pb038/pb38.htm

Sawhill, I. (1999). Investing in children. Children's Roundtable Report #1. Retrieved July 28, 2000 from the World Wide Web: http://brookings.edu/comm/ChildrensRoundtable/Issue/issue1.htm

Schuler, D. (1996). New community networks: Wired for change. NY: Addison-Wesley Publishing Company.

Schumacker, R. E., & Lomax, R. G. (1996). A beginner's guide to structural equation modeling. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Scientific Software International (1999). From theory to statistical model. Retrieved December 10, 1999 from the World Wide Web: http://www.ssicentral.com/lisrel/lis00454.htm

Shaw, C. R. (1930). The Jack-Roller: A delinquent boy's own story. Philadelphia, PA: Albert Saifer.

Shaw, C. R., McKay, & H. D., McDonald, J. F. (1938). Brothers in crime. Chicago: The University of Chicago Press.

Shaw, C. R., & McKay, H. (1969). Juvenile delinquency and urban areas, (Rev. ed.). Chicago: The University of Chicago Press.

Short, R. & Talley, R. (1999). Services integration: An introduction. Journal of educational and psychological consultation, (10), (3), 193-200.

Simons, R. L., Johnson, C., Beaman, J., Conger, R. D., & Whitbeck, L. B. (1996). Parents and peer group as mediators of the effect of community structure on adolescent problem behavior. American Journal of Community Psychology, 24, (1), 145-171.

Spector, P. E. (1981). Research Designs. In M. S. Lewis-Beck (Ed.), Series: Quantitative applications in the social sciences (Series / Number 07-023). Iowa City, IA: Sage Publications.

Spring, J. (1998). Conflicts of interest: The politics of American education, (3rd ed.). NY: McGraw Hill.

Stagner, M. and Duncan, M. (1997). Comprehensive community initiatives: Principles, practice, and lessons learned. The Future of Children, 7, (2) 132-140.

Tabachnick, B. G., & Fidell, L. S. (1996). Using multivariate statistics, (3rd ed.). New York: HarperCollins College Publishers.

Talley R. & Short R. (1995). Creating a new vision of school psychology: Emerging models of psychological practice in schools. (ERIC Document Reproduction Service No. ED 390 016)

The National Commission on Excellence in Education, U.S. Department of Education (1983). A nation at risk: The imperative for educational reform. A report to the Nation and the Secretary of Education, United States Department of Education. Washington DC: U.S. Department of Education.

Trojanowicz, R. C. & Morash, M. (1992). Juvenile delinquency: Concepts and control, (5th ed.). NJ: Prentice Hall.

University of Wisconsin, Institute for Research on Poverty (1996). Poverty thresholds and poverty guidelines [On-line]. Available: http://www.ssc.wisc.edu/irp/faq7.htm

U.S. General Accounting Office (1997). School finance: State efforts to reduce funding gaps between poor and wealthy districts (GAO/HEHS-97-31), 5-23. Washington D.C.: Author.

U.S. Department of Housing and Urban Development (1999). Now is the time. Washington DC: Author.

U.S. Department of Justice, National Institute of Justice (1999). Attitudes toward crime, police, and the law: Individual and neighborhood differences. Washington DC: Author.

U.S. Department of Justice, National Institute of Justice (1998). Linking community factors and individual development. Washington DC: Author.

Virginia Commission on the Future of Public Education (1997). The Report of the Virginia commission on the future of public education to the Governor and the General Assembly of Virginia. Richmond, VA: Author.

Virginia Commission on the Future of Public Education (1998). Report of the commission on the future of public education (HJR196): Blueprint for excellence. Richmond, VA: Author.

Virginia Department of Education (VDOE) (1997). Superintendent's Annual Report for Virginia, 1996-97. Richmond, VA: Author.

VDOE (1998a). Superintendent's Annual Report for Virginia, 1997-98. Richmond, VA: Author.

VDOE (1998b). Guide to the Virginia assessment system. Richmond, VA: Author.

VDOE, 1999. School performance report card. Retrieved August 23, 1999 from the World Wide Web: www.pen.k12.va.us/html/pages/112-350.html

Virginia Polytechnic Institute and State University, Virginia Center for Housing Research (1999). Losing ground in Virginia: The unaffordability of rental housing for low-income families in the 1990's. Retrieved January 10, 2000 from the World Wide Web: www.arch.vt.edu/caus/research/vchr/pdfreports/losgrnd.pdf

Wasik, B. H. (1992). The context of the classroom and children's learning. In J. Belsky (Chair) The context of schooling. Symposium conducted at the School Readiness: Scientific Perspectives National Conference, Columbia, MD.

Wentzel, K. (1999). Social influences on school adjustment: Commentary. Educational Psychologist, 34, (1), 59-69.

Wilder, L. (1999, March 4). Race. The Daily Press, p. A9.

Wilhoit, F. M. (1973). The politics of massive resistance. NY: George Braziller, Inc.

Wilson, W. J. (1997). When work disappears: The world of the new urban poor. NY: Alfred A. Knopf.

Wilson, W. J. (1991). Studying inner-city social dislocations: The challenge of public agenda research. American Sociological Review, 56, 1-14.

Wilson, W. J. (1987). The truly disadvantaged: The inner city, the underclass, and public policy. Chicago, IL: The University of Chicago Press.

Zins, J., (Ed.) (1999). Journal of Educational and Psychological Consultation, Special Issue: Integrating education, health, and social services for young people.

VITA

Spencer Ross Baker

Bachelor of Arts—Justice and Public Policy—North Carolina Wesleyan College—1995. Minor concentration in Psychology; Member of Alpha Sigma Lambda Honor Society, Transfer and Departmental Honors.

Master of Arts—Counseling—Hampton University—1997. Completed an independent study requiring the development of a thesis "Impact of socioeconomic status on academic achievement of Virginia adolescents." Committee members were Helen Randolph Stiff, Ed.D., Wanda S. Mitchell, Ed.D., and Zina T. McGee, Ph.D..

Publications

- Baker, S., Havill, V., Roberts, A., & Victor, J. (2000). Parental values of children's personality across race, social class, and gender of child. Resources in Education. (ERIC Document Reproduction Service No. ED 437199)

Professional Presentations

- Baker, S. R., Victor, J., Halverson, C., Chambers, A. (2000). Construct Validity of the AB5C using MTMM. Presentation at the Tenth European Conference on Personality, Krakow, Poland, July 16 – 21, 2000.
- Baker, S. (2000). Convergent and Discriminant Validity of the Big Five. Presentation at the Hampton University Research Forum 2000, February 12, 2000.
- Baker, S., Havill, V., Roberts, A., and Victor, J. (1999). Parental Values of Children's Personalities across Race, Social Class, and Gender of Child. Poster presentation at the Biennial Meeting of the Society for Research in Child Development, Albuquerque, NM, April 15 – 18, 1999.
- Victor, J., Baker, S., Hill, K., and Watson, L. (1999). Through parents' eyes: Child description of personality, concerns, and future behavior. Poster presentation at the 21st Annual Minority Health Conference, Durham, NC, February 19, 1999.
- Baker, S., (1998). How social and economic status moderates parent's descriptions of their children: Comparisons across race and social and economic status. Presentation at The Council for Exceptional Children Symposium on Culturally and Linguistically Diverse Exceptional Learners, Washington DC, November 5 & 6, 1998.

Professional Membership

- Life Member of the Phi Kappa Phi Honor Society.
- Member of Alpha Sigma Lambda Honor Society.
- Member of the American Psychological Association.
- Member of the American Educational Research Association.
- Member of the Society for Research on Child Development.
- Member of the American Statistical Association.