

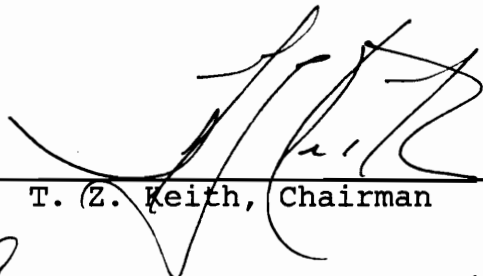
HOW CAN PARENTS AFFECT HIGH SCHOOL STUDENT PERFORMANCE
BY WHAT THEY DO AT HOME?

by

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Dissertation submitted to the Faculty of the
Virginia Polytechnic and State University
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY
in
Educational Research and Evaluation


APPROVED:



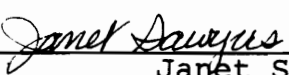
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(ABSTRACT)

The purpose of this study was to investigate the effects of parental involvement on grades and achievement test scores through the variables time on task, general self-esteem, and student attitude about school. The study controlled for the background characteristics of ethnicity, gender, family background, and ability. To do this, structural models were developed based on theory, logic, prior research, and time precedence and were analyzed using 18,141 subjects from the High School and Beyond data set. Although parental involvement in the home had no direct effect on grades or achievement test scores in high school, it did affect time on task, general self-esteem, and attitude about school in such a way as to indirectly improve grades, especially through student attitude about school. When individual components of parental involvement were analyzed, consistent indirect effects on high school grades

were found from fathers and mothers. The study suggests that if parents monitor school work, help with school plans, and talk to their child about personal experiences, their child's time on task, general self-esteem, and attitude about school will improve in a way that improves grades in school at the high school level.

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to the following members of my doctoral committee: Dr. Lawrence Cross, Dr. Judy Engelhard, Dr. Timothy Keith, Dr. Janet Sawyers, and Dr. Lee Wolfle. I am grateful to each for their advice and support throughout this study. Special thanks goes to my chairperson, Tim, who saved this project.

I would like to thank my family for their support; my dad, Curtis Ben Helmandollar, Sr.; my mom, Frances Vest Helmandollar; my sister Jeanne; my brother Paul; the Wrights, Joe, Freda, and Eric; and especially my wife, Janet Wright Helmandollar and daughter, Chinah Marie Helmandollar.

I thank all my many friends, especially Monty, Julia and Vic, for their encouragement and support and the people of Roanoke County Schools especially the staff, students and faculty of The Arnold R. Burton Technology Center.

This work is dedicated to kids in schools.

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Chapter I

Introduction

Purpose

The purpose of this study was to investigate the effects of parental involvement in the home on high school student performance. The indirect effects of parental involvement on grades and achievement test scores through the variables time on task, general self-esteem, and student attitude about school were especially of interest. The study controlled for the background characteristics of ethnicity, gender, family background, and ability. In the study, structural equation modeling techniques were applied to the High School and Beyond data set (National Center for Education Statistics, 1981, 1983).

The Need for the Study

In an effort to make American schools more productive, researchers have examined variables that may contribute to learning and which are potentially manipulable by schools, parents, or students (Fehrmann, Keith, & Reimers, 1987; Keith, 1982; Keith, Reimers, Fehrmann, Pottebaum, & Aubey, 1986; Natriello & McDill, 1986; Walberg, Paschal, & Weinstein, 1985; Watson, Brown, & Swick, 1983). One variable found to influence student performance in school is parental involvement (Bennett, 1986). The specific nature of parental involvement and the related effects on student performance, however, have not been consistently delineated

(Marjoribanks, 1983). Although a focus on the family, specifically, parental influences on school performance, parallels the national educational reform movement, family variables have received far less attention in the literature than have other school related performance variables. Most school improvement research has focused on school processes and school impact (Bennett, 1986; Bickel & Bickel, 1986; Peng et al., 1982). Epstein (1987) recommended a research focus on students and the family to supplement the popular emphasis on effective schools. She suggested a more in-depth look at family system variables and how they affect school outcomes.

Statement of the Problem

A major family system variable in a student's education is parental involvement. Parental involvement is referred to by some as participation of parents in the school (Comer, 1988; Peng et al., 1982), by others as interest in students' school work at home (Fehrmann et al., 1987) and to still others as general parental involvement in the child's activities (Epstein, 1987). Although research findings generally support positive influences of parental involvement on student performance in school (Keith, 1991; Fehrmann et al., 1987), some studies have found little or no effect (Keith et al., 1986; Marjoribanks, 1983). These inconsistencies may reflect the type of parental involvement being studied or the measure of performance utilized.

Parental involvement may influence grades more than standardized achievement tests (Fehrmann et al., 1987; Natriello & McDill, 1986; Weiner & Robinson, 1986). Also, the age of the child may confound the results (Sattes, 1985; Keith, 1991). Studies using elementary grade students have generally reported stronger parental influence than those with secondary grade students, although fewer secondary studies have been conducted (Sattes, 1985). These studies have not offered parents specific input on how they influence their child's performance at the senior high school level. Furthermore, few studies have suggested what parents can do at home to enhance student performance in school.

This study was conducted to provide information to parents about how parental involvement in the home affects high school student performance through the manipulable variables time on task, general self-esteem, and student attitude about school.

Development of the Models

The models for school performance diagrammed in Figure 1 and Figure 2 were developed to analyze the effects of family system variables on school outcomes. Substantively, the models suggest that parental involvement (as reported by students in their sophomore year in high school) influences grades (Figure 1) and achievement test scores (Figure 2) both directly, and indirectly through time on task, general

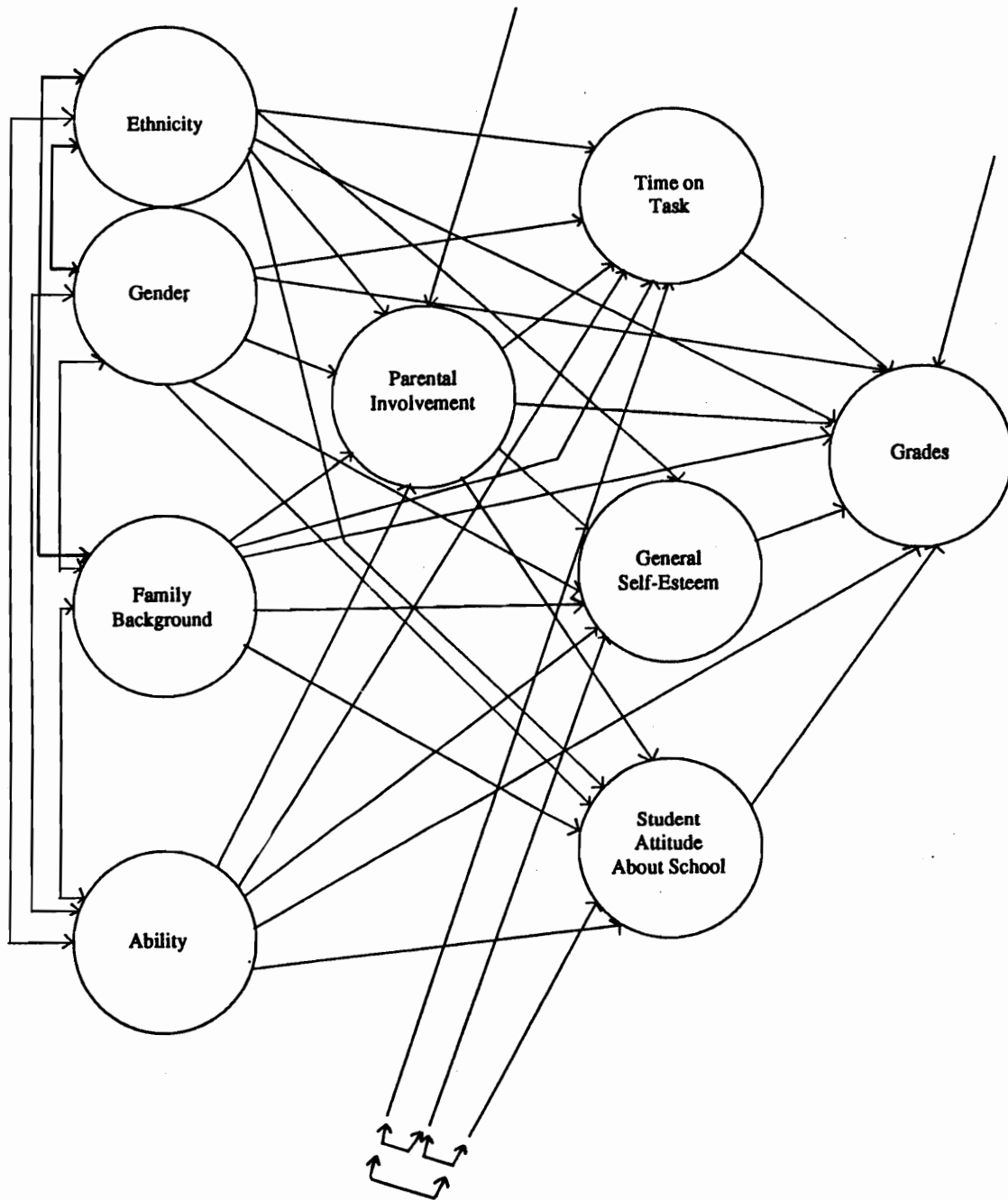


Figure 1
Model For Grades

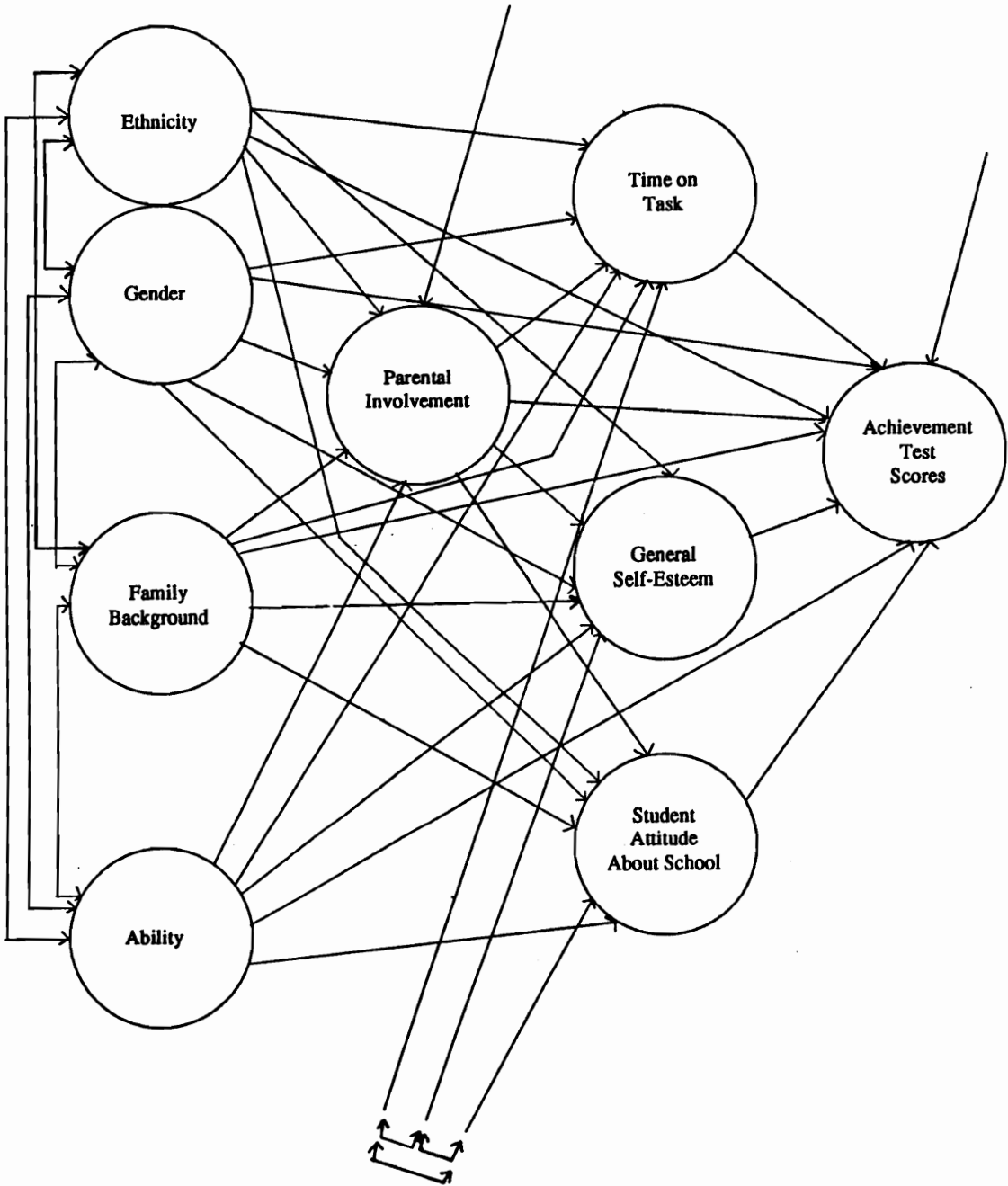


Figure 2
Model For Achievement Test Scores

self-esteem, and student attitude about school (as measured in the students' senior year). By measuring student attitude about school, time on task, general self-esteem, achievement, and grades when the students were seniors, time precedence (a necessary component for causal inference) could be assumed.

Research has supported the use of these variables in a structural model. Fehrmann et al. (1987) examined the indirect effects of parental influence on seniors' grades through homework time and television viewing time. They found nonmeaningful indirect effects of parental influence through homework time on grades. Keith et al. (1986) found similar results using standardized achievement tests as the achievement measure. This study went beyond previous research by examining the effects of parental involvement through student attitude and general self-esteem as well as time-on-task. In addition, the composite parental involvement variable created for this study was segmented to analyze different aspects of parental influence (Keith, 1991).

The arrows in the models diagrammed in Figure 1 and Figure 2 indicate a "weak causal ordering" (Keith, 1982), suggesting that if indeed a causal relation does exist, it is in the direction of the arrows rather than the reverse. The variables ethnicity, gender, family background, and ability in the first block of the models are termed

exogenous variables because they have causes from outside the model. These variables were measured when subjects in the study were sophomores in high school. Parental involvement, the primary variable of interest, appears in the second block of the model and was also measured when the students in the study were sophomores. Variables appearing in the third block of the model, time on task, general self-esteem, and student attitude about school, were measured when the students in the study were seniors in high school and are termed endogenous variables because they are assumed to be caused by other variables in the model. The criterion variables of interest, also measured in the students' senior year, are grades in school and achievement as measured by standardized test scores.

Criterion Variables

In this study, grades and standardized achievement measures (tests of mathematics, science, writing, and civics) were used as criterion measures of student performance. Grades attained were used as one performance measure since they are the most frequent and direct indicators available for assessing the progress of students in a learning setting (Fehrmann et al., 1987; Keith, 1982; Natriello & McDill, 1986; Weiner & Robinson, 1986). The use of standardized test results is common in path analytic studies (Cool & Keith, 1991; Ethington & Wolfle, 1984, 1986). Grades, however, offer several additional advantages

for assessing in-school performance. Grades are multi-faceted and incorporate many components of evaluation including verbal, behavioral, and written performance. Moreover, grading practices used by the classroom teacher are considered to be content specific and designed to measure the mastery of competencies and content in the setting.

Exogenous Variables

In the two models developed for this study, ethnicity, gender, family background, and ability were considered exogenous variables with their causes lying outside the models. By entering these variables in the first block of the model, the effects attributable to ethnicity, gender, family background and ability were controlled while focusing primarily on the impact of parental involvement on final grades and achievement test scores through the manipulable variables of time on task, general self-esteem, and student attitude about school.

Ethnicity. Ethnicity has been shown in path analysis studies to contribute to differences in academic performance (Wolfle, 1985). These effects are mixed when grades and achievement are used as performance measures (Cool & Keith, 1991; Keith, 1982).

Gender. Many studies have addressed the differences in achievement between boys and girls (Benbow & Stanley, 1980; Ethington & Wolfle, 1984, 1986; Fennema & Sherman, 1977;

Pallas & Alexander, 1983; Rosser, 1988; Weiner & Robinson, 1986). Although the etiology of these differences is unsubstantiated, gender may be important in any study of the factors contributing to grades attained or achievement. Gender, therefore was entered into the models in this study as an exogenous variable with causes lying outside the model for which no explanation was attached.

Family Background. A variable often entered into regression equations and path analysis equations is family background or socioeconomic status (Sewell, Haller & Portes, 1969). Some studies have shown little or no effects of family background when variables similar to those used in this study were entered into the model (Watson et al., 1983; Walberg et al., 1985; Natriello and McDill, 1986). However, many studies have shown direct path coefficients from socioeconomic status to grades and achievement, suggesting that socioeconomic status contributes to success in school even when other variables are controlled (Sewell, Haller & Portes, 1969).

Ability. Previous achievement as measured by standardized test scores was entered into the models to control for the effects of aptitude (ability) on grades and achievement. In many causal models as well as in regression procedures, ability is among the most potent predictors of school grades (Keith, 1982) and achievement (Ethington & Wolfle, 1986).

Endogenous Variables

Parental Involvement. Parental involvement is the primary variable of interest in the study. Several studies have found positive effects of parental influences on school grades (Fehrmann et al., 1987; Helmandollar, 1986; Keith et al., 1986) and on achievement (Marjoribanks, 1983; Parsons, Adler, & Kaczala, 1982; Sherman, 1979; Watson, Brown, & Swick, 1983). This influence may be related to parental attitude and involvement (Peng, Owings & Fetters, 1982). Parental involvement was, therefore, entered into the model.

Time on Task. School attendance and homework time spent were two time on task variables considered in this study. The effects of homework on learning by elementary and secondary students appear to be large and consistent (Walberg et al., 1985). Furthermore, parental involvement in monitoring homework can have positive effects on student attitudes and achievement (Epstein 1987; Keith et al., 1986). Attendance not attributable to illness is another time-on-task component potentially manipulable by students and parents.

Student Attitude About School. A low but significant positive correlation is usually found when attitude is used in studies to predict achievement (Aiken, 1976; Helmandollar, 1986; Parsons et al., 1982; Natriello & McDill, 1986). Many studies, however, have not included this variable in their learning models (Fehrmann et al.,

1987; Keith et al., 1986; Keith, 1982).

General Self-esteem. Self-esteem has long been an important variable in learning research (Epstein, 1987; Spears & Deese, 1973). When distinguishing between general and school related self-concept, Calsyn and Kenny (1977) attributed no cause to a positive correlation they found between academic achievement and various self-concept measures.

Models Summary

In short, the models were developed based on existing research to analyze the effects of parental involvement in the home on high school student performance in school. Variables in the models were discussed separately above to develop the justification and rationale for inclusion of the variables in the models. The indirect effects of parental involvement through time on task (attendance and homework time), general self-esteem, and attitude about school were considered important because increased school performance resulting from the detriment of any of these variables would indeed be of questionable gain if school performance improved through the sacrifice of such valued affective attributes.

Research Questions

The following questions were formulated to clarify the purpose and direction of the study:

1. Does parental involvement in the home affect student

achievement and grades directly, and indirectly through time on task, general self-esteem, and student attitude about school?

2. How do these effects differ for grades and for achievement test scores?

Limitations of the Study

Caution should be used in interpreting and applying results of this study. The paths in this study represent a weak causal ordering, suggesting that if a cause and effect relation does exist, it is in the direction of the arrows. It is recognized that causation may not exist where significance is found and that causes may be spurious. It is also recognized that equally feasible, alternative causal explanations may fit the data. However, the variables entered into these models in the order selected is soundly based on literature and rationale as developed in this and the following chapter.

The composite variables of parental involvement, student attitude about school, time on task, and general self-esteem follow from responses to the questions themselves and may not be true indicators of the constructs.

The final grades variable is considered an error free measure of final grades when, in actuality, it is the students' report of their grades rather than the grade itself. It is beyond the scope of this study to debate the efficacy of the measure.

Manipulable variables are being studied using path analysis where no variables are manipulated. It is outside the scope of this study to manipulate the variables in an experimental design.

Chapter II

Review of Selected Literature

Parental Involvement Related to Student Performance

The crisis in education has led to much needed and valuable research on school processes and how these variables affect student performance in school (Bennett, 1986; Bickel & Bickel, 1986; Peng et al., 1982). The influence of the home on student performance, particularly the role of the parents, has received far less attention. Joyce Epstein, from the Center for Research on Education at John Hopkins University, recommends a research focus on students and the family to supplement the popular emphasis on effective schools (1987).

Parental involvement has been found to influence student performance. Noting the importance of parental involvement Shaefer (1971) reported that parental interest and involvement in a child's education is far more important than the quality of schools. Several studies have found positive effects of parental influences on school grades (Fehrmann et al., 1987; Helmandollar, 1986; Keith, 1991) and on achievement (Marjoribanks, 1983; Parsons, Adler, & Kaczala, 1982; Sherman, 1979; Watson, Brown, & Swick, 1983). This influence is seemingly related to parental attitude and involvement (Peng, Owings & Fethers, 1982). Mize (1977) attributed over half of the variance in achievement scores to parent, family, and home environment. Fehrmann et al.

(1987) suggest that parental involvement can include expectations of school performance, verbal encouragement or interactions regarding school work, direct reinforcement for school performance, general academic guidance and support, and student perceptions of the degree to which their parents influence their future plans.

Parental involvement may influence student performance in school indirectly through other variables. These may include attendance, motivation, and self-concept which Sattes (1985) identified as related to parental involvement and achievement. Children's achievement attitudes were influenced more by their parents' attitudes about their abilities than by their own past successes or failures in school according to Parsons, Adler and Kaczala (1982). Their path model using volunteering 5th through 9th graders in a midwestern school district suggested that parents influence school performance in mathematics by being role models and providing expectancies. Epstein (1987) acknowledged the role of parental attitude when she concluded that too much flexibility at home or laissez-faire attitudes regarding time management may result in a lack of dedication to homework or school study and may result in school lateness, absence, or incomplete homework.

Others have used student report data for parental influence variables and have found negligible effects (Keith et al., 1986). Likewise, Marjoribanks (1983) in a study of

900 Australian families using family interviews found that at high ability levels there was no relation between mathematics learning and parent-child interactions. In general however, research does support parental influence as a contributing variable toward academic achievement (Watson, Brown, & Swick, 1983).

Few studies have offered parents input on how family interaction at home can enhance their child's performance in school at the senior high level. What parents can do at home to influence student performance in high school is of particular significance since parents of high school aged students do not typically interact with the school as do parents of students in earlier grades. Most parents of high school aged students do care about their child's education but have difficulty interacting with the school (Comer, 1988). According to Comer, parents of high school aged students seem alienated from the schools because they do not hear from the schools unless it is something negative about their child, resulting in distasteful interactions. More information for parents about how their support and involvement at home affect student performance in high school is needed.

Outcomes of Parental Involvement

Grades and achievement test scores are among the performance measures that parental involvement may influence. Other student outcomes of interest include

attitudes toward learning, self-concept, and time on task (Epstein, 1987).

Grades and Achievement Test Scores. Grades attained are often used as a component of high school performance since they are the most frequent and direct indicators available for assessing the progress of students in the learning setting (Fehrmann et al., 1987; Keith, 1982; Natriello & McDill, 1986; Weiner & Robinson, 1986). Although standardized test results are often used in path analytic studies (Cool & Keith, 1991; Ethington & Wolfle, 1984, 1986), including grades as well offers several advantages to assessing in-school performance. Baker (1988) noted that standardized tests may be somewhat insensitive to curricular and instructional variations, may omit areas of emphasis for particular schools, and may greatly underestimate student performance due to the frequently used multiple choice format.

Although the subjective nature of grades in school has been the topic of much concern, grades are multi-faceted and incorporate many components of evaluation including verbal, behavioral, and written performance. Moreover, grading practices used by the classroom teacher are considered to be content specific and designed to measure the mastery of competencies and content in the setting (Keith, 1982).

Time on task. The literature suggests that learning time affects student performance in school (Keith, 1991).

Time on task is the amount of time a student spends in active learning. Two measures of this variable include homework time spent and school attendance.

Homework Time Spent. The effects of homework on learning by elementary and secondary students appear to be large and consistent (Walberg et al., 1985). A direct path coefficient from homework time to grades of .192 was found by Keith (1982) in his analysis of 20,364 high school seniors drawn from the first wave (1980) of the National Center for Education Statistics' High School and Beyond longitudinal study. Furthermore, parental involvement in monitoring homework can have positive effects on student attitudes and achievement (Epstein, 1987; Keith et al., 1986).

Attendance. Attendance is another time-on-task component potentially manipulable by students, parents and the school. Infectious illness and genuine emergencies are often unavoidable and therefore, are recognized as legitimate reasons for school absence, and in many cases should take precedence over attendance in school. However, many school absences are due to reasons often controllable by the parents. Many school systems are now formulating attendance policies to encourage better attendance (Salem City Schools, 1987; Roanoke County Schools, 1988). Given that school attendance and tardies have not been the thrust of learning process models and are many times not

controlled, there is a need for empirical data to support or refute the position of the schools for attendance and tardy policies and to provide information to parents.

General Self-esteem. Self-concept as cause has been cited by Spears and Deese (1973) in many divergent theories. They point to the highly abstract nature of self-concept and the diverse, even contradictory, subconstructs that comprise it. They note that self-concept in its motivational aspect causes behavior, finding stable correlations between student specific self-concept and grades. They point out that causal propositions involving self-concept are often not formulated logically.

Many research studies have found a positive correlation between academic achievement and various self-concept measures (Calsyn & Kenny, 1977). Recognizing asymmetry, Calsyn and Kenny cited considerable disagreement concerning the direction of causal symmetry and refer to the self-enhancement theorists' and skill development theorists' battle over causative supremacy. Their study distinguished between general self-concept and school related self-concept and supported no causal relationship.

Student Attitude About School. Aiken (1976), in a review of attitude variables in learning mathematics, summarized that a low but significant positive correlation is usually found when attitude is used in studies to predict

mathematics achievement. He also pointed out its secondary influence to ability as a forecaster of achievement. Further, he reported that differences in attitude as well as achievement frequently favor boys. He noted, too, that the influence of parents is demonstrated in students' mathematics attitudes and achievement. Other studies have shown similar results (Helmandollar, 1986; Natriello & McDill, 1986; Parsons et al., 1982). Many studies, however, have not included student attitude about school in their learning models (Fehrmann et al., 1987; Keith et al., 1986; Keith, 1982).

Lutz (1975) in an investigation of causal relations among cognitions and behavioral intentions, looked at an individual's intention to perform an action, the individual's attitude about the action, and the consequences. He concluded that behavioral intention is approximately equal to overt behavior, "Specifically, it is assumed that certain cognitive elements combine in some manner to produce affect... which in turn leads to behavior" (p. 198). In a subsequent article, Lutz (1975b) saw attitude as a resultant of a cognitive process involving belief and elements of cognitive structure. He also pointed out that attitude is theoretically based on multiple attributes.

Other Influences on High School Performance

Ethnicity. Many studies have controlled for the

effects of race on achievement (Keith, 1982; Keith et al., 1986; Keith & Page, 1985; Cool & Keith, 1991). Recognizing that racial differences in performance are evident, studies have attempted to delineate these differences. Wolfle and Robertshaw (1983) found that blacks tend to report parental status with more measurement error than do whites, which suggests that reliability of some measures may be greater for whites than for blacks. Wolfle recommends extra caution when interpreting results of racial models using least-squares estimates. When controlling for this estimated measurement error, Wolfle (1985) found that whites and blacks are similar in how their background characteristics influence educational attainment. When other background variables are controlled, ethnicity has shown no effect on grades (Keith, 1982) but has shown consistent effects on achievement test scores (Cool & Keith, 1991).

Gender. Many studies have addressed the differences in ability and achievement between boys and girls. Girls average higher overall grades than boys in both high school and college, however, boys outscore girls on the SAT in both verbal and math areas by a combined score of 57 points (Rosser, 1988). Although the SAT is the only reported standardized test where boys perform better than girls on verbal ability, the performance difference in mathematics is consistent across most tests of achievement (Ethington &

Wolfe, 1986).

Benbow and Stanley (1980), using data collected by the Study of Mathematically Precocious Youth (SMPY) which studied approximately 10,000 males and females from 1972 to 1980, found "that large sex differences in mathematical aptitude are observed in boys and girls with essentially identical formal educational experiences" (p. 1262). Their results indicated that boys, on the average, scored about one-half of the females' standard deviation better than did the girls. The greatest disparity between boys and girls was in the upper ranges of mathematical reasoning ability. They concluded that "differential course-taking cannot alone explain the sex differences observed" (p. 1263). They further theorized that, "it is more likely that mathematical reasoning ability influences subsequent course-taking in mathematics" (p. 1263) and that "sex differences in achievement in and attitude toward mathematics result from superior male mathematical ability" (p. 1264).

In a follow-up study, Benbow and Stanley (1983) reported that in groups of students under age 13 with exceptional mathematical aptitude, where difference in mathematics exposure was nonexistent between the sexes, more males than females scored extremely high on the mathematical part of the SAT. It was emphasized that they were dealing with "intellectually highly able students and that these findings may not generalize to average students" (p. 1031).

Pallas and Alexander (1983), on the other hand, attribute large sex differences in mathematics achievement to participation in mathematics courses.

Helmandollar (1986) in a study of 192 gifted students at the Roanoke Valley Governor's School for Science and Technology found no difference in mathematics or science ability or achievement in girls and boys. He did, however, find that parents' attitude had a strong influence on final grades attained at the Governor's School in both science and mathematics.

In a study using High School and Beyond data, Ethington and Wolfle (1984) explained about one-third of the difference in mathematics achievement between men and women through variables introduced into a structural model including attitude and grades.

Many theories have been suggested and tested to explain the superiority of male performance in the areas of mathematics including gender specific attitudes (Ethington & Wolfle, 1986), preparation (Ethington & Wolfle, 1984; Pallas & Alexander, 1983), socialization processes (Fennema & Sherman, 1977), problem solving approaches (Weiner & Robinson, 1986), and the assertion by representatives of the National Organization of Women of purposeful sex biasing in testing to alienate females from scholarships and educational and occupational opportunities (Rosser, 1988). Although the etiology of these differences is

unsubstantiated, the difference must be controlled in any study of the factors contributing to grades attained or achievement.

Family Background. A variable often entered into regression equations and path analysis equations is socioeconomic status (Sewell, Haller & Portes, 1969). Ethnicity and family background, two socioeconomic indicators often referred to in educational studies, showed no significant direct effects on high school senior's grades when ability, parental involvement, homework, and television time were entered into a path model using data from the High School & Beyond data set in a study by Fehrmann, Keith and Reimers (1987). Watson et al. (1983) found the influence of parents in the home to be effective in helping the child achieve, regardless of income or educational level of the parents and stated that in this regard "socio-economic status may be ruled out" (p. 179).

Keith (1982) in his study of the effects of homework time on grades found that "neither race nor family background (socioeconomic status) had an appreciable direct effect on grades when ability, field, and study time were controlled" (p. 250). Natriello and McDill (1986) combined the school process model (Barr & Dreeben, 1983) with socioeconomic background characteristics of students. They saw manipulable variables as mediating variables between social background and student performance. In their study,

however, the effects of socioeconomic factors (father's education, mother's education, father's occupation, number of books in the home and number of siblings) were small and insignificant on the mediating variables and on the criterion variable of interest, English grade point average.

In a synthesis of studies looking at homework time spent and its effects on achievement, Walberg et al. (1985) found that homework time spent conferred equally beneficial effects on children of low, middle, and high socioeconomic groups of various achievement levels. They pointed out that graded homework itself produces an effect three times larger than social class.

Ability. In many causal models as well as in regression procedures, ability is among the most potent predictors of school grades (Keith, 1982) and achievement (Ethington & Wolfle, 1986). In studies of educational, occupational and status attainment, Sewell, Haller and Ohlendorf (1970) found path coefficients of .589 and .630 from mental ability to academic performance supporting the hypothesis, "Mental ability is predicted to have a substantial direct effect on academic performance (Haller, 1968, p.164-165)" (as quoted in Sewell, Haller, & Ohlendorf, 1970).

The Use of Structural Modeling in Educational Research

In addition to correlational studies, many recent studies, through structural modeling, have assigned

causation to predictor variables. Rationale for positing several models of causation to a single data set is justified by Duncan, Haller and Portes (1968) who, working with friends' influence on ambition in a classical modeling paper, formulated several models in order to compare the merits of each. They developed four structural models: a just-identified model, an overidentified model, a partially recursive model, and a composite model. The purpose of their study was to suggest the possibilities of structural modeling through reinterpretations of data collected and analyzed through correlations and hypothesis testing from a former study, in part to deal more effectively with reciprocal causations. Their paper was an introduction to the analysis of simultaneous systems through exploratory structural modeling.

The use of structural modeling is further supported by studies of educational, occupational and status attainment by Sewell, Haller, and Ohlendorf (1970) who originally proposed and revised models in their analyses. Their strategy for model revision was to employ an arbitrary criterion for the magnitude of the effects of a particular path coefficient as opposed to whether or not the path was statistically significant. The model revisions were based on fitting the model to the data after the original model was proposed. They found direct effect path coefficients of .589 and .630 from mental ability to academic performance.

Their use of modeling techniques suggested that, "Mental ability is predicted to have a substantial direct effect on academic performance (Haller, 1968. p.164-165)" (as quoted in Sewell Haller and Ohlendorf 1970).

Ethington and Wolfle (1984) explained about one-third of the difference in mathematics achievement between men and women through variables introduced into a structural model including attitude and grades. Wolfle (1985) used LISREL analysis to compare two populations, whites and blacks, in a structural model to test factor pattern coefficient differences. Establishing that whites and blacks had common factor patterns, Wolfle then compared structural aspects of the model across the two groups, again finding no difference, as equality constraints resulted in no deterioration of fit in the model. In a later study, Ethington and Wolfle (1986) found that the process of mathematics achievement differs for men and women. They further found that attitudes toward mathematics influenced mathematics achievement differently for men than for women by using an alternate method of comparing coefficients across groups incorporating multiple measures of correlations due to several highly skewed, dichotomous variables in their model.

Helmandollar (1986), using structural modeling techniques, found no direct or indirect effect of sex on mathematics achievement for 192 students at the Roanoke

Valley Governor's School for Science and Technology. In this study, parent attitude and GPA along with concern for grade contributed toward explaining 40% of the variance in a structural model of final mathematics grades attained. Using the same population, Helmandollar found similar results in a structural model for final science grades with slightly more variance accounted for.

Keith and associates (1987, 1986, 1985, 1982) have done extensive research using path analysis on the High School and Beyond data set by looking at the effect of manipulable variables such as homework time, television viewing time, and parental involvement on high school grades and achievement. Direct effects of homework time spent on grades (.192) were found in a path model including race, family background, ability, and field of study (Keith, 1982). A follow-up study included achievement test scores along with grades in models with these same variables (Keith, 1985). Including parental involvement in a later model, Keith et al. (1986) found no direct effect of parental involvement on achievement test scores when gender, ethnicity, family background, ability, homework, and television viewing time were entered in a path model. The study emphasized indirect effects as well as direct effects of parental involvement. Direct and indirect effects on academic achievement were addressed at length in a paper (Cool & Keith, 1991) which included motivation in a

path model. Direct and indirect effects of the home were looked at by Fehrmann, Keith, and Reimers (1987) in a path model which again included indirect effects of parental involvement through the homework time variable. Finally, in a paper specifically examining the effects of parental involvement on achievement in high school, Keith (1991) summarized an extensive body of work done in the field by himself and others using path analytic models applied to the High School and Beyond data set.

Summary

Inconsistencies, conflict, and lack of sufficient supportive research generally confound many areas of educational research due to the large amount of unexplained variance or "free will" inherent in any sociological study. Attempts to control background variables while isolating and examining manipulable variables have been and will be an ongoing thrust of educational research. Because of the cumbersome nature of true experimental design when working with youth and the efficacy issues involved, it is important that methodologies and strategies that test causal explanations using available data be tested and applied for the betterment of the pedagogical field as a whole. While caution in interpreting any study is always warranted, and may be even more so with causal modeling, the method is becoming widely used and accepted. The variables selected for this study, positioned in the theoretical framework

selected, are consistent with similar work found in the literature.

Chapter III

Method

This study analyzed the direct effects of parental involvement on achievement and grades and the indirect effects through time on task, general self-esteem, and student attitude about school. The study used path analytic techniques based on the structural models developed in Chapter 1.

The Data

Data used for this study included 18,141 students from the Sophomore cohort High School and Beyond (HS&B) study (National Center for Education Statistics, 1981, 1983). In that study over 30,000 sophomores were selected from over 1,100 schools in a highly stratified national sample. They were asked to respond to a battery of questions concerning many facets of school and their lives and were administered a test battery. Respondents completed surveys as sophomores in the spring of 1980 and again in the spring of 1982 in a follow-up study (NCES, 1983). Students selected from that data set for this study were those who participated in both the original 1980 base-year study and the 1982 follow-up and did not transfer or drop out of school during that period. The data from the national sample were especially suited for this study because time precedence, a necessary component in establishing causal links, could be assumed by using sophomore data influencing senior, follow-up data.

Data Collection Instruments

Information in High School

and Beyond came primarily from students' reports on questionnaires. Questions focused on students' behavior, school experiences, background, aspirations, and outside activities. The 1982 follow-up survey questionnaire for 1980 sophomores replicated nearly all questions used in the base year. "The purpose of the sophomore follow-up questionnaire was to document shifts in attitudes and values since the base year" (NCES, 1983, p. 8). In addition to the questionnaires, sophomores were administered the same tests in the base year (1980) and the first follow-up year (1982). The tests included:

1. Vocabulary (21 items, 7 minutes) - synonym format;
2. Reading (20 items, 15 minutes) - short passages focusing
on comprehension;
3. Mathematics (38 items, 21 minutes) - quantitative
comparisons;
4. Science (20 items, 10 minutes) - knowledge and reasoning
ability;
5. Writing (17 items, 10 minutes) - writing ability and
basic grammar; and
6. Civics (10 items, 5 minutes) - law, government, and
social behavior.

The Structural Models

The two models proposed in Chapter I were analyzed separately using the two criterion variables of grades as

reported by students and achievement as measured by the HS&B test battery. The models were identical except for the criterion variables. The models developed for this study are diagrammed in Figure 1 and Figure 2. Composites and codings appear in Figure 3.

In the models, hypothesized causal effects are represented by single-headed arrows. In the first block, double-headed arrows between purely exogenous variables represent zero-order correlations. The exogenous variables ethnicity, gender, family background, and ability were measured during the subjects' sophomore year in high school, as was the endogenous variable parental involvement. It was hypothesized that these variables would influence achievement and grades directly, and indirectly through time on task, general self-esteem, and student attitude about school, endogenous variables measured when the subjects were seniors in high school.

Variables in the Models The following variables were selected for use in the models developed for this study:

Ethnicity. Ethnicity was a dummy coded variable with 1 assigned to whites and 0 assigned to all other racial groups including blacks and Hispanics.

Gender. Gender was a dummy coded variable with 1 assigned to males and 0 assigned to females. In the HS&B data set, sex is a composite variable with three indicators taken from three different survey items. However, all

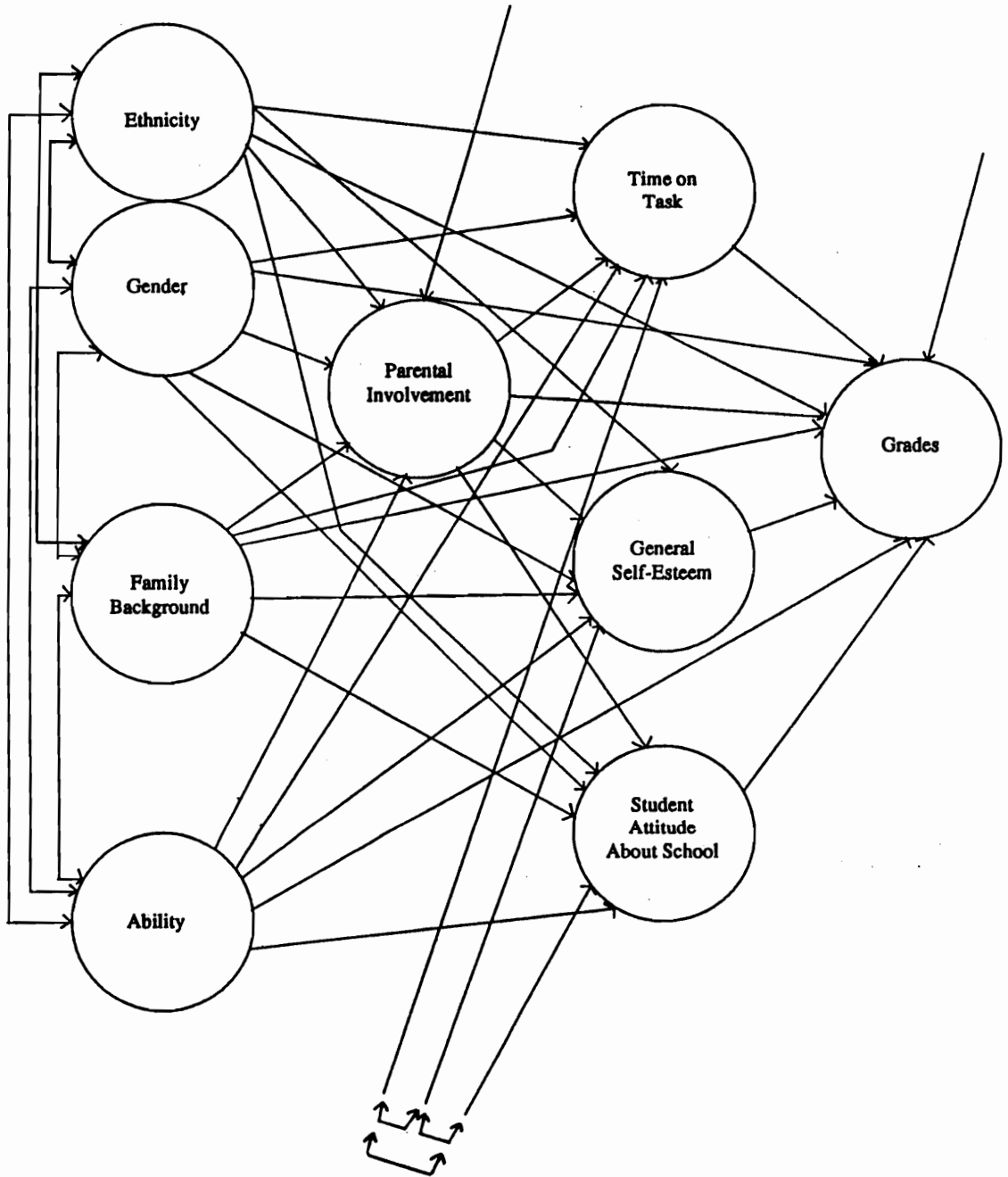


Figure 1
Model For Grades

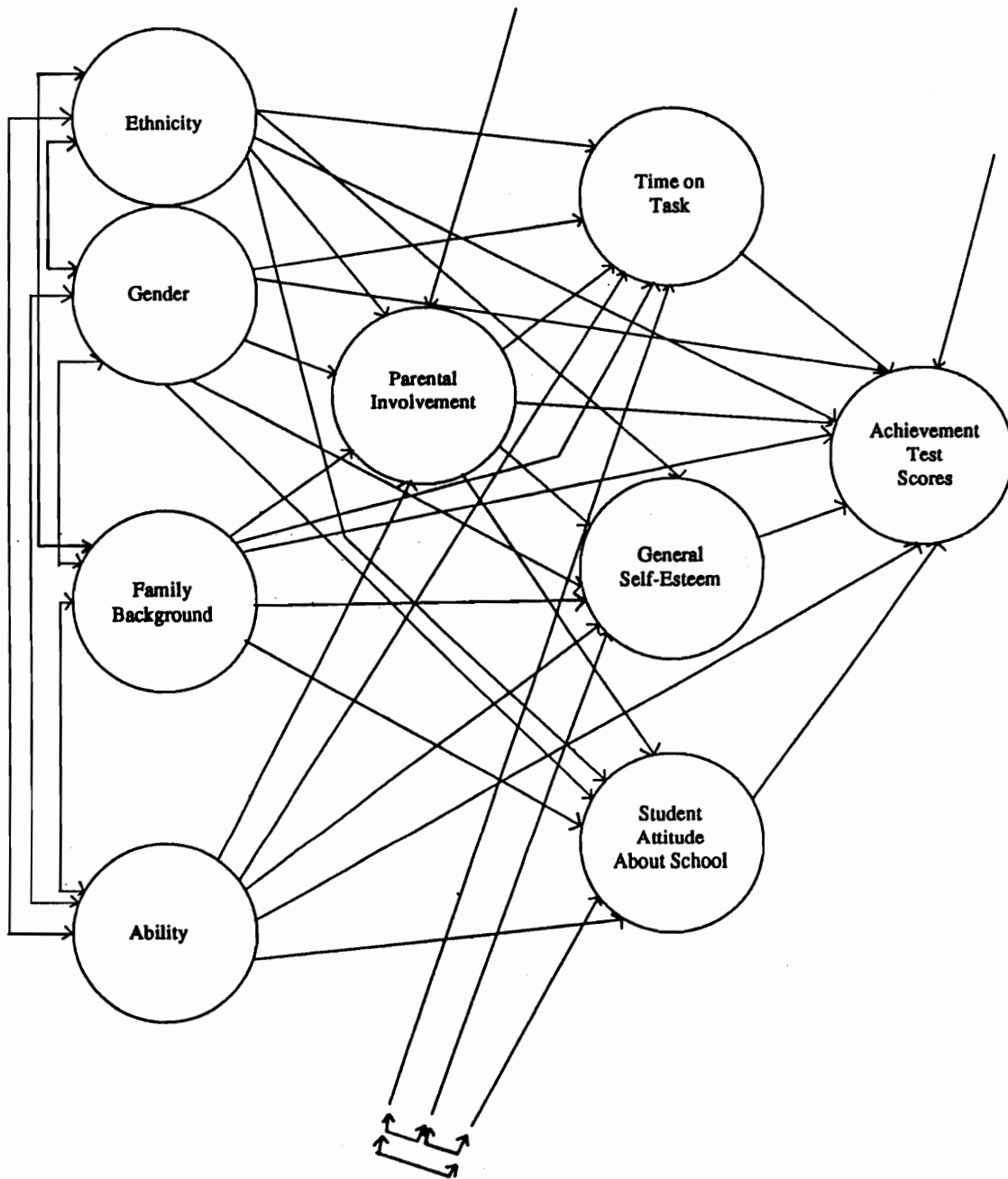


Figure 2
Model For Achievement Test Scores

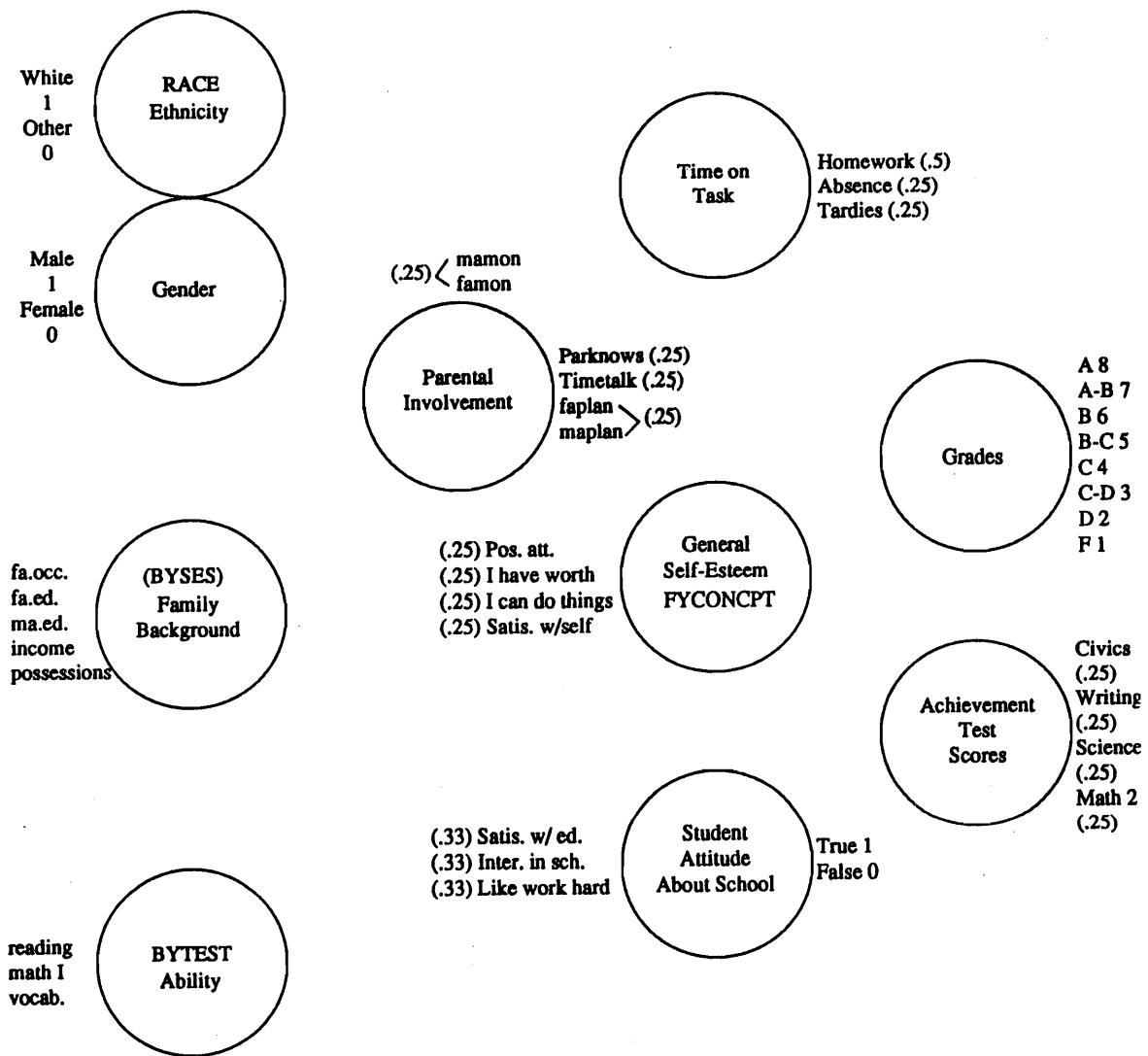


Figure 3
Composites and Codings of Variables

conflicting data were resolved through additional analysis so that sex of all respondents was identified.

Family Background. The High School and Beyond socioeconomic status composite compiled in the base year was used. The composite consisted of an average of non-missing components including father's occupational status, father's and mother's education, family income, and household possessions.

Ability. Ability was a composite variable made by averaging reading, math, and vocabulary base-year test scores. These three were specified as likely measures of prior achievement to be used for aptitude by Heyns and Hilton (1982) who reported their respective reliabilities to be .78, .85, and .81.

Parental Involvement. Parental involvement was a composite variable with indicators chosen from the sophomore questionnaire administered in the spring of 1980.

Sophomores were requested to respond to the following statements by:

Indicating true (coded 1), false (coded 0), or not applicable (missing value):

1. My mother keeps close track of how well I am doing in school.
2. My father keeps close track of how well I am doing in school.
3. My parents almost always know where I am and what I am

doing.

Indicating not at all (1), somewhat (2), or a great deal (3):

4. How much have you talked with your father about planning your school program?
5. How much have you talked with your mother about planning your school program?

Indicating rarely or never (1), less than once a week (2), once or twice a week (3), or every day or almost every day (4):

6. How much time do you spend talking with your parents about personal experiences?

The composite parental involvement variable consisted of the mean of standardized parental questions. When like questions were asked about mother and father, the questions were combined as a parent component before averaging and weighted as one parent response (see Figure 3).

General Self-esteem. The self-esteem variable was taken from the 1982 sophomore follow-up questionnaire administered when the students were seniors. The follow-up questionnaire was chosen for this variable as well as the time on task and attitude about school variables because it was assumed that parental involvement would influence grades and achievement through these variables over the course of the two years between the base year and follow-up questionnaires. The self-concept psychological scale

constructed by HS&B was used, and is an average of the standardized questionnaire items:

1. I take a positive attitude toward myself.
2. I feel I am a person of worth, on an equal plane with others.
3. I am able to do things as well as most other people.
4. On the whole, I am satisfied with myself.

Student Attitude About School. Student attitude about school was a composite variable made up of indicators from the 1982 sophomore follow-up questionnaire administered when the students were seniors. The following components were selected and their standardized scores averaged for the composite.

Former sophomores were requested to respond to the following statements by indicating true (coded 1) or false (0):

1. I am satisfied with the way my education is going.
2. I am interested in school.
3. I like to work hard in school.

Time on Task. Time on task included homework time spent, attendance, and tardies. Homework time was selected from the 1982 sophomore follow-up questionnaire administered when the students were seniors. Former sophomores were requested to respond about the average amount of time spent on homework per week using the following scale:

No homework is ever assigned (Coded 0)

I have homework, but I don't do it (0)

Less than 1 hour a week (1)

Between 1 and 3 hours per week (2)

More than 3 hours, less than 5 hours per week (3)

Between 5 and 10 hours a week (4)

More than 10 hours a week (5)

Attendance was a self-report indicator chosen from the 1982 sophomore follow-up questionnaire administered when the students were seniors. The following questions were selected:

Former sophomores were asked, "Between the beginning of school last fall and Christmas vacation, about how many days were you absent from school for any reason, not counting illness?" Response choices were; none (coded 6), 1 or 2 days (5), 3 or 4 days (4), 5 to 10 days (3), 11 to 15 days (2), 16 to 20 days (1), 21 or more (coded 0.)

Students were also asked how many times they were late to school during the same period. The same response choices were given.

The time on task composite variable was averaged with homework time weighted at .5, tardies .25, and absences .25.

Achievement. The criterion measure of achievement was an average of standardized civics, writing, science and mathematics part two scores taken in 1982. Heyns & Hilton (1982) reported reliabilities of these tests to be .53, .80, .75, and .54 respectively.

Grades. The criterion measure of grades consisted of

students' responses to the question: "Which of the following best describes your grades so far in high school?"

Responses included: Mostly A's (or a numerical average of 90-100, coded 8); About half A's and half B's (or 85-89 coded 7); Mostly B's (or 80-84, coded 6); About half B's and half C's (or 75-79, coded 5); Mostly C's (or 70-74, coded 4); About half C's and half D's (or 65-69 coded 3); Mostly D's (or 60-64, coded 2); Mostly below D (or below 60, coded 1).

The Analysis

The models for grades and achievement test scores were analyzed separately using the SPSS statistical package, GEMINI (Wolfle & Ethington, 1985), and PASE (Wolfle, 1984). The parental involvement composite variable was then broken down into individual aspects and analyzed through PASE. Indirect effects were tested for significance using GEMINI. Paths of .05 or greater were considered meaningful.

Chapter IV

Results

The means, standard deviations, and correlations for the variables used in this study appear in Table 1 and Table 2. Figure 4 depicts a path analytic display of the results for grades while Figure 5 shows achievement test scores. Tables 3 and 4 present the direct, indirect, and total effects of variables in the grades and achievement test scores models. In the diagrams, double-headed arrows represent zero-order correlations among exogenous variables and partial correlations among endogenous variables. The partial correlations reflect the association of error terms in the model which are not assumed to be zero. These apply to those intervening variables which are blocked with no causal path suggested due partly to lack of time precedence (time on task, general self-esteem, and attitude about school). In other words, an association is recognized among these variables but no causal inference is made. The numbers associated with single-headed arrows are path coefficients. Paths from outside the model reflect variability not explained by variables in the model and are calculated by the square root of $1 - R^2$. As with all large sample analyses, significance tests alone are insufficient to determine causal effects. Therefore, path coefficients of .05 or greater are interpreted as meaningful effects (Pedhazer, 1982). All effects referred to as meaningful in

TABLE 1 VARIABLE INTERCORRELATIONS, MEANS, AND STANDARD DEVIATIONS
USED FOR COMPOSITE MODELS

VARIABLE	1	2	3	4	5	6	7	8	9	10
1 GRADES	1									
2 ACHIEVEMENT	.505	1								
3 TIME ON TASK	.374	.254	1							
4 SELF-ESTEEM	.165	.121	.098	1						
5 ATTITUDE	.424	.177	.428	.244	1					
6 PARENT INVOLVE	.237	.174	.234	.139	.256	1				
7 ETHNICITY	.150	.313	.022	-.031	-.025	.086	1			
8 FAMILY BACKGRD	.208	.379	.102	.099	.051	.203	.233	1		
9 GENDER	-.174	.015	-.180	.052	-.149	-.137	-.009	.065	1	
10 ABILITY	.491	.806	.203	.126	.136	.176	.322	.410	.072	1
MEAN	5.684	51.263	.001	.000	-.003	-.005	.742	.004	.497	5.086
ST. DEV	1.442	8.027	.704	.073	.734	.609	.437	.721	.500	.885

TABLE 2 VARIABLE INTERCORRELATIONS, MEANS, AND STANDARD DEVIATIONS USED
FOR INDIVIDUAL COMPONENTS OF PARENTAL INVOLVEMENT ANALYSES

VARIABLE	1	2	3	4	5	6	7	8	9	10	11
1 GRADES	1										
2 ACHIEVEMENT	.505	1									
3 TIME ON TASK	.374	.254	1								
4 SELF-ESTEEM	.165	.121	.098	1							
5 ATTITUDE	.424	.177	.428	.063	1						
6 FATHER MONITORS	.123	.102	.116	.070	.135	1					
7 MOTHER MONITORS	.086	.045	.106	.049	.129	.504	1				
8 PARENTS KNOW	.140	.078	.154	.104	.146	.149	.171	1			
9 TIME TALKING	.165	.134	.143	.119	.171	.154	.130	.168	1		
10 FATHER PLANS	.151	.166	.141	.106	.142	.354	.130	.121	.275	1	
11 MOTHER PLANS	.171	.100	.169	.098	.188	.134	.209	.156	.350	.522	1
12 ETHNICITY	.150	.313	.022	-.031	-.025	.076	-.002	.051	.074	.090	-.003
13 FAMILY BACKGRND	.208	.379	.102	.100	.051	.180	.079	.030	.130	.275	.125
14 GENDER	-.174	.015	-.180	.052	-.149	.022	.008	-.119	-.176	.053	-.149
15 ABILITY	.491	.806	.203	.126	.139	.108	.049	.066	.135	.187	.100
MEAN	5.68	51.26	.001	.000	-.003	.787	.904	.842	2.26	2.00	2.30
ST. DEV.	1.44	8.03	.704	.073	.734	.410	.294	.365	1.14	.696	.637

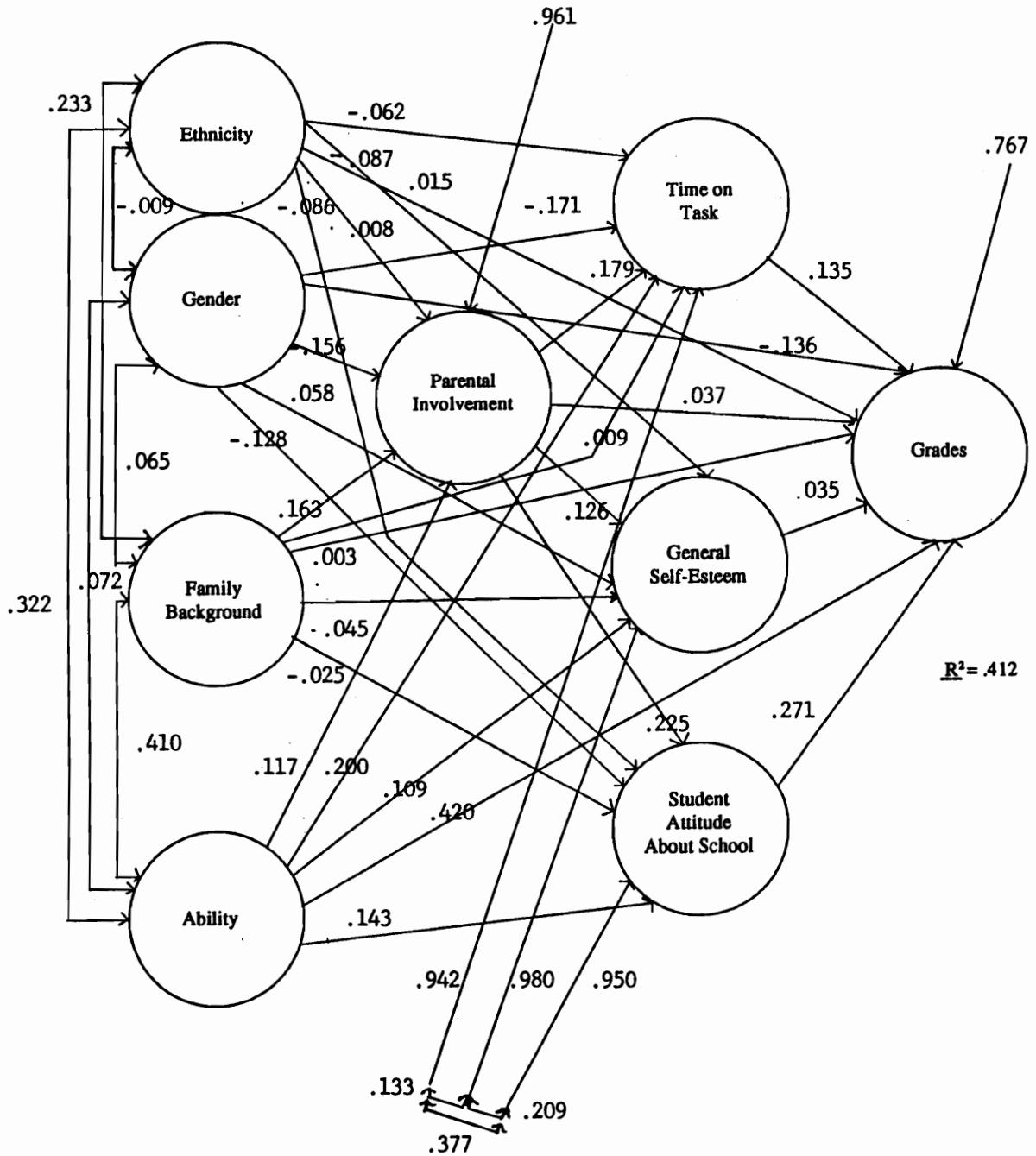


Figure 4
The Effects of Parental Involvement on Grades

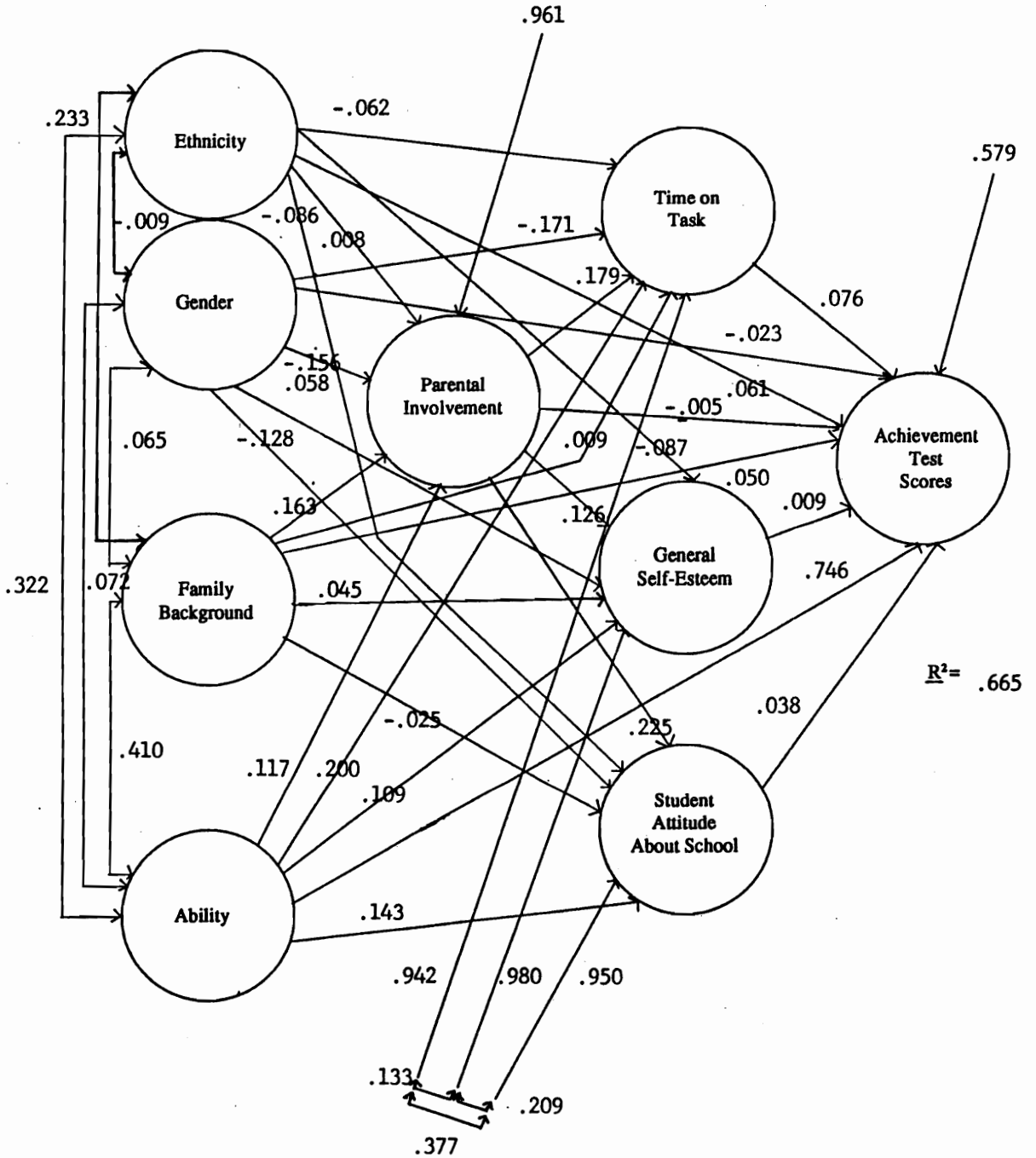


Figure 5
The Effects of Parental Involvement on Achievement Test Scores

Table 3 Direct, Indirect, and Total Effects of Variables in the Grades Model

Variable	Grades		
	Direct	Indirect	Total
Ethnicity	.015	-.034	-.019
Gender	-.136	-.076	-.211
Family Background	.003	.017	.020
Ability	.420	.085	.505
Parental Involvement	.037	.090	.127
Time on Task	.135	---	.135
General Self-Esteem	.035	---	.035
Student Attitude About School	.271	---	.271

Table 4 Direct, Indirect, and Total Effects of Variables in the Achievement Test Scores Model

Variable	Achievement Test Scores		
	Direct	Indirect	Total
Ethnicity	.061	-.009	.052
Gender	-.023	-.020	-.043
Family Background	.050	.003	.053
Ability	.746	.024	.770
Parental Involvement	-.005	.023	.018
Time on Task	.076	---	.076
General Self-Esteem	.009	---	.009
Student Attitude About School	.038	---	.038

this discussion were also found to be significant.

Parental Involvement

The primary variable of interest in this study was parental involvement. As can be seen from Table 3 parental involvement had a meaningful total effect on grades of .127. This total effect was made up of a direct effect of .037 and an indirect effect of .090. The total indirect effects from the parental involvement variable through time on task, general self-esteem, and attitude about school (.090) is considered meaningful. In other words, parental involvement, as indicated by sophomores, tends to increase time-on-task, general self-esteem, and attitude about school over the course of the following years in a way that increases grades in school, as reported by students in their senior year. Note the direct effect of parental involvement on grades (.037) by itself was not meaningful.

The analysis showed that although parental involvement had no direct effect on grades, it did affect time-on-task (.179) which in turn affected grades in school (.135); however, the slight indirect effect of .024 was nonmeaningful. More striking was the meaningful indirect effect of parental involvement on grades through student attitude about school (.061). This suggests that parental involvement enhances the students' attitude about school (.225) which in turn improves students' grades (.271) for a meaningful and significant indirect effect of .061.

Parental involvement was also found to enhance students' general self-esteem (.126), however, no indirect effect on grades was found through this variable (.004). These results suggest that one way parents may best help student performance in school is by working to improve their child's attitude about school.

The residual path from outside the model to the parental involvement variable ($1 - R^2 = .961$) indicates that only 7.6% of the variance in parental involvement is explained by exogenous variables preceding in the model. This suggests that parents may indeed largely control their level of involvement through a sizeable component of individuality as is represented by the path from the residuals.

The relative influence of exogenous variables in the model on parental involvement is shown in Figures 4 and 5 by the direct paths from these variables to parental involvement. The path of .008 from ethnicity to parental involvement suggests there is no difference in white and non-white parental involvement in the presence of the other exogenous variables in the model. The negative path of -.156 from gender to parental involvement suggests that parents were more involved with their daughters than with their sons. The path of .163 from family background suggests that parents with higher socio-economic status tended to be more involved with their children. Likewise,

parents of high ability students tended to be more involved with their children (.117).

Unlike with grades, parental involvement had no total effect on achievement test scores (.018). This may be partly due to the overwhelming path of .746 from ability to achievement test scores. This path left very little variance in the achievement test score model to be accounted for by other variables. Research using less closely associated ability and achievement variables may produce stronger paths from parental involvement to achievement test scores.

Intervening Variables

The intervening variables time on task, general self-esteem, and student attitude about school were of interest to better understand how parents affect student performance in school. Time on task, which was comprised of homework time spent, attendance, and tardies, had a direct effect on grades of .137, which is meaningful. This effect suggests that students who attend school regularly and work at home receive better grades in school. Likewise, the meaningful path of .076 from time on task to achievement test scores indicates that increased time on task also improves achievement test scores.

General self-esteem had no effect on grades (.035) or achievement test scores (.009). Furthermore, only 4% of the total variance in general self-esteem was explained by

variables preceding in the model. In other words, general self-esteem did not contribute meaningfully to grades or achievement test scores, and general self-esteem was relatively unaffected by variables preceding in the model. Of the preceding variables, however, parental involvement did display the strongest path (.126) suggesting that parental involvement can enhance student general self-esteem. These results are consistent with mixed results of self-esteem in prior research (Calsyn & Kenny, 1972).

Student attitude about school had the strongest direct effect on grades of any variable in the model other than ability. There was no effect on achievement test scores. Since attitude about school is considered malleable, this effect suggests that improving the student's attitude about school may be an effective goal of parents intervening with their child. Furthermore, the path from parental involvement to attitude about school (.225), which is the strongest path from parental involvement to any other variable suggests that changing student attitude about school may be an area where parents can be most effective.

Since all three intervening variables are in the same block with no causal nexus assumed, the partial correlations between these variables are of interest. The partial correlation is a measure of the association of variable residuals. Figures 4 and 5 indicate that the strongest

partial correlation is between time on task and attitude about school (.377). This suggests that some cause outside the model may be associated with increases in both variables.

Background Variables

As expected, ability had a strong, positive, direct effect on grades (.420) and achievement test scores (.746), increased students' general self-esteem (.109), and led to a better attitude about school (.143), which supports the work of Sewell (1970) and others. High ability students were found to apply themselves to school tasks more than did low ability students (.200) and tended to report more parent involvement (.117). High ability students may have applied themselves more due to challenging themselves with more rigorous course selections which demand more homework time (Keith, 1982).

While nonwhites were found to spend more time on school related tasks than whites (-.062), no direct relation of ethnicity to grades was found when other variables in the model were included (.015) although whites scored better on achievement tests (.061). These findings support the work of Keith (1991). This path however must be interpreted with extra caution due to the possible presence of measurement error leading to bias in the least-squares estimate when ethnicity is involved (Wolfle, 1983). Note, however, the zero-order correlations between ethnicity and family

background (.233) and ethnicity and ability (.322).

Supporting the Coleman Report (Coleman et al., 1966), whites were shown to have lower general self-esteem than non-whites (-.087) and to have a less positive attitude about school (.086).

As expected, girls reported better grades than boys as indicated by the direct path of -.136; and girls studied more than boys (-.171). Girls also had a better attitude about school than did boys (-.128), had lower self-esteem (.058), and tended to be more involved with their parents (-.156).

Although family background influenced parental involvement, with parents having higher socioeconomic status tending to be more involved (.163), the variable had no effect on grades, time-on-task, or attitude about school when other variables were entered into the model. This supports the work of Watson et al. (1983) and Walberg et al. (1985).

As expected, achievement test scores were not as affected by the variables in the model as was grades. Ability had an overwhelming direct effect on achievement test scores (.746) where the effect on grades was .420. Ethnicity had a small but meaningful effect on achievement (.061) but not grades (.015). Time-on-task had a direct effect of .076 on achievement test scores (grades .135), however, the indirect effect on achievement test scores of

parental involvement through time-on-task was not meaningful (.014). Direct effects from general self-esteem were non-meaningful for grades as well as achievement test scores (.035, .009). Attitude about school, which was the most meaningful direct and indirect effect for grades was non-meaningful for achievement test scores (.038).

Parental Involvement Variable Decomposed

To better analyze the separate indicators for the parental involvement variable, models for grades and achievement were analyzed separately with the parental involvement variable separated into its individual components. The data were analyzed through P.A.S.E. (Wolfle, 1984) using the models as depicted in Figures 4 and 5. The parental involvement variable was separated into its six separate components as outlined in chapter three and analyzed separately for grades and achievement test scores. Twelve separate analyses were conducted to assess the direct, indirect, and total effects of each separate parental support component on the two performance criteria.

As expected from analysis of the clustered achievement model, no direct, indirect, or total effects were meaningful from individual parental involvement measures to the outcome variable of achievement test scores, supporting the work of Keith (1991). Likewise, no meaningful effects were found from "parents know where the child is and what they are doing" on grades. All other individual parental components

did however result in significant and meaningful effects on grades. Variables and effects are presented in Tables 5 and 6.

Father monitoring schoolwork, while having a nonmeaningful direct effect of .024, had a meaningful total indirect effect of .051 through the intervening variables for a total effect of .074 ($R^2 = .412$). Mother monitoring schoolwork had an indirect effect of .049 which approaches meaningfulness and when added to the slight direct effect of .013 results in a total effect of .062 which is considered meaningful ($R^2 = .411$). Time spent talking with parents about personal experiences resulted in meaningful total indirect effects of .051 which when added to the slight and nonmeaningful direct effect of .017 results in total effects of .068 ($R^2 = .411$). Father helping with educational plans showed a meaningful indirect effect of .056 which adds to the slight and nonmeaningful direct effect of .014 for a total effect of .070 ($R^2 = .411$). Mother helping with education plans displayed a meaningful total indirect effect of .061 added to the direct effect of .029 for a total effect of .090 ($R^2 = .412$).

These results suggest that it may not be so much what parents do but that they do. In other words, the parental involvement effect is stable and robust across student responses which deal with different aspects of parental involvement in the home. However, it seems the involvement

Table 5 Direct, Indirect, and Total Effects of Parental Involvement Components on Grades

Variable	Grades		
	Direct	Indirect	Total
Father Monitors Homework	.024	.051	.074
Mother Monitors Homework	.013	.049	.062
Parents Know Where and What I Do	.032	.000	.032
Time Talking to Parents	.017	.051	.068
Father Helps with School Plans	.014	.056	.070
Mother Helps with School Plans	.029	.061	.090

Table 6 Direct, Indirect, and Total Effects of Parental Involvement Components on Achievement

Variable	Achievement		
	Direct	Indirect	Total
Father Monitors Homework	-.006	.012	.006
Mother Monitors Homework	-.009	.012	.003
Parents Know Where and What I Do	.004	.014	.018
Time Talking to Parents	.000	.012	.012
Father Helps with School Plans	-.010	.015	.005
Mother Helps with School Plans	.016	-.006	.010

must be action oriented as is suggested by the non-meaningful effects of the parental involvement component, "I know where my child is and what they are doing" as contrasted with the meaningful effects of monitoring, talking, and helping.

Chapter V

Discussion and Conclusions

Studies in the past have shown the importance of parental involvement on students' school performance. The purpose of this study was to show the direct and indirect effects of parental involvement in the home on both high school grades and achievement test scores through the student variables time on task, general self-esteem, and attitude about school.

The variables time on task, general self-esteem, and student attitude about school were chosen not only for their influence on grades and achievement, but also because of their inherent worth outside of these performance measures. It was reasoned that time on task, general self-esteem, and attitude about school were valuable constructs to be nurtured in students along with the performance measures of grades and achievement test scores. Furthermore, these variables were selected because they were constructs that parents could potentially affect in the home without interacting with the school. Parents of high school aged children are hesitant to become involved at school but are interested in how to help their child achieve better in school (Comer, 1988).

The study showed that parents who show interest in their child educationally can positively influence their child's grades and directly influence their child's general

self-esteem, attitude about school and time on task. The study also reveals to parents how indirect effects of their influence may be meaningful toward school performance. The effect of parental involvement through time on task, general self-esteem, and attitude about school on grades was meaningful and significant which indicates collective positive influences through these variables on grades.

Parental influences were greater on grades than on achievement. It is not surprising that grades were more affected by parental involvement than were achievement test scores. First, grades are more sensitive to student effort and may better reflect the students' attitude about school. Second, since the ability and achievement measures used in the study were very similar, a large part of the variance in achievement test scores was accounted for by the direct effect of ability.

Aside from the achievement and grades variables, parental involvement showed a strong direct influence on student time on task, general self-esteem, and attitude about school. Parents who monitor their child's work, help them with school plans, and spend time talking with them about personal experiences can enhance their child's general self-esteem, attitude about school, and time spent on school related tasks even in their high school years. Furthermore, it is important to note that increased school performance does not require the sacrifice of a child's general

self-esteem, attitude about school, and time on task. In other words, parents do not have to push their child to the point of creating distaste for school in order for school performance to improve. It is comforting to note that positive parenting techniques can enhance student time on task, student attitude about school, and student general self-esteem while improving high school grades.

The strongest effect of parental involvement on grades was through student attitude about school. This significant and meaningful indirect effect suggests to parents that supporting and encouraging their secondary aged students at home will not only enhance their child's attitude about school but will also indirectly improve their child's grades through attitude about school.

Analysis of the individual components of the parental involvement variable suggests that when parents spend time talking with their children, monitoring schoolwork, and helping plan their education, a positive, meaningful, indirect effect on grades results, mostly through student attitude about school. Interesting for fathers is the meaningful indirect effect on grades of fathers helping with school plans and of father monitoring schoolwork. Perhaps here is an area where fathers can be especially effective in helping their child perform in school.

The study provides good news for parents. If parents attempt to help their child's performance in school by

increased involvement with their child in the home, their efforts will probably help. As shown by the analysis of separate parental involvement components, what parents do may not matter as much as that they do. Parents can use their preferred parenting style to support their children at home in a way that will benefit in-school performance whether it be monitoring schoolwork, helping with educational plans, or talking with their child about personal experiences.

One way to look at models analyzed in this study is in respect to the total variation not explained by variables in the model (as depicted by the single headed arrows with sources outside the model). These arrows indicate the amount of variance accounted for by unexplained sources outside the models. The grades model explained about 41% of the variance in grades attained. This suggests that quite a large variation in grades is attributable to variables within the model. This becomes especially salient when one considers that the difference between a letter grade in school may be quite a small percentage indeed.

More variation in achievement test scores was explained by the achievement test scores model (67%) than the grades model. This was due largely to the overwhelming contribution of the ability measure. This model proved less useful in its interpretation due partly to this overwhelming path from ability to achievement test scores.

Parental involvement is 92% unexplained by variables preceding in the model (exogenous variables). This suggests that 92% of parental involvement is not explained by the child's gender, ethnicity, family background, or ability. This is good news for parents because parental involvement may be largely "free will" and potentially quite self-manipulable by the parent in spite of background characteristics. In other words, parents can change their own behavior (increase parental involvement) in order to help their child better perform in school.

The three intervening variables of time on task, general self-esteem, and student attitude about school are also largely unexplained by variables preceding in the model (89%, 96%, 90% unexplained respectively). Although the model does not explain a large degree of variance in these three intervening variables, parental involvement is the largest contributor within the model. Parental involvement is the largest contributing path to time on task of any variable in the model except ability, is the largest to general self-esteem, and is the largest contributing path to student attitude about school. The remaining unexplained variance in these variables leaves much for future research. The challenge, of course, is to determine in future models what indeed does cause variation in these variables and to determine if this variation can be better understood.

Caution should be used in interpreting the results of

this study. The HS&B data used for the study was based on student perceptions of grades, time on task, and parent involvement, and not the measures themselves. However, reliability for most measures has been established in former studies. The composites created were averages based on strategies used by Keith and others or were HS&B composite indexes. The parental involvement variable was an a priori specified, averaged z-score of six questions that students responded to about their parents. It may be argued that the composite lacks justification when the intercorrelations of the indicator variables, the six questions, are viewed and the analysis examined. However, that is not the conclusion reached by this researcher since the composite contributes meaningful effects to a model in which accompanying paths support existing research.

Some minor variations in correlation coefficients may be noticed by other researchers working with the HS&B data set. These may be due to the listwise deletion selection criteria which selected only 18,141 students from the data set of 28,875. School dropouts and transfers accounted for some of the difference. The remaining were nonrespondents to at least one question in either the base year or the follow-up year. Although this procedure eliminated possible subjects from the study, it assured that all subjects responded to all measures. Transfers were deleted from the study because it was reasoned that results may be confounded

by parents likely being more interested in a child's activities at school in a new environment (especially since these respondents were weighted to account for nonrespondent transfers who were difficult to locate). Although pairwise correlations were also generated and analyzed in this study, logic suggested interpretation based on listwise deletion.

Acceptance of these models does not mean they are correct or that they are the only explanation for the data. The models developed for this study were based on theory, conjecture, literature, experience, and listening. The models represent merely an exercise in thinking and ultimately a vehicle for communication. It is recognized that equally feasible, alternative causal explanations may fit the data and that causation may not exist where significance is found. The models embody the concept of free will represented by the preponderance of unexplained variance surrounding the models which beckons researchers to unravel the random mystery in search of causal links. The excitement of the models is in their resistance to causal predictability and their defense of inevitable free will in parents and in students. Hooray for the elusiveness of self-esteem.

So what should parents do? Substantively, when parents get involved with their child at home concerning school it enhances their child's general self-esteem, it increases their child's time on task which in turn improves grades and

it enhances their child's attitude about school in a way that improves grades. When one asks what parents can do to help their child, the implications of this study suggest that they should support their child's school efforts in any way they can. Specifically, they should monitor their child's school work where possible, plan school related activities with their child, and spend time talking with their child as often as possible about school experiences.

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- even the score? NEA Today, Special Edition, 6, 48-53.
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Wolfe, L. M., & Ethington, C. R. (1985). GEMINI -
Program for Analysis of Structural Equations with
Standard Errors of Indirect Effects. VPI&SU.

VITA

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Birthdate 3-13-1952

EDUCATION:

A.B.D. Educational Research & Evaluation, Virginia Polytechnic Institute and State University (VA Tech).
Expected Ph.D. Spring 1992.

M.S. 1979, Radford University. Major: Secondary Guidance,
Minor: Physical Science.

B.A. 1974, College of William and Mary. Major: Fine Arts,
Physics.

CERTIFICATION:

Virginia Postgraduate Professional Certificate-
Endorsements: Director of Vocational Education, Secondary
Supervisor, General Supervisor, Secondary Principal,
Secondary Guidance, Unclassified Trades, Principles of
Technology, Physics, and Art.

EXPERIENCE:

1992-Present
Director, Roanoke Area Tech Prep Consortium.

1988-1992
Assistant Principal, Adult Education Coordinator, Arnold R.
Burton Technology Center, Roanoke County Schools.

1987/88/90
Adjunct Instructor each Spring Semester, James Madison
University, Physics Workshop 501 (Principles of Technology).

1984-1988
Teacher, Principles of Technology, Arnold R. Burton
Vocational School, Roanoke County Schools.

1981-1984
Guidance Counselor, Art Teacher, Head Track Coach
(1982-1985) Northside High School, Roanoke County Schools.

1979-1981
Teacher, Gifted Program, Curriculum Development and
Instruction in areas of Physics, Art, and Technology,

Roanoke County Schools.

1974-1979

Teacher, Physics, Art, and Physical Science. Coordinated Gifted Program. Head Track Coach and Assistant Football Coach, Hurley High School, Buchanan County Schools.

GRANTS WRITTEN & FUNDED:

1991-1994

Project Director, Roanoke Area Tech Prep Exemplary Grant (\$450,000).

1991-1993

Roanoke Area Tech Prep Continuation Grant in Early Childhood Development (\$50,000).

1991-1992

International Marketing Planning Grant (\$15,000).

1991-1992

Tech Prep Planning Grant: Educators in the Workplace (\$15,000).

1990-1992

Roanoke Area 2 + 2 Project in Early Childhood Development (\$50,000).

1989-1992

Project Director, Roanoke Area Project PACE (Industry/Education Partnership, \$30,000).

1989-1990

Project Director, Gifted and Talented Vocational Education Grant: Merging the Arts and the Vocations (\$5,000).

1988-1990

Project Director, Roanoke Area 2 + 2 Project in Automated Manufacturing Technology (\$40,000).

INVITED PRESENTATIONS:

March 10, 1992

National Tech Prep Network Conference, Dallas, Texas: "Promoting Tech Prep Programs."

February 7, 1992

Regional State Tech Prep Conference, Abington, VA: "Steps in Implementing Tech Prep Projects."

January 31, 1992

Virginia State Tech Prep New Project Directors Meeting,
Richmond, VA: "Steps in Implementing Tech Prep Projects."

November 22, 1991

Virginia Tech Sponsored Regional Tech Prep Conference,
Roanoke, VA: "Promoting Tech Prep Programs."

November 1, 1991

Virginia State Tech Prep Project Directors Meeting,
Richmond, VA: "Steps in Implementing Tech Prep Programs."

October 16, 1991

Keynote Speaker, Northwest Tri-State Competency-Based
Vocational Education Conference, Lewiston, Idaho: "Tech Prep
Virginia Style" (secondary and post-secondary educators from
Washington, Idaho, and Oregon).

October 14, 1991

Idaho Association of Private Industry Council's Annual
Conference, Coeur D'alene, Idaho: "Promoting Tech Prep and
2 + 2 Programs" (educators, business, industry, government,
and social service leaders).

September 26, 1991

Virginia Community College Deans/Provosts Meeting and
Conference, Portsmouth, VA: "Public Relations/Marketing of
Tech Prep Programs."

June 27, 28, 1991

National Leadership Conference, Vocational Industrial Clubs
of America (VICA), Louisville, KY: "Vicamania" (student
motivational rock'n'roll performances at Freedom Hall and
Kentucky Fairgrounds).

May 2, 1991

Challenge 2000 Conference, Roanoke, VA: "Using Principles
of Technology to Strengthen Academic Skills."

April 26, 27, 1991

State Leadership Conference, VICA, Richmond, VA: "Vicamania"
Performances.

April 9, 1991

Northwest Regional 2 + 2 Articulation Conference, Center for
Occupational Research and Development (CORD) sponsored,
Boise, ID: "Marketing 2 + 2 Programs."

March 15, 1991

Challenge 2000 Conference, Richmond, VA: "Using Principles
of Technology to Strengthen Academic Skills."

February 21, 1991

Midwest Regional 2 + 2 Tech Prep Articulation CORD
Conference, Oklahoma City, OK: "Marketing Tech Prep
Programs."

December 12, 1990

Leadership of the Roanoke Valley Education Conference,
Roanoke, VA: "Combining Technical and Academic Education."

November 8-9, 1990

Seventh Annual Excellence in Education Conference, VA Tech,
Blacksburg, VA: Exhibitor, Roanoke Area 2 + 2 Program in
Automated Manufacturing Technology.

October 17-18, 1990

Virginia Society for Human Resource Management Conference,
Roanoke, VA: Exhibitor, Roanoke Area 2 + 2 Program in
Automated Manufacturing Technology.

October 3, 1990

Eastern Regional Tech Prep Conference, Hagarstown, MD: "The
Tech Prep Marketing Committee."

September 28, 1990

2 + 2 Project Directors Orientation Meeting, Richmond, VA:
"Issues and Tactics for 2 + 2 Implementation" (Panelist).

May 5, 1990

State Leadership Conference, VICA, Norfolk, VA: "Vicamania"
at Chrysler Hall.

April 26, 1990

Principles of Technology Regional Conference, Staunton, VA:
"Implementing Principles of Technology."

May, 1978

Virginia Gifted and Talented Education Conference, Richmond,
VA: "An Individualized Educational Gifted Program." Slide
production and presentation.

OTHER:

1990-1991

Steering Committee, Arnold R. Burton Technology Center
School Self Study.

1988-1990

Established and Directed Roanoke County Schools'
Teleconferencing Center including securing downlink
equipment donations from area businesses and conducting
conferences for education, business, industry, and service

organizations.

1988-1989

Facilitated various Drive-in Regional Administrator conferences through the Virginia Center for Educational Leadership (VCEL), "Train the Trainer" series including Teleconferences and workshops on Marginal Learners, Improving Achievement Test Scores, Administrative Uses of Microcomputers, and Teacher Empowerment.

1985-1988

Evaluated the Roanoke Valley Regional Governor's School for Science and Technology (Graduate Assistantship through Virginia Tech).

Summer 1985 & 1986

Computer Lab Assistantship, Virginia Tech, Department of Educational Research and Evaluation (Analysis and Training).

1984-1985

Taught one of two pilot programs in Virginia as part of nationwide consortium for developing Principles of Technology curriculum.

1981

Produced Roanoke County Schools' Gifted Program audio/visual presentation: "The Pursuit of Excellence."

1978-1984

Founded and Directed Knox Creek Mountain Festival through Buchanan County Schools Art/Gifted Program, Hurley, VA. (Attended by an estimated 5,000 people yearly).

1978-1979

Developed model program for Buchanan County Schools for Gifted and Talented Students.

AWARDS:

November 9, 1990

Certificate of Recognition for Excellence in Education, Virginia Tech, for Roanoke Area 2 + 2 Program in Automated Manufacturing Technology.

July, 1989

Received Commendation from Roanoke County Board of Supervisors for contributions to the county through Projects PACE and 2 + 2.

September, 1985

Received Distinguished Service Certificate for Extraordinary

Teaching Contributions to the nationwide Principles of Technology Project by the Center for Occupational Research and Development in Waco, TX and The Agency for Instructional Technology in Bloomington, IN.

Summer 1969

Received National Science Foundation Scholarship grant after Junior year in High School to attend Physics and Computer Science Colloquium at Colorado College for 10 week session.

REFERENCES:

Furnished on request

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