THE EFFICACY OF MIDDLE SCHOOL INDICATORS TO PREDICT THE ACADEMIC AND BEHAVIORAL PERFORMANCE OF AT-RISK NINTH GRADERS

by

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Dropping out of high school may have individual as well as social implications. The process of dropping out is attributed to social and academic risk factors. Attendance, course completion and grade-point-average have been identified as key indicators of students off-track for graduation. This study utilized a single exploratory case design with embedded quantitative statistical analysis to understand the characteristics of 416 students transitioning from three middle schools to a large, suburban high school. Correlation and regression analyses were used to examine the relationship between 12 middle school indicators and ninth grade attendance, course completion, and grade-point-average. Findings suggested that middle school grade-point-average, course grade D, attendance, and ACT math scores were strong predictors of ninth grade performance. The major implications have highlighted key middle school risk indicators for identifying and providing intervention to transitioning students at risk of school failure.

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To Kobe, Kortnie and Logan.

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CHAPTER I

INTRODUCTION

The United States has a dropout crisis (Christle, Jolivette, & Nelson, 2007; Neild, Stoner-Eby, & Furstenberg, 2008). Recent data suggest that approximately 10 percent of students entering high school eventually leave school before graduation without a diploma or equivalency (U.S. Department of Education, 2007). Students who dropout of school are four times more likely to be unemployed, and earn one-third less income than high school graduates (Patterson, 2004; U.S. Census Bureau, 2006). They have fewer employment options, and if employed, usually end up in low-skilled, low-paying positions with few opportunities for advancement. In addition, students who dropout report having more health problems, and on average, die at an earlier age than students who graduate (U.S. Department of Education, 2007). They often lack the resources and quality health care needed for productive lives. Finally, high school dropouts make up a higher percentage of the nation's prison inmates (U.S. Department of Justice, 2002), and they are more dependent on welfare and other government programs (Christle, Jolivette, & Nelson, 2007). Consequently, dropping out of school may be viewed as a social, as well as personal crisis.

Research suggests that the transition from middle school to high school is a critical point on the path to high school graduation (Christle, Jolivette, & Nelson, 2007; Neild, Stoner-Eby, & Furstenberg, 2008; and Patterson, Beltyukova, Berman & Francis, 2007). Students making this transition may experience social as well as academic challenges that result in negative consequences, including academic loss and drop out. Nationally, one-third of the students who drop out of high school make this decision between the ninth and tenth grade year (Patterson, Beltyukova, Berman & Francis, 2007). Allensworth and Easton (2005) suggest that freshmen-year academic performance is strongly linked to high school graduation. Specifically, they report that freshmen students who fail a core academic course in language arts, math, science or social studies are three and half times more likely to not graduate from high school. Therefore, graduation rates are not likely to improve until schools improve students' academic performance in the freshmen year.

While student consequences are high for dropping out of school, federal and state accountability systems have raised the stakes for schools whose students fail. No Child Left Behind (2001) requires each state to set targets for graduation rates that progressively increase, resulting in all schools reaching a 100 percent graduation rate by 2014. Failure to meet the federal benchmarks may result in a variety of consequences for schools, including the loss of federal title funding. Many states have changed their graduation requirements, including setting performance standards on statewide assessments. In addition, schools have implemented a variety of reform efforts focused on increasing freshmen success through structural changes, such as block scheduling and

teacher teams. Schools have also increased the rigor of their curriculum, provided tutoring, and developed more holistic assessments of student learning with mixed results.

A school reform that may address the needs of freshmen, leading to greater student success, is Freshmen Achievement Team (FAT). FAT provides struggling freshmen students in core academic areas with tiered interventions and monitors students' academic progress. Teachers are teamed, particularly in social studies and language arts, and assigned a cohort of approximately 75 freshmen students. Teachers are provided a common plan time to develop common assessments and develop interdisciplinary instruction. In addition, each team is provided time twice each month to meet with a counselor, an administrator, an intervention specialist, a Special Education teacher, and a school psychologist, to monitor student progress and develop classroom and school-wide interventions for students who struggle. It is believed that teacher teaming creates a smaller learning environment that is adapted to provide individual intervention for struggling students prior to academic failure. Early identification of at-risk students is critical to providing effective intervention.

The FAT process, however, is based on accurately identifying students who are likely to (at risk of) drop out. At-risk students are pre-identified for intervention by exhibiting risk indicators in middle school. A *List of Incoming Transition Students At-Risk (LITSAR)* identifies the most at-risk students that are transitioning to the high school based on 12 indicators, including a student's grade-point-average, number of D and F grades, number of suspensions and expulsions, attendance rate, scores on the four ACT Explore exams, and scores on the reading and math state assessments. Students who are

identified as at risk on six or more of the 12 indicators are considered to be possibly at-risk for school failure. These students are monitored by FAT and provided early interventions. While the *LITSAR* relies on a number of indicators, an efficient typology of at-risk indicators may improve the efficacy of interventions.

The development of at-risk indicators would be helpful in the development of differentiated interventions for struggling students. Early identification of struggling students may lead to timely and effective intervention that improves student performance, leading to high school completion. For example, a number of studies have suggested that previous academic failure (Finn & Rock, 1997), problem behavior (Tobin & Sugai, 1999), and attendance rates (McIntosh, Flannery, Sugai, Braun, & Cochrane, 2008), are strong predictors of student dropout. Unfortunately, academic failure and problem behavior rarely exist in isolation. McIntosh, Flannery, Sugai, Braun, and Cochrane (2008) suggest that multiple factors combine to put students in more dramatic risk of failure in high school. Consequently, early identification of at-risk factors is important to mitigating the cumulative effect of school failure.

The purpose of this study was to examine the efficacy of 12 middle school academic risk indicators to identify struggling students entering the ninth grade. I examined existing data from a large, suburban high school to analyze the nature of the indicators and their relationship to ninth grade performance. Initially, I examined descriptive data of academic performance, problem behavior, and attendance of ninth grade students. Subsequently, I used statistical analysis to answer the following research questions: First, how many students are considered at-risk? Second, how do at-risk ninth

graders perform on each middle school indicator? Third, what are the characteristics of at-risk and non-risk students? Fourth, how does each eighth grade indicator correlate to ninth grade performance? Finally, what are the significant predictors of ninth grade performance?

CHAPTER II

BACKGROUND RESEARCH

Recent research into high school completion has identified dropping out of school as a personal and social crisis (Christle, Jolivette, & Nelson, 2007; Neild, Stoner-Eby, & Furstenberg, 2008). High school dropouts have limited life experiences and, as a group, become a drain on social services. Schools have developed a wide range of interventions to keep students on track for graduation. Effective school interventions have typically been based on evidence from student data.

Unfortunately, the complexity of social and academic risk factors may mitigate the impact of intervention. Risk factors are cumulative in nature, and may be identified as early as the sixth grade. The transition of students from middle school to high school may be a tipping point for students in process of dropping out. Current research has suggested that strong predictors may occur during the ninth grade, including attendance, course completion, and grade-point-average (Allensworth & Easton, 2005; Allensworth & Easton, 2007; Christle, Jolivette, & Nelson, 2007; Neild, Stoner-Eby, & Furstenberg, 2008; and Patterson, Beltyukova, Berman & Francis, 2007). Early identification of students that struggle academically is an important first step to providing targeted interventions.

A Focus on the Ninth Grade

Students experience many changes in the transition from middle to high school. High schools, particularly in an urban or suburban setting, are large institutions that students may find to be cold and impersonal places compared to their middle school experience (Mizelle, 2005). In addition to their physical size, high schools are remarkably different from the middle school. Students find a greater emphasis placed in high school on course grades and higher expectations are placed on completing homework (Letrello & Miles, 2003). Students often feel overwhelmed and under prepared for these new academic demands. Students who fail often find themselves retaking courses or face the possibility of not graduating on time.

High schools, also, increasingly require students to make more choices about their curriculum and extracurricular activities that have greater ramifications on their future. Decisions about course selection, such as college-prep or honor courses, may increase the pressure that students feel to succeed far beyond what has previously been experienced. Participation in extracurricular activities may conflict with the time necessary for students to complete the new homework demands. Consequently, students entering high school are faced with increased expectations and time conflicts that may lead them to struggle in school (Patterson, Beltyukova, Berman & Francis, 2007).

Students' experiences in transitioning to high school are not necessarily unique and may be anticipated. Roderick (1993) suggested that a high school's physical size might negatively impact student performance. In a study of students beginning in the seventh grade, she found that the academic performance and attendance of students that

eventually dropped out decreased substantially after each transition, from elementary to middle school and from middle to high school. She suggested that transitioning from school to school negatively impacted student performance. She further concluded that dropping out is based on something within the environment that causes student to disengage from school, such as the physical size of the school.

In addition, a change in the teacher-student relationship may negatively impact student performance. In a study of transitions of poor, urban students, Seidman, Aber, Allen, and French (1996) found that there was a decline in grade-point-averages during the first year of high school. Further analysis suggested that students felt a significant loss of support from school staff while experiencing significant increases in negative transactions with teachers and other adults regarding the students' academic progress throughout the transition year. Seidman and associates (1996) conclude that these changes in student perceptions are rooted in existing organizational arrangements within the school and not from changes within the students themselves. In addition, Neild, Stoner-Eby, and Furstenberg (2008) suggest that there is a mismatch between students' academic and social skills and high school's organization, practices and demands. They note that the majority of ninth graders enter with academic skills several years below grade level, and teachers are ill-prepared to teach students in need of basic literacy and numeracy skills.

Student achievement in middle school also may have contributed to a difficult transition to high school. Allensworth and Easton (2005) suggested that there is a strong relationship between middle school performance and ninth grade course completion. In

their study of Chicago Public Schools, only 40 percent of students entering high school with relatively weak test scores were on-track for graduation at the end of 9th grade, and only 68 percent of these students actually graduated four years later. In comparison, over 75 percent of the students with relatively strong test scores were on-track at the end of ninth grade. They concluded that middle school achievement levels influence a student's successful transition to high school.

Research has found that the transition to ninth grade is crucial for dropout prevention (Kennelly & Monrad, 2007). The ninth grade year is often identified as the year when students are likely to get off-track for high school success. More students fail ninth grade than any other high school grade, and a disproportionate number of students were held back during this time (Herlihy, 2007). According to Neild and Balfanz (2006), about two-thirds of the dropouts in Philadelphia schools were in grade 10 or below.

As Neild, Stoner-Eby, and Furstenberg (2008) have concluded, turning around ninth grade student outcomes is an enormous task that will not be achieved through piecemeal solutions. Individual interventions or policies have not appreciably impacted educational outcomes for students who are vulnerable for academic failure. Christle, Jolivette, and Nelson (2007) have suggested that there is a wide variety of personal and school factors that contribute to school failure and dropout, and Suh and Suh (2007) also suggested that the combination of two or more risk factors may dramatically increase the likelihood of dropping out. Suh and Suh further concluded that students who dropped out of school were not all alike but rather they differed according to personal and social characteristics. Understanding that contributing factors to school failure are

multivariable, the identification of a single precursor is problematic. A current approach to addressing the needs of struggling students has focused on problem solving.

A Problem-Solving Approach

A problem-solving approach is a systemic process that includes the assessment of a student's needs, development and implementation of supports to meet those needs, and the monitoring and evaluation of student outcomes (Nunn & McMahan, 2001). Used as an alternative method of identifying students in need of special education services, it attempts to overcome the "wait to fail" phenomenon in which students have to fall far enough behind others students before meeting special education's discrepancy criterion. By the time these students qualify for special education, they have already experienced years of academic failure (Lau, et al., 2006). Introducing interventions prior to a student actually failing may improve student performance and mitigate a student's decision to drop out. Nunn and McMahan (2001) have identified four key principles of a problem solving approach that include: (1) assessment of classroom performance, (2) collaborative decision-making, (3) solutions based, and (4) frequent progress monitoring.

Assessment of Classroom Performance

The problem solving approach views student concerns in the context of performance relative to expectations of the general education classroom. Students are evaluated within the day-to-day context of classroom demands. As students work toward defined learning targets, their performance is assessed and monitored. Assessment within the classroom is functional and dynamic, assisting in the identification of problem behavior, development of interventions, and evaluation of intervention outcomes.

Assessment is an on-going process used to increase confidence in decisions made at every level of involvement with the child. Assessment is a practical tool to guide intervention. The function triad of assessment-intervention-outcomes allows collaborative data based decisions to increase the effectiveness of each intervention.

Collaborative Decision-Making

The problem solving approach enhances individual skills of team members through collaborative planning, decision-making, and support. Felner, et al. (2007), in their work with smaller learning communities, suggest that empowering teacher teams to make decisions on student outcomes leads to more effective teaching and higher expectations for student progress. Staff empowerment to make decisions concerning a student's educational experience is critical to effective problem solving. With access to student data, teams evaluate a student's performance and develop an intervention plan for student improvement through a decision- making protocol. The protocol is a multi-step process that gathers input from all stakeholders, including teachers, counselors, parents and students. This process relies on the use of evidence-based strategies and student data to develop student interventions that are effective in addressing the student's needs. Student data are continually monitored and interventions are adjusted accordingly. Figure 1 outlines the decision-making protocol, beginning with the student's problem or concern. At each step in the protocol, staff members are focused on solutions that improve student outcomes.

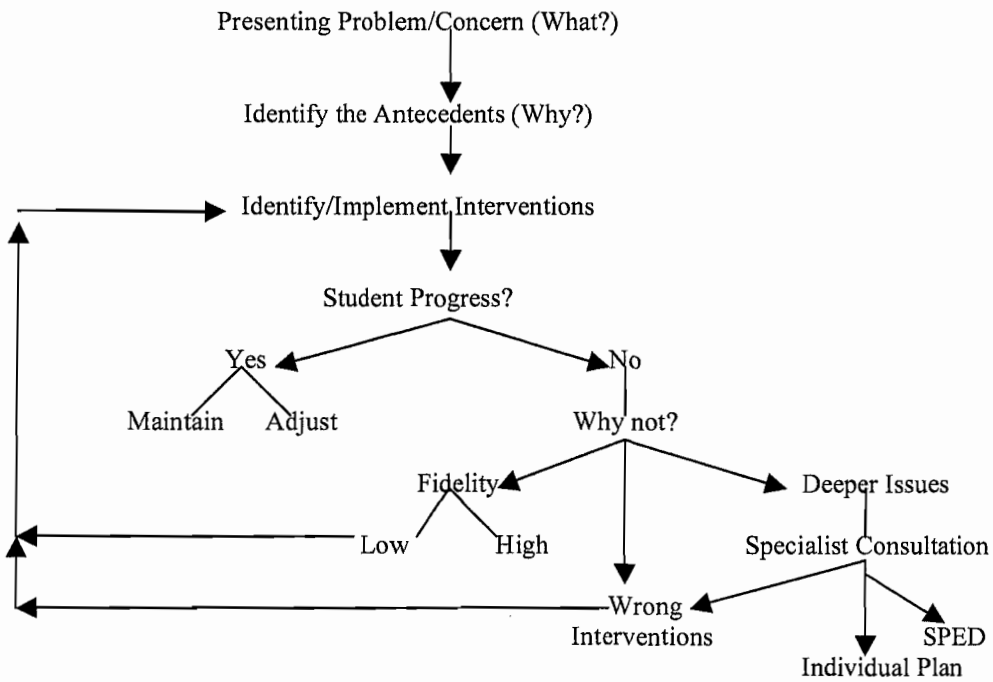

Figure 1. FAT Decision-Making Protocol

Solutions Based

The problem solving approach is solutions oriented. Central to problem solving is the development of solutions that meet the educational needs of each student. Lau, et al. (2006) stated that an important goal is to provide resources and support to at-risk students so that they can be served within the regular classroom. With this understanding, interventions may need to be a package of strategies. Agras, Kazdin and Wilson (1979) suggest that a multiple variable problem, such as school failure, may require a multifaceted strategy that includes strategic and intensive interventions. Many ingredients may comprise an intervention package, including some that are unnecessary and perhaps even ineffective. Allensworth and Easton (2007) suggest that problems with course

failure in 9th grade indicate broader problems of academic performance. They report that failure in even one semester course is generally a sign of trouble in other courses. This suggests that singular interventions that address a particular course might be limited in their ability to affect broader outcomes, compared to more comprehensive coordination of an intervention package across classes. If the entire intervention package with all its distinguishable components changes behavior, then the problem solving team can reinforce effective interventions and begin to scrutinize particular components that may not work. School failure requires a comprehensive approach to intervention.

Although interventions need to be flexible to address the individual needs of struggling students, the success of a particular intervention package is reliant upon valid judgments made by teachers. The American Educational Research Association (1999) and the U.S. Department of Education (2003) have stressed the importance of validity information that supports the use of evidence-based interventions. Interventions are most effective when there is a strong relationship between assessment results, prescribed interventions, and desired outcomes. Gleason and Dynarski (2002) suggest that dropout prevention programs are effective when evidence-based interventions are focused on individual student outcomes with frequent progress monitoring.

Frequent Progress Monitoring

Problem solving uses simple, frequent and ongoing indicators of progress to monitor the impact of interventions upon student outcomes. Sugai and Horner (2002) suggest that student data may be used throughout the problem solving process to: (a) define and prioritize areas of continuing concern, (b) select and adjust practices to

address these areas of concern, (c) continually evaluate the impact of these practices in achieving desired outcomes, and (d) guide long-term action planning and sustainability goals. The empowerment of teachers to monitor student progress and adjust interventions based on student data should lead to improved student performance. As students struggle, data may inform decisions about increasing the level of intervention from strategic to intensive.

Multi-Tiered Intervention

A growing body of research has examined the utilization of multi-tiered intervention systems in schools (Kamps & Greenwood, 2005; Sugai, 2003; Vaughn, et al., 2008). Borrowed from the mental health field (Sailor, Stowe, Turnbull & Kleinhammer-Tramill, 2007), multi-tiered interventions include systemic, strategic and intensive interventions. Each level is characterized by specific strategies that increase in intensity as students are in need of further intervention. Systemic interventions are strategies that involve the entire school community. Strategic interventions are focused on small groups of students that need targeted strategies that are beyond systemic efforts. Intensive interventions target individual students with specific needs that require individual strategies.

Systemic Interventions

Systemic interventions include school-wide reforms that impact every student. These interventions focus primarily on structural reforms intended to personalize students' experience and improve instruction. While identified as interventions, these structures are intended to be more proactive in the prevention of failure as opposed to

reacting to a student that has already failed. Systemic interventions include a number of components, each of which is described below.

Block scheduling offers every student the opportunity to take eight classes that are divided equally over two days; the first four classes meet on the first day and second four classes meet on the following. This alternating day schedule allows each class to meet for approximately 90 minutes each session. This extended class time is intended to provide students with more in-depth instruction, increased student learning and an improved school climate. In a meta-analysis of 58 studies on blocking scheduling, Zepeda and Mayers (2006) have suggested that research supports two generalizations: (a) students and teachers have reported increased positive interactions, and (b) student grades and grade-point-averages have increased.

Interdisciplinary teaming occurs in all ninth grade language arts and social studies courses, where teachers share a common cohort of students. Teachers share a common planning time to develop an interdisciplinary curriculum and common assessments. In addition, interdisciplinary teams provide a context for a smaller learning environment. While research on the impact of interdisciplinary teaming on student achievement is mixed, Felner, et al. (2007) have suggested that teaming may create positive school attitudes and improve student attendance. Students have a greater sense of belonging and engagement. This is accomplished through the creation of small, personalized learning communities that rely on the teaming concept.

Instructional coaches are provided to work with staff in further developing their instructional practice, particularly in the areas of literacy and math. Coaches meet

regularly with individual teachers to plan lessons, observe teacher's instruction, and provide feedback to teachers. In addition, coaches facilitate larger group meetings. A growing body of research into teacher mentors and teacher quality has suggested that the coaching model is an effective approach to staff development (Onchwari & Keengwe, 2008; Ryan, Hornbeck & Frede, 2004). It enables teachers to talk about their practice, observe each other's practice and work together to plan, design, research, evaluate curriculum, and teach each other what they know about instruction. Heck (2007) argues that efforts to improve teacher quality positively correlates with improved student achievement.

IB Middle Years Programme (MYP) is an internationally recognized program that provides a consistent framework for curriculum alignment and common assessment. Mayer (2008) has suggested that the implementation of a rigorous academic curriculum, such as IB, may raise the academic achievement of all students. This may be accomplished through better articulation and curriculum alignment in grades six through ten. An expressed goal of the MYP program is to improve the transition of students from middle school to the high school (IBO, 2008). Teachers within each school as well as between schools meet on a regular basis through out the school year as grade-level teams and as content-area teams to maintain curriculum alignment and academic expectations for students.

LINK Crew is a program that connects every ninth grade student with an older student mentor. Mentors are selected through an application process and based on their involvement within the school. The expressed goal of the program is to improve the

transition of ninth graders to high school through the development of a relationship with other students (Karcher, 2005). Mentors develop and facilitate transition activities that extend throughout the school year. Mentor programs, such as Link Crew, have been linked to positive changes in students' self-esteem, social skills and school behavior (Karcher, 2005).

Advisory is a program that connects a small group of students with a school staff member, who mentors the students through out the four years of high school. Galassi, Gulledge, and Cox, (1997) have suggested that advisory programs are a type of primary prevention effort with improvements in a student's self-concept and connection with school. Advisory groups meet for 90 minutes every other week. The staff member facilitates activities connected to college and career planning, as well as course forecasting. Each advisory is arranged by alpha grouping, according to the student's last name. School counselors are assigned to each advisory and work with students within the group setting, as well as individually.

Strategic Interventions

Strategic interventions address the academic and behavioral needs of students who need more than systemic interventions to be successful at school. These students may struggle due to specific skill deficiencies and disengagement from the school environment. Strategic interventions provide targeted instruction and support to address these needs. Strategic interventions include:

Freshmen Seminar is an 18-week course that provides targeted literacy instruction to students with in the context of the four core content areas of English literature, social

studies, mathematics and science. Instructors work closely with the content-area teachers to align the instruction of reading strategies with the content curriculum. As students move through middle school to high school, reading demands increase with the need to understand more complex concepts and vocabulary. Many struggling students, however, do not show mastery in basic reading skills. Research suggests that students need explicit instruction in vocabulary and the application of comprehension strategies (Vaughn, et al., 2008). Freshmen Seminar is a strategic intervention for students that struggle with reading in the content areas.

Algebra Block is an extended math course for students with deficient Algebra skills. While a typical math course will meet every other day in 90-minute blocks, the Algebra Block meets everyday for 90 minutes. Current research has suggested that interventions designed to provide extended time may improve student academic performance (Ketterlin-Geller, Chard, & Fien, 2008). Extending instructional time allows struggling students greater exposure to mathematical concepts and greater access to teachers. In addition, the inclusion of a special education teacher with a math teacher may reduce the ratio of students to teachers and provide greater support for struggling students.

Peer tutoring is provided for struggling students in all content areas. Students are identified through the FAT process and paired with a peer tutor. Peer tutors are selected through an application process that focuses on a potential tutor's academic achievement and willingness to work with out students. Peer tutoring occurs three times each week after regular school hours through out the school year. Stenhoff and Lignugaris-Kraft

(2007) suggest that peer tutoring may have a positive impact on academic performance, and Somers and Piliawsky (2004) suggest that peer tutoring helps retain at-risk students in school. A review of current research identifies peer tutoring as an evidence-based strategy that may benefit both the tutor and tutee.

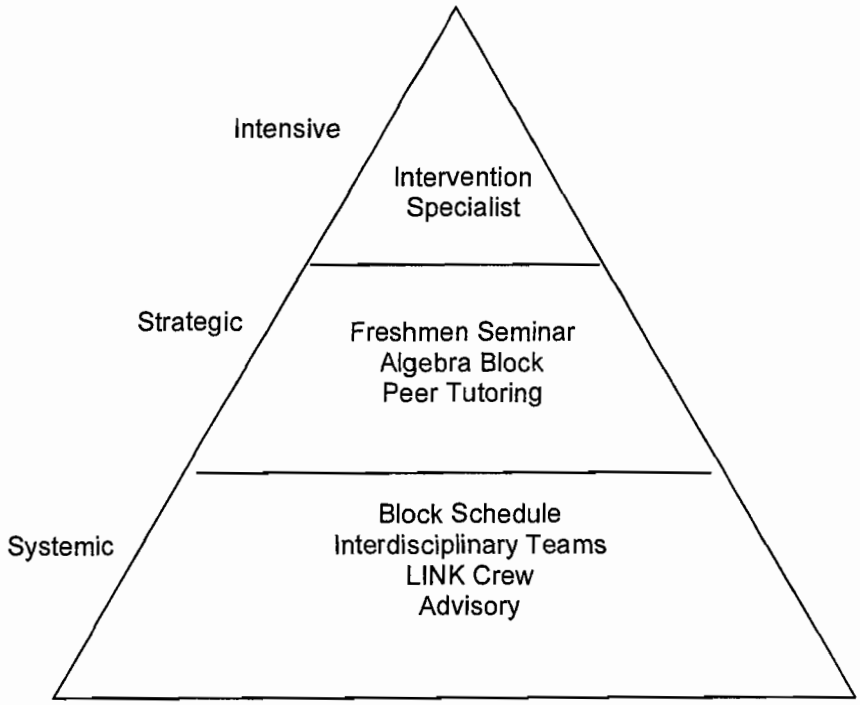

Figure 2. Intervention Pyramid

Intensive Interventions

Intensive intervention is utilized with students who do not respond to strategic intervention. Short of qualifying for special education services, these students seem to require constant monitoring by an Intervention Specialist. Todd et al. (2008) have

suggested that a monitoring system, such as check-in/check-out may be highly effective with at-risk students. With this in mind, each Intervention Specialist is assigned approximately 75 at-risk students, who are identified by cumulative grade-point-average, office discipline referrals, and attendance. These students meet daily with the specialists to monitor the student's academic progress and provide mentoring. In addition, the specialist facilitates access to other district, school or community resources as needed by the student or the student's family.

School Failure

Extensive research in the area of school failure focuses on a key construct of risk, which is understood to be an unwelcome or negative educational outcome. Risk is often divided into two categories: social risk and academic risk (Lee, 2003). Social risk refers to demographic factors associated with a higher likelihood of school failure. Ethnicity, age, minority-language status, gender, family income, parents' education, and family structure are often associated with dropping out. Academic risk refers to students' school behaviors and performance, which often reflect the actual manifestation of school-related problems. Poor grades and test performance may be indicators of academic risk. Risk factors are cumulative in nature, suggesting that a student with more than one risk factor is statistically more likely to drop out.

Social Risk

Social risk factors have been shown to negatively impact a student's academic performance, and are linked to high school drop out. Race, ethnicity, gender and socioeconomic status are highly correlated with the likelihood of struggling in school

(Croninger & Lee, 2001). Studies have shown that a disproportionate number of minority students leave high school before graduating. Neild and Balfanz (2006) found that only one-half of African American males finished school with their peer group in four years and only 46 percent of Latino males graduated with a diploma within six years. In addition, studies have indicated that schools with high percentages of low-income or minority students tend to have poor academic performance and high dropout rates, and schools with the most low-income students are often concentrated in urban communities (Finn, 2006).

Students who attend more than one high school are less likely to complete school. Rumberger (2002) has suggests that student mobility during high school, as well as during earlier grades, poses risks to graduating. A variety of factors may influence students to transfer to another school. A family's inability to secure stable housing and employment are often cited as factors in student mobility. Mobility, however, is a factor separate from other social risk factors. Kennelly and Monrad (2007) believe that student mobility reduced the chances of graduation even after controlling for a variety of family background variables. Finally, the timing of a student's move is important. Swanson and Scheider (1999) notes that changing schools, particularly between grades eight and 10 significantly increases the likelihood of students dropping out compared to non-mobile students.

Student problem behavior is also cited in research as a social risk factor in school dropout. Problem behavior includes student behaviors such as non-attendance, drug use, violence, and defiance. These behaviors often lead to school avoidance or school

discipline, depriving students of classroom instruction. Of these factors, Gleason and Dynarski (2002) suggest that high absenteeism is strongly associated with school dropout. Students who are frequently absent from school are less likely to earn class credits essential for graduation. Absenteeism deprives students of academic knowledge and skills necessary for academic success. As students fall behind academically, they may experience further withdrawal from school.

In addition, student violence may be associated with school drop out. Tobin and Sugai (1999) draw a connection between referrals for violence involving fighting in grade six to similar referrals in grade eight. They state that a high frequency of discipline referrals in grade six translates strongly to chronic discipline problems in later middle school, and eventually predict frequent suspensions in grade nine. Three or more suspensions in ninth grade may lead to school failure. While suspending students who are dangerous or disruptive is necessary to keep schools safe and orderly, suspensions cause an interruption to a student's education, and repeated suspensions may lead to alienation and dropout.

It is important to note that social risk factors do not cause students to drop out of school. Rather these factors may be indicators of students who are disengaging from the school climate and eventually withdrawing from school. As risk factors accumulate, students may experience greater difficulty staying on track for graduation. This process of dropping out may begin as early as elementary school.

Academic Risk

In addition to social risk factors, students may experience academic risk factors. Croninger and Lee (2001) suggest that academic risk refers to a student's previous school performance at a specific point in time. Previous academic performance, such as course grades and test performance, is a strong indicator of high school completion. Allensworth and Easton (2005) suggest that students who fail core subjects, such as English, mathematics, science or social studies, are less likely to complete high school. They suggest that students who enter high school with strong achievement test scores are more likely to be on-track for graduation than lower-scoring students. Students with lower achievement scores struggle to keep up with their peers and eventually find that they are falling behind. Researchers suggest that the strength of poor academic achievement mediated the effects of all other independent factors. Consequently, dropout prevention efforts should focus directly on improving academic achievement.

Academic risk factors also have typically included school characteristics. A growing body of research has indicated that school-level factors may contribute a significant role in determining whether or not a student completes high school. Allensworth and Easton (2005) found that dropout rates varied widely across Chicago high schools, even after controlling for individual risk factors, including race, gender, prior academic achievement, family socioeconomic status and student retention in previous grades. They suggested that school's organization, structures, and curriculum may play a role in the process of students dropping out.

Research also indicates that high schools exhibit lower dropout rates, particularly among low-achieving, low-income students when they have smaller enrollments, better interpersonal relationships among students and adults, teachers who are supportive of students, and a curriculum that is both focused and more rigorous (Consigner & Lee, 2001). These authors report that high schools with highly supportive teachers cut the probability of dropping out in half. Recognizing the influence of these school-level factors can lead schools to improve school climate, academic rigor, as well as develop smaller learning communities that personalize the educational experience for students (Kennelly & Monrad, 2007).

McIntosh, Flannery, Sugai, Braun, and Cochrane (2008) suggest that social risk and academic risk factors do not necessarily operate in isolation. They argue that the two are interrelated. Students with early difficulties in academics are at greater risk of developing behavior problems. Likewise, students with early difficulties in behavior are at greater risk of suffering academically. This interaction may reach a critical mass in high school where students suffering from both are at greater risk of dropping out than students with problems in only one area. Consequently, a systemic early identification system of students at-risk of dropping out is required to address the complexity of students' needs.

Identifying At-Risk Students

Early identification of at-risk students may provide an opportunity to intervene in the process of dropping out. Recent research has suggested that most dropouts may be identified as early as the sixth grade. Balfanz and Herzog (2005) found that more than

half of Philadelphia sixth graders, who exhibited poor attendance, received a poor final behavior grade, or failed either math or English, eventually dropped out of school. They report that between 1,000 and 2,000 sixth graders had these risk factors in a given year. As students transition into middle school, these indicators may become more prevalent. While many dropouts exhibit either academic performance problems or disengagement in middle school, students rarely show both at the same time. Kennelly and Monrad (2007) suggests that this outcome indicates a convergence of academic and social risk factors as students move closer to high school. Identifying struggling students and intervening prior to this convergence may improve the odds that student will remain in school to graduation.

A closer examination of middle school indicators suggests that two eighth grade factors were strong indicators of dropout. Poor attendance, defined as missing at least five weeks of school, and failure in either math or English had a strong correlation with dropping out. Neild and Balfanz (2006) found that eighth graders who attended less than 80 percent of the time were 78 percent more likely to drop out, and eighth graders who failed math or English were 77 percent more likely to become dropouts. In this study, gender, race, age and test scores were not strong predictors of attendance and course failure. While eighth grade indicators may provide strong predictors of dropping out, nearly one-third of Philadelphia dropouts did not exhibit any warning signs in eighth grade, but had problems in ninth grade. This suggested the need to continue monitoring at-risk students during ninth grade.

In studying ninth graders in Philadelphia, Nield and Balfanz (2005) found three indicators that may predict future dropout. These indicators include poor attendance, poor academic performance, and failure to be promoted to 10^{th} grade on time. Students who attended less than 70 percent of the time or failed to earn two or more credits were found to be less likely to finish high school. In addition, the failure to earn a sufficient number of credits resulted in students being retained in the ninth grade. Student retention was identified as an at-risk indicator. According to this study, a ninth grader with just one of the characteristics was 75 percent more likely to dropout. About one-half of the dropouts were identified before entering high school, and 80 percent who dropped out were either at-risk in eighth or ninth grade. Failure to earn sufficient credits to move from ninth to tenth grade was considered the biggest risk factor for dropping out.

In similar studies in Chicago Public Schools, Allensworth and Easton (2007) found that more than one-half of dropouts could be identified by the end of the first semester by using either course failure rates or student absences from school. They determined that course grades and failure rates are slightly better predictors of graduation than attendance, because they directly impacted whether or not students are making progress in their courses. With course grades and failure rates, schools were provided with specific information to target programs and interventions for struggling students.

Allensworth and Easton also found that cumulative grade-point-average provides important information about who is likely to struggle, and they suggested that it might be the best predictor of dropping out. Cumulative grade-point-average was a broad indicator of a student's academic performance and it may have indicated whether a student was

sufficiently making progress in acquiring the necessary credits for graduation. While potential dropouts was identified as early as elementary school, struggling students experienced decreasing attendance and grades during the transitions between middle school and high school, and therefore, suggested that ninth grade was a tipping point year in the process of dropping out.

Prevalent Indicators of At-Risk Students

Current research has consistently identified four key high school indicators that are indicative of who is most likely to drop out. Research has suggested that developing identification systems around these indicators may better identify at-risk students and focus resources for dropout prevention (Allensworth & Easton, 2007; Jerald, 2006; Kennelly & Monrad, 2007). The four indicators include failure in core subjects, low attendance, failure to be promoted to the next grade, and disengagement in the classroom, including problem behavior.

An effective approach of identifying at-risk students would utilize these indicators in conjunction with one another as opposed to in isolation as a single indicator. An over-simplified system may misjudge the complexity of risk factors. Accurate identification is critical. Even the highest quality dropout prevention programs will have little effect if risk factors identify the wrong students (Gleason, 2002).

Failure in core academic courses is a strong indicator of at-risk students. Numerous studies have included failure in core academic courses as a predicator (Allensworth & Easton, 2005; Balfanz, Herzog & MacIver, 2007; Neild & Balfanz, 2006). Graduation is the result of students accumulating sufficient course credits.

Allensworth and Easton (2005) conclude that receiving more than one F in a core academic course together with failing to be promoted to the tenth grade to be a key indicator. As struggling students a fail course, they fall farther behind and may not be able to make up the sufficient amount of credit. In both Chicago and Philadelphia, grades tended to be better indicators of dropout than test scores. More than any other indicator, credit accumulation may be the most accurate measure of student progress towards graduation.

Excessive absenteeism is considered one the strongest predictors of course failure, and consequently, a predictor of high school dropout. As suggested by Neild and Balfanz (2006), 78 percent of eighth grade students with attendance rates below 80 percent eventually dropped out of school. Students with moderate levels of absenteeism from one to two weeks per semester are substantially at risk of not graduating. Allensworth and Easton (2007) linked even moderately poor attendance in ninth grade with eventual dropout. In their study, only 63 percent of the students who missed about one week eventually graduate within four years, compared to 87 percent of those who missed less than one week. As an indicator, absenteeism may be considered a strong predictor of course failure and eventual drop out.

Failure to be promoted to the next grade is also a key indicator of dropping out. Alexander, et al. (1997) studied high school drop out and they concluded that 64 percent of the students that repeated a grade in elementary school and 63 percent of the students held back in middle school failed to earn a diploma. Once students enter high school, failure to be promoted was directly connected to course failure. While high school

students may group in grade levels by age, students were promoted by the accumulation of course credit. Failure to accumulate sufficient credit may have created a situation where a student is identified by age as a tenth grader with ninth grade standing. Neild and Balfanz (2006) determined that more than half of the dropouts are not promoted past the ninth or tenth grade, but are 17 years old and older when they drop out. Consequently, there was a strong connection between course failure and failure to promote students to the next grade level that ultimately impacts a student's progress to graduation.

Disengagement from school is also considered a precursor to dropping out. Students most often report school-related reasons for why they dropped out (Kennelly & Monrad, 2007), including a lack of motivation, boredom, and unchallenging atmosphere, and an overall lack of engagement in school. Research has indicated that the development of smaller, personalized learning environments may lead to stronger student relationships and students feeling a sense of relevance in their education (Felner, et at., 2007). Students who lack a personal connection with school begin to disengage from the educational experience, and often experience academic failure (Finn, 1993). While disengagement from school is a strong indicator of dropping out, it is not necessarily easy to measure. Student attendance and discipline records as well as participation in co-curricular and extra-curricular activities may provide some indication of a student's level of engagement.

This review of literature on at-risk students identified the social and academic factors that contribute to students dropping out school. Dropping out is a process that may be influenced by the accumulation of risk factors. At-risk students may be identified

as early as the sixth grade. The strongest predictors, however, appear to be ninth grade indicators. The development of an efficient identification system may facilitate the implementation of effective interventions for drop out prevention. A current model used to identify at-risk students transitioning from middle school to high school utilizes 12 independent indicators. The purpose of this study is to determine the efficacy of these 12 middle school academic risk indicators as predictors of ninth grade academic and behavioral performance in a large, comprehensive high school.

CHAPTER III

METHODOLOGY

This study utilized a single case study design (Yin, 2003) with embedded quantitative statistical analysis to understand the characteristics of transitioning students who may have been at risk of school failure and the relationship between 12 middle school indicators and three ninth grade performance measures. The case in this study included 416 ninth grade students that matriculated from three middle schools to a large, suburban high school. The high school collected middle school indicators to guide development of interventions for struggling students using Freshmen Achievement Teams to deliver a number of diverse program components. The analysis included descriptive, correlation and multiple Ordinary Least Square (OLS) and logistic regression.

Research Design

The initial analysis in this case study was to identify the characteristics of students transitioning from middle school to high school based on 12 middle school performance variables. Descriptive statistical analysis identified the number of students considered at-risk of school failure; how students performed on each indicator; and the characteristics of at-risk and non-risk students. In addition, the middle school variables were organized into categories and each category was evaluated by the outcome measures. Figure 3

illustrates how the variables were categorized into: (a) classroom performance, (b) school behavior, (c) state assessment, and (d) national assessment.

The next analysis presents correlations between the various middle school variables and high school outcome measures. These correlations may identify the predictive nature of each middle school variable to the outcome measures. Issues of collinearity were analyzed prior to introducing regression statistics to measure the significance of the relationship between middle school and high school variables, as well as how the different variables were related to each other. The results reflect data collected over the course of an 18-week semester.

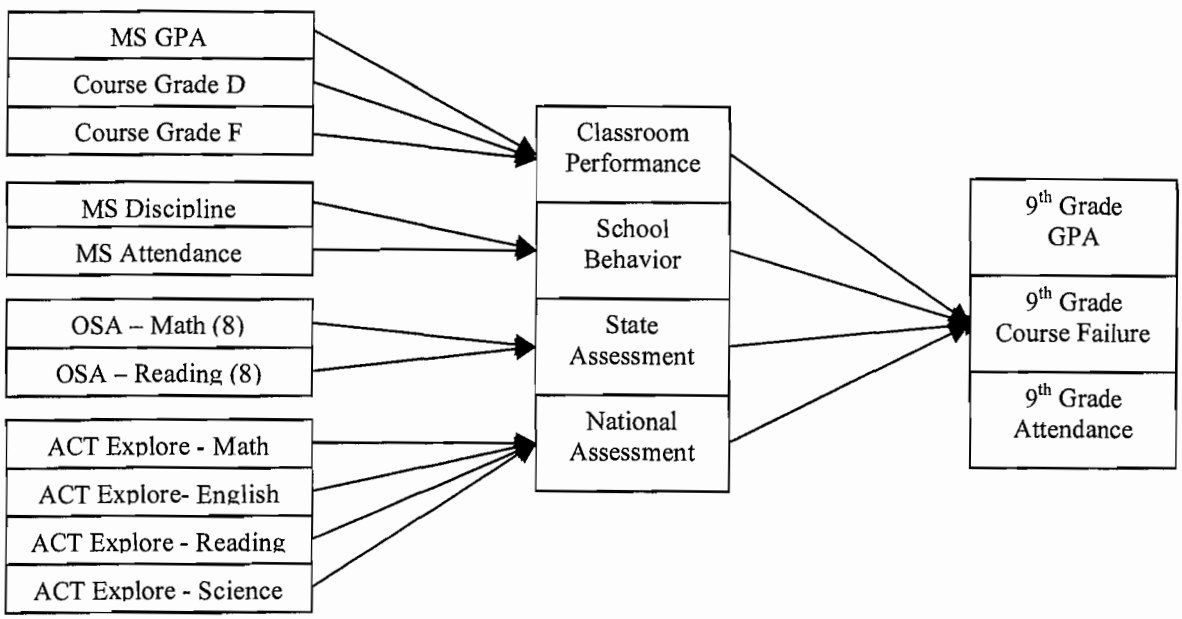

Figure 3. Middle School Indicators by Category

Setting

In this case study, I analyzed data collected from a large, suburban high school located in the Pacific Northwest. The school was one of five high schools in a district that serves an estimated 37,958 students, during the 2008-2009 school year. Of these students, 40 percent were considered to be an ethnic minority, speaking 90 different primary languages. In addition, the rate of students receiving free or reduced lunch was 30.9 percent, and approximately 11.5 percent of the students qualified for special education services.

The district had a strong record of academic excellence and innovation. Approximately 57 percent of high school students completed the Scholastic Aptitude Test for college admission with an average score of 1087, which was 39 points higher than the state average and 70 points higher than the national average. The district's drop out rate was relatively low at 3.6 percent. The district was recognized for its innovations, having been selected to participate in the Harvard Executive School Leadership Program and awarded grants from the US Department of Education for the creation of smaller learning communities. In addition, Nike, Inc. awarded grants for the development of innovative school leadership.

The high school in this study enrolled approximately 1875 students. The demographics of the school identified 35 percent of the students as ethnic minority, including 16 percent Asian-American, 16 percent Hispanic, and three percent African-American. Approximately 25 percent of the students received free or reduced lunch, and 15 percent qualified for special education services. In addition, 21 percent of the students

were designated as talented-and-gifted. For the past seven years, the school offered the International Baccalaureate Diploma Program for college bound students. This program was designed primarily for eleventh and twelfth grade students preparing for university. Approximately 55 percent of the junior and senior classes participated in this program. The most recent state report card rated this school strong overall.

The school benefited from the district's innovations; receiving approximately $1.4 million over five years in federal grant money to develop smaller learning communities in the ninth and tenth grades. These funds were being used to develop structures, such as teacher teams and academies, to personalize the learning experience for all students. Over the past three years, the high school focused its school improvement goals on decreasing the number of classes that ninth grade students fail each year. The freshmen failure rate for the past four years averaged 31.5 percent. This reflects the percentage of students that failed at least one semester course during the freshmen year. The 2006-2007 school year was the highest rate for freshmen failure at 43 percent. Table 1 provides the percentage of students that failed at least one semester course during the school year.

Table 1.

Freshmen Failure Rate – percentage of students who failed at least one course during the ninth grade year.

2004-05	2005-06	2006-07	2007-08
25	29	43	29

In addition, the school focused on improving both the 4-year and 1-year drop out rates. Dropouts include any student that leave school prior to completing the requirements for a high school diploma. The four-year rate reflects the percentage of students that drop out of school over the course of four years. It is an indicator of the percentage of students that start high school in ninth grade and graduate within four years. The one-year rate reflects the percentage of students that drop out in that year. During the 2005-2006 school year, the percentage of students that left school without earning a diploma peaked at 4.9 percent. Table 2 provides these rates for the past four years.

Table 2.

Four-year & One-year Dropout Rates

Variable	2003-04	2004-05	2005-06	2006-07
4-Year	7.4	7.9	17.2	9.3
1-Year	2.4	2.3	4.9	3.3

In order to address the needs of at-risk ninth grade students, the school in this study has developed Freshmen Achievement Teams (FAT). These interdisciplinary teams are composed of language arts and social studies teachers, a counselor, an administrator, an intervention specialist, school psychologist and a special-education teacher who meet twice a month. Teachers are assigned to each team based on recommendations from content-area departments and school administration. Selected teachers have interest and

experience in teaching ninth grade students. Teachers are provided with a shared planning time during the school day and additional collaboration time during the summer to plan and develop classroom-based interventions and instruction that support the FAT model. Each team monitors the academic and social performance of approximately 75 ninth-grade students randomly assigned to the team for intervention.

FAT relies on 12 independent indicators of middle school performance to identify at-risk students transitioning from middle school to high school. These 12 indicators are categorized into four areas: classroom performance, school behavior, state assessments and national assessments. Students are assessed on each indicator as either at-risk or non-risk. Cut scores for each indicator are set by the school district. Students that are considered at-risk or deficient on six or more of the indicators are considered to have an overall risk status and may receive intervention to improve their academic and behavioral performance. This model attempts to capture the complexity of risk factors in a flexible and efficient system of identification.

Each team develops intervention plans for struggling students. These plans often include a wide variety of interventions, ranging from classroom-based accommodations, such as extended time on assignments or new seating in the classroom, to more targeted, school-wide interventions, such as group counseling and specific literacy instruction. Teams adjust the level of intervention along this continuum based on the student's level of responsiveness. These interventions are organized into three tiers based on student need and intensity of intervention.

Participants

The participants in this study included 416 of the 488 students that matriculated into the ninth grade during the 2008-2009 school year. These students matriculated from three different middle schools. Only students that attended the same middle school during the previous three school years were included in this study. All student data were obtained from the school district's electronic information system. Table 3 provides demographic information for each middle school during the 2008-2009 school year.

Table 3.

Demographic Information for Middle School A, B and C

Variable	School A	School B	School C
N (2008-2009)	869	892	1020
Free/Reduced Lunch (%)	25	41	14
SPED (%)	13	16	10
ELL (%)	9	16	5
TAG (%)	17	25	16
Ethnicity (%)			
Caucasian	66	47	59
Hispanic	18	25	7
Black	3	5	4
Asian	11	21	28
Others	2	2	1

There are differences between the three middle schools in student demographics and academic performance. School A was the smallest of the three schools. All of the students that attended school A transitioned to the high school in this study. School B was the most racially diverse school with the lowest level of socioeconomic status. A district-wide talented-and-gifted program was located at school B. School C is the largest and the most affluent middle school. While all of school A students transitioned to the high school in this study, approximately one-third of the students from schools B and C transitioned to the same school. Table 4 provides academic data for the past three years for each middle school.

Table 4.

Academic Data for Middle School A, B and C

Variable	School A	School B	School C
State Reading Assessment*			
2005-06	79	78	87
2006-07	81	74	88
2007-08	81	76	87
State Math Assessment*			
2005-06	78	79	94
2006-07	81	78	92
2007-08	88	82	91

*Note. * Percentage of students meeting state standards*

Measures

The high school in this case study utilized 12 indicators of middle school performance to identify students that struggled in the ninth grade and are at risk of school drop out. Developed by the school district, this *List of Incoming Transition Students At-Risk (LITSAR)* identified the most at-risk students based on: the student's grade-point-average, the number of D and F grades, the number of suspensions and expulsions, attendance rate, scores on the four ACT Explore exams, and scores on state assessments in reading and math. A cut score was set for each middle school indicator, and a student received a point on an at-risk index for each indicator that was deficient. Students who performed below expectation on six or more of the 12 indicators were considered to be possibly at-risk for school failure. These students were monitored by the school and received academic and behavior intervention to improve performance. The relationship between these 12 indicators to ninth grade attendance rate, grade-point-average, and course completion was examined.

Independent Variables

The independent variables in this study included the 12 middle school indicators used to identify students entering high school who may be at risk of school failure. The middle school indicators were grade-point-average, grade F, grade D, suspension, expulsion, attendance, Oregon's Assessments of Knowledge and Skills math, Oregon's Assessments of Knowledge and Skills reading, ACT Explore math, ACT Explore English, ACT Explore reading, and ACT Explore science.

Middle school grade-point-average was used as an indicator of students' classroom performance. GPA was unweighted and based on a 4-point scale with A's assigned 4 points, B's assigned 3 points, C's assigned 2 points, D's assigned 1 point, and F's assigned 0 points. Any other course grade was not included. Such grade indices may include pass, no pass, satisfactory, unsatisfactory, and incomplete, etc. The range of student GPA was from 0.00 to 4.00. According to the school's at-risk index, a cumulative GPA below 2.20 was considered at-risk. Grade-point-average was a continuous variable, and its distribution in this study was negatively skewed. Student grade-point-average was obtained from the school district's *Electronic Student Information System.*

Middle school grade F was an indicator of students' classroom performance. It reflected the number of courses during a grading period that a student failed to make adequate academic progress. This was a count variable. For each course that was failed, a student was given a point. According to the school's at-risk index, one grade F in any course during the three years of middle school was considered at-risk. Grade F was a continuous count variable. It had a zero-inflated flat distribution, and it was limited by few valid cases. Students' grade F was obtained from the school district's *Electronic Student Information System.*

Middle school grade D was an indicator of students' classroom performance. It reflected the number of courses during a grading period that a student made low progress and was in danger of failing. This was a count variable. A student received one point for each course with a grade D. One grade D in any course during middle school was considered at-risk on the district's index. Grade D was a continuous count variable. It

also had a zero-inflated flat distribution with few valid cases. Student grade D was obtained from the school district's *Electronic Student Information System.*

Suspension was an indicator of a student's behavior. It was the number of occurrences that a student was removed from school as a disciplinary action. Students were suspended from school for a wide variety of disciplinary issues, including but not limited to poor attendance, defiance of authority, fighting, possession of illegal drugs or alcohol, and cheating. The length of a suspension ranged from one to ten days. Regardless of length, each occurrence was counted as one in this study. One occurrence of suspension was counted as at-risk on the school's index. Suspension was a continuous count variable and its distribution was binary. Student suspension was obtained from the school district's *Electronic Student Information System.*

Expulsion was the number of occurrences that a student was removed from school for longer than ten days for a disciplinary reason. Expulsion was a more severe disciplinary action than a suspension, ranging in length from 11 days to a full calendar year. Issues that lead to an expulsion included: fighting, possession of drugs or alcohol, or possession of a weapon. Each occurrence of expulsion was counted as one. One occurrence of expulsion was counted as at-risk on the school's index. Expulsion was a continuous count variable, and its distribution was limited by too few cases. Student expulsion was obtained from the school district's *Electronic Student Information System.*

Middle school attendance rate was an indicator of student behavior. It was measured as either present, absent excused, or absent non-excused. Student absences were considered excused in the event of illness or family emergency. Absence due to any

other reason was considered non-excused. An attendance rate below 90 percent was considered at-risk on the school's index. This equated to 18 or more missed days from school. Attendance rate was a continuous ratio variable and its distribution was negatively skewed. Student attendance rates were obtained from the school district's *Electronic Student Information System.*

Oregon's Assessments of Knowledge and Skills (OAKS) was part of the state's school accountability program. It assessed students in grades three through eight and grade ten in reading, writing, mathematics, and science. Student scores on the assessments were deemed as either does not meet, meet or exceed based on cut scores set for each grade level. Student scores were a component of the states rating of each school and were used to fulfill the accountability requirements of the federal No Child Left Behind legislation. Student scores on the eighth grade math and reading assessments were independent measures in this study.

OAKS – Math was an indicator of a student's academic achievement. The cut score for meeting the state standard was 230. A student score below this level was considered at-risk on the school's index. OAKS_Math was a continuous interval variable with a normal distribution. Student assessment results were obtained from the school district's *Electronic Student Information System.*

OAKS – Reading was an indicator of a student's academic achievement. The cut score for meeting the state standard was 231. A student score below this level was considered at-risk on the school's index. OAKS_Reading was a continuous interval

variable with a normal distribution. Student assessment results were obtained from the school district's *Electronic Student Information System*.

ACT Explore was a national assessment program that assesses eighth and ninth grade students in English, mathematics, reading and science. These assessments provided information about how well a student performed compared to other students. Explore was part of larger assessment program that included ACT Plan for tenth graders and the ACT for eleventh graders. Many universities accept the ACT as a college admissions criterion. Explore, Plan and ACT were scored along a common scale extending from one to 36. The maximum score on the Explore was 25 (ACT, 2007). The school district used the full ACT assessment program to assess all students in grade eight through eleven. ACT Explore assessments in math, English, reading and science were independent measures in this study.

ACT Explore – Math was an indicator of a student's academic achievement. The cut score for meeting the "college ready" level was 17. A student score below this level was considered at-risk on the school's index. ACT_Math was a continuous interval variable with a normal distribution. Student assessment results were obtained from the school district's *Electronic Student Information System*.

ACT Explore – English was an indicator of a student's academic achievement. The cut score for meeting the "college ready" level was 13. A student score below this level was considered at-risk on the school's index. ACT_English was a continuous interval variable with a normal distribution. Student assessment results were obtained from the school district's *Electronic Student Information System*.

ACT Explore – Reading was an indicator of a student's academic achievement. The cut score for meeting the "college ready" level was 15. A student score below this level was considered at-risk on the school's index. ACT_Reading was a continuous interval variable with a normal distribution. Student assessment results were obtained from the school district's *Electronic Student Information System.*

ACT Explore - Science was an indicator of a student's academic achievement. The cut score for meeting the "college ready" level was 20. A student score below this level was considered at-risk on the school's index. ACT_Science was a continuous interval variable with a normal distribution. Student assessment results were obtained from the school district's *Electronic Student Information System.*

Dependent Variables

The dependent measures in this study were ninth grade attendance rates, grade-point-averages, and course completion. These three measures have been identified as strong predictors of dropping out of school (Allensworth & Easton, 2007; Neild & Balfanz, 2006; Kennelly & Monrad, 2007).

Ninth grade attendance rates were used as a measure of a student's school behavior and engagement. Student attendance rates were measured as either present, absent excused, or absent non-excused. Student absences are considered excused in the event of illness or family emergency. Absence due to any other reason is considered non-excused. Attendance rates were continuous ratio variable with a negatively skewed distribution. Student attendance rates were obtained from the school district's *Electronic Student Information System.*

Ninth grade grade-point-average was used as a measure of students' academic performance. GPA was un-weighted and based on a 4-point scale with A's assigned 4 points, B's assigned 3 points, C's assigned 2 points, D's assigned 1 point, and F's assigned 0 points. Any other course grade was not included. Such grade indices may have included pass, no pass, satisfactory, unsatisfactory, and incomplete, etc. The range of student GPA was from 0.00 to 4.00. The GPA included all course work completed through the first semester of a student's ninth grade year. GPA was a continuous variable with a negatively skewed distribution. Students' GPA's were provide by the school district's *Electronic Student Information System.*

Ninth grade course completion was used as a measure of students' academic performance and students' progress towards graduation. Students enrolled in seven courses each semester; 14 courses over the academic year. Each semester course was worth 0.5 credit. Students could earn a total of seven credits in an academic year. Students were required to earn 24 credits to receive a high school diploma. A student must earn three credits, or pass six out of seven courses, after the first semester of 9^{th} grade to be considered on-track for graduation. Each failed semester course was given a value of 1, and each course that received a passing grade was given a value of 0. Grade F was a continuous count variable. Its distribution was limited by too few cases. Students' course credits were obtained from the school district's *Electronic Student Information System.*

Procedures

With the assistance of the school district, I collected extant data accessed through archival databases maintained by the school district. These data included individual student grade-point-average, course completion, and attendance records from the district's *Electronic Student Information System*. In addition, data on the 12 indicators of middle school performance were collected and analyzed. Only students with data from all 12 indicators and all three of the outcome measures were included in this study. These data sets were merged through the use of Microsoft Access and Excel and later analyzed with SPSS 17.0. To maintain confidentiality, any identifying student information was removed prior to researcher access. A form of passive consent was used to gain student participation. Parents were informed by mail and had the option to exclude their student from the study.

In the first analysis, descriptive statistics were used to analyze each middle school indicator and the characteristics of at-risk and non-risk students. The second analysis involved correlation statistics to evaluate the correlations between each middle school indicator and each ninth grade performance measure. In addition, issues of collinearity were examined. Finally, multiple Ordinary Least Square (OLS) and logistic regression analysis were applied to the middle school risk indicators and the ninth grade outcome measures to identify the strongest predictors of ninth grade performance.

CHAPTER IV

RESULTS

The results of this study reveal that few students entered the ninth grade with risk indicators. Over half of the students transitioned to ninth grade with two or fewer risk indicators. A sizeable number of students, however, were at risk, and these students were disproportionately minority, English-Language-Leaner, or Special Education students. There were significant differences between students identified as at-risk with six or more indicators and non-risk students who had five or fewer indicators. The most significant differences were in classroom performance. Classroom performance indicators, specifically grade D, identified dramatic differences in course failure and ninth grade grade-point-average. Although classroom performance indicators were key predictors, students struggled more on national assessments than on any other indicator. Finally, the results of this study suggest that four middle school indicators were strong predictors of ninth grade performance. These indicators included grade-point-average, grade D, attendance, and ACT math.

Results are presented in two parts. First, analyses are provided on the characteristics of middle school risk indicators. Descriptive statistical analyses were applied to the raw data for all variables. Second, analyses exploring the relationship

between middle school risk indicators and high school performance are provided. Correlation and regression analyses were applied to understand these relationships. In these analyses, all eighth grade indicators were dichotomously coded as at-risk or non-risk based on the district's cut score for risk. For ninth grade outcomes, GPA and attendance rate were continuous variables while course failure was a dichotomous variable indicating whether or not a student has any course failures during the year. Finally, a summary of findings is provided

Table 5.

Demographical Information of Ninth Grade Participants During the 2008-2009 School Year

Variable	Study	Total
N	416	488
SPED (%)	7	8
ELL (%)	9	10
Ethnicity (%)		
Caucasian	63	65
Hispanic	16	17
Black	3	4
Asian	17	13
Other	1	1

Of the 488 students that entered the ninth grade in 2008-2009, this study included 416 students; approximately 97 of the students in the study were considered at-risk and

supported through the school's intervention program. These students attended the same three middle schools for the previous three years, and they completed all academic assessments that were included in this study. The demographic composition of this study closely reflects the demographics of all students in the ninth grade. Table 5 provides demographical information of the participants.

How Many Students Are Considered At-Risk?

The first consideration is the overall risk status of students in the study. Descriptive analysis of middle school risk indicators reveals that 18.8 percent of the students entered high school with zero risk indicators and 0.2 percent of the students possessed all 12 risk indicators. These suggest that 78 students in this study exceeded the performance expectations on all 12 indicators and were not at risk of school failure. On the other hand, only one student in this sample did not meet the cut score on any of the 12 indicators and may be deemed highly at risk. Table 6 presents the number students by the number of indicators on the at-risk index. The table indicates 319 students, or 81.3 percent, have scores below six and are not considered at risk. The remaining 97 students, or 25.3 percent, have six or more indicators on the index and are deemed as at-risk of dropping out. The majority of students, 51.7 percent, have two or fewer risk indicators. The average number of risks on 12 indicators for all students is 3.35.

Table 6.

Students by Number of Middle School Risk Indicators

# of Indicators	# of Students	Percentage	Cumulative %
0	78	18.8	18.8
1	74	17.8	36.5
2	63	15.1	51.7
3	44	10.6	62.3
4	31	7.5	69.7
5	29	7.0	76.7
6	19	4.6	81.3
7	19	4.6	85.8
8	14	3.4	89.2
9	22	5.3	94.5
10	16	3.8	98.3
11	6	1.4	99.8
12	1	0.2	100

Demographical information provided in Table 7 reveals that the at-risk group, or students with six or more indicators, was predominately male (60.82%) and composed of a higher percentage of Special Education (19.59%) and English Language Learner (35.05%) students than the non-risk group. The at-risk group was predominately Hispanic (46.39%) and African-American (9.28%). These averages, with the exception of male, were more than three times higher than the total group average for these sub-groups. This suggested that male and ethnic minority students are more likely to be at risk for school failure when entering high school than other students. In addition, Special Education

students were over represented in the at-risk group. The composition of the SPED group was nearly seven times higher in the at-risk group than the non-risk group.

Table 7.

Demographic Information by Middle School Risk Status

Variable	At-Risk	Non-Risk	Total
N	97	319	416
SPED (%)	20	3	7
ELL (%)	35	1	9
Ethnicity (%)			
Caucasian	41	69	63
Hispanic	46	7	16
Black	9	1	3
Asian	2	22	17
Other	1	1	1

What Are the Characteristics of At-Risk and Non-Risk Students?

An examination of group performance suggests that there are marked differences between at-risk and non-risk students on each of the middle school indicators. Students were assigned a group status of at-risk and non-risk based on the total number of indicators. Students who did not meet the performance expectations on six or more indicators were identified as at-risk. Students who did not meet expectations on five or fewer indicators were identified as non-risk. This analysis examines the mean and SD for each group on each middle school indicator. Raw data are used in this analysis. In Table

8, variables are categorized into four groups: classroom performance, school behavior, state assessment and national assessment.

Table 8.

Summary of Middle School Risk Indicators by Risk Status Using Raw Scores

	At-Risk (n=97)		Non-Risk (n=319)		Total (N=416)	
Variable	M	SD	M	SD	M	SD
I. Classroom Performance						
MS_GPA	2.11	0.55	3.56	0.48	3.22	0.79
MS_F	6.96	7.04	0.37	1.84	1.91	4.67
MS_D	8.93	4.42	0.97	2.45	2.83	4.53
II. School Behavior						
Suspension	0.57	1.43	0.03	0.16	0.15	0.74
Expulsion	0.01	0.10	0.00	0.00	0.00	0.05
MS_Attendance	0.94	0.06	0.96	0.04	0.95	0.44
III. State Assessment						
OAKS_Math	224.47	8.69	243.69	2.74	239.21	14.43
OAKS_Reading	224.66	8.63	241.67	9.48	237.71	11.75
IV. National Assessment						
ACT_Math	11.85	3.38	18.30	3.35	16.80	4.32
ACT_English	11.51	2.49	17.77	3.82	16.31	4.43
ACT_Reading	12.00	1.87	17.53	3.77	16.24	4.15
ACT_Science	13.66	2.12	19.61	2.77	18.46	3.36

Classroom performance indicators were direct measures of student performance on classroom assessments. These indicators included grade-point-average, grade D, and grade F. There were large discrepancies between at-risk and non-risk students on all three indicators. Non-risk students had an average of 3.56 on MS_GPA and at-risk students had an average of 2.11. In practical terms, this difference of 1.45 points between the two groups represented a full grade and a half difference in performance. In addition, at-risk students averaged 18 times more F grades, 6.96 to 0.37, and nearly nine times more D grades, 8.93 to 2.45, in middle school than non-risk students. Over the course of three years in middle school, the average at-risk student failed 2.33 trimester courses and received three grades of D each year.

Similar differences between the two groups appeared in school behavior, particularly in school discipline. At-risk students were 19 times more likely to have been suspended or expelled from school for a disciplinary issue than non-risk students. Each suspension and expulsion represents misbehavior that interferes with the learning environment. Suspended and expelled students lost instructional time from school and contributed to a student's absenteeism. While at-risk students received 19 times more suspensions from school than non-risk students, attendance rates were rather similar between the two groups. At-risk students attended school 94 percent of the time, and non-risk students attended 96 percent of the time. The difference is within a standard deviation and equates essentially to less than four days over the course of the school year.

On state and national assessments, there was consistently a large discrepancy between the two groups, greater than one standard deviation. At-risk students averaged

224.47 on state math assessments (OAKS_Math) and 224.66 on state reading assessments (OAKS_Reading). In comparison, non-risk students averaged 243.69 on math and 241.67 on reading. The ACT Explore Assessment indicated similar differences with the largest occurring on the math assessment (ACT_Math) at 6.45 points. This was a difference of nearly 1.5 SD. The narrowest margin of difference was 5.53 points on the reading assessment, a full standard deviation difference. Such differences between the two groups suggest the need to analyze ninth grade performance.

How Do At-Risk Ninth Graders Perform on Each Middle School Indicator?

An analysis of ninth grade performance by each middle school indicator suggests that group differences persist into the ninth grade. While previous analyses examined overall risk status, this analysis will examine students at risk on each middle school indicator. Students were identified based on performance expectations as at-risk or non-risk on each middle school indicator. The 12 risk indicators were grouped into four general categories, including (a) classroom performance, (b) school behavior, (c) state assessment, and (d) national assessment.

The first category includes measures of academic performance in the classroom, such as grade-point-average, grades of F, and grades of D. Table 9 suggests that there is a marked difference between at-risk and non-risk ninth graders. Of the 416 students in this study, 59 entered high school with a middle school grade-point-average below a 2.20. These students faired poorly on all three ninth grade measures compared to other students. Students with low grade-point-averages attended school less often, failed nine

times more courses, and averaged a full grade and a half lower in high school courses than students with higher middle school grade-point-averages.

Table 9.

Ninth Grade Measures by Risk Status by Middle School Risk Indicators – Classroom Performance

		HS_Attendance		Course Failure		HS_GPA	
Variable	N	M	SD	M	SD	M	SD
MS_GPA							
Risk	59	0.92	0.07	1.49	1.46	2.18	1.16
Non	357	0.97	0.04	0.16	0.85	3.05	0.92
Total	416	0.96	0.05	0.35	0.94	2.97	0.98
MS_D							
Risk	171	0.94	0.06	0.81	1.32	2.20	0.92
Non	245	0.97	0.04	0.03	0.16	3.51	0.59
Total	416	0.96	0.05	0.35	0.94	2.97	0.98
MS_F							
Risk	116	0.94	0.06	1.08	1.49	1.95	0.88
Non	300	0.97	0.04	0.07	0.29	3.36	0.69
Total	416	0.96	0.05	0.35	0.94	2.97	0.98

Similar performance is noted for students who failed or received a letter grade of D in a middle school course. These students also attended high school less frequently, failed more courses and earned a lower high school grade-point-average than other students. While more students were identified as at-risk by grade D, students who failed a course in middle school experienced greater differences in course failure and high school

grade-point-average. They were 15 times more likely to fail during the first semester of high school, and they earned nearly a full grade and a half lower overall. In addition, students who failed a course performed equally as well as students with a letter grade of D on high school attendance. The suggestion is that marginally performing middle school students struggle nearly as much as students who failed on all three high school measures compared to other students.

The second category includes measures of school behavior, such as attendance rates, suspension, and expulsion. Using Table 10, it is not surprising that students with poor middle school attendance also have poor high school attendance rates. Of the 40 students that had middle school attendance rates below 90 percent, their high school attendance rate was 87.5 percent; a full ten percentage points lower than the average of other students. In addition, non-attendance may have impacted course completion rates and high school grade-point-averages as non-attending students failed over twice as many courses and earned a full grade below other students.

There are differences between student who received suspension or expulsions and students who did not. Eight percent of the students in this study were suspended from school at least once from middle school for disciplinary reasons. These students missed between one and ten days of class instruction. In addition, one student was expelled from school for more than ten days. Suspended and expelled students failed over five times more classes and earned a full grade lower, on average, than other students. Suspended students failed 1.3 courses during middle school while non-suspended students failed a mere 0.26 courses. In addition, suspended students earned a 1.814 grade-point-average,

which is considerably lower than non-suspended students who earned a 3.084 average. There was also a marginal difference in attendance rates of a mere three percentage points between the two groups. Suspended students attended nearly 94 percent of the time while non-suspended students attended nearly 97 percent.

Table 10.

Ninth Grade Measures by Risk Status by Middle School Risk Indicators –School Behavior

		HS_Attendance		Course Failure		HS_GPA	
Variable	N	M	SD	M	SD	M	SD
MS_Attendance							
Risk	40	.875	.103	.83	1.466	2.189	1.168
Non	376	.974	.038	.30	.856	3.058	.928
Total	416	.964	.056	.35	.943	2.974	.986
Suspension							
Risk	36	.937	.078	1.31	1.527	1.814	.942
Non	380	.966	.053	.26	.814	3.084	.918
Total	416	.964	.056	.35	.943	2.974	.986
Expulsion							
Risk	1	.849	-	.00	-	2.000	-
Non	415	.964	.055	.35	.944	2.976	.986
Total	416	.964	.056	.35	.943	2.974	.986

The third category of variables includes measures from OAKS in eighth grade math and reading. As indicated on Table 11, there are marginal differences between at-risk and non-risk students in high school attendance based on either indicator. Both indicators, however, suggest marked differences between at-risk and non-risk on course

failure and high school grade-point-average. Using either math or reading as a risk indicator, at-risk students failed, on average, seven times more courses than other students, and earned a full grade lower on average. Unlike the school behavior indicators, which identified very few students as at risk, approximately one in four students had either math or reading as a risk indicator. Slightly more students, 26 percent as opposed to 24 percent, struggled with reading than math.

Table 11.

Ninth Grade Measures by Risk Status by Middle School Risk Indicators – State Assessment

		HS_Attendance		Course Failure		HS_GPA	
Variable	N	M	SD	M	SD	M	SD
OAKS_Math							
Risk	101	.947	.073	1.00	1.549	2.028	.967
Non	315	.969	.048	.14	.481	3.277	.779
Total	416	.964	.056	.35	.943	2.974	.986
OAKS_Reading							
Risk	109	.951	.067	.96	1.509	2.119	1.030
Non	307	.969	.050	.13	.470	3.277	.769
Total	416	.964	.056	.35	.943	2.974	.986

The final category includes the sub-tests of the ACT Explore assessment for eighth grade students. This nationally norm-referenced assessment includes four sub-tests: math, English, reading and science. As with the state assessments, there was a marginal difference across all four assessments between risk and non-risk students in

high school attendance. There was a fairly consistent pattern in course failure and high school average. Specifically, at-risk students failed far more courses and earned much lower grade-point-average than non-risk students. In addition, it is important to note the number of students identified as at-risk by each assessments. Using Table 12, more students were identified as at-risk by these indicators than by any other. Approximately 39 percent of all students were identified by the ACT math assessment, and the ACT reading assessment identified another 45 percent as at risk for school failure. An astonishing 67 percent of all students were identified by the ACT science assessment as at-risk.

How Does Each Eighth Grade Indicator Correlate to Ninth Grade Performance?

A high linear correlation between the 12 middle school risk indicators and the three high school measures may provide greater understanding to the predictive value of each indicator. Using Table 13, which provides correlation results for this study, a high correlations exists between MS_F and MS_D ($r=.723$, $p<.001$) and MS_F and MS_GPA ($r=.654$, $p<.001$). This suggests that a collinearity issue exist between MS_F and the two variables. An analysis of collinearity statistics for these indicator variables was conducted, and it confirmed that MS_F had a multi-collinearity problem (Tolerance=.339). Sager and Brown (1994) have suggested that two variables with a high correlation value may be too closely related to provide useful information, and one of the variables should be dropped from the analysis. Given the high correlation between MS_F and other variables, MS_F was dropped from further analyses.

Table 12.

Ninth Grade Measures by Risk Status by Middle School Risk Indicators – National Assessment

		HS_Attendance		Course Failure		HS_GPA	
Variable	N	M	SD	M	SD	M	SD
ACT_Math							
Risk	188	.955	.057	.67	1.24	2.43	.962
Non	228	.972	.054	.09	.431	3.41	.762
Total	416	.964	.056	.35	.943	2.97	.986
ACT_English							
Risk	95	.952	.063	.96	1.51	2.04	.966
Non	321	.967	.053	.17	.580	3.24	.809
Total	416	.964	.056	.35	.943	2.97	.986
ACT_Reading							
Risk	163	.956	.059	.70	1.31	2.39	.984
Non	253	.969	.053	.13	.480	3.34	.791
Total	416	.964	.056	.35	.943	2.97	.986
ACT_Science							
Risk	269	.959	.057	.52	1.12	2.61	.994
Non	147	.973	.052	.05	.244	3.62	.542
Total	416	.964	.056	.35	.943	2.97	.986

A review of the remaining middle school indicators suggests that a moderate to strong correlation exists between the middle school indicators and high school grade-point-average. The strongest correlation is between MS_ D and HS_GPA ($r=.653$, $p<.001$), and the weakest was between MS_Attendance and HS_GPA ($r=.260$, $p<.001$).

The correlation with MS_Attendance, however, is stronger than expected. Similarly, moderate correlations exist between the middle school indicators and HS_F; the strongest correlation is with MS_D ($r=.502$, $p<.001$). The correlations with HS_Attendance are all relatively weak, below 0.3. The lone exception is between HS_Attendance and MS_Attendance ($r=.519$, $p<.001$). Given the relationship between HS_Attendance and MS_Attendance, the strength of this correlation is not surprising. If anything, the relationship would suggest a stronger correlation. In the end, there is a weak to moderate correlation between all ten eighth grade indicators and the three ninth grade outcome measures.

What Are the Significant Predictors of Ninth Grade Attendance?

To identify the strongest predictors of ninth grade performance, multiple Ordinary Least Square (OLS) and logistic regression analyses were applied to ten middle school risk indicators and the three ninth grade outcome measures. Due to collinearity, MS_F was removed from this analysis. In addition, the single case of Expulsion calls into question its statistical significance. These two variables were removed from further analyses. Regression analysis was conducted for each of the ten remaining middle school indicators and the three high school measures, including HS_GPA, HS_F, and HS_Attendance

Table 13. *Correlation Between Middle School Risk Indicators and Ninth Grade Performance*

	8th grade risk status by each indicator												9th grade outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	MS_GPA	MS_F	MS_D	Susp	Exp	MS_Att	OAKS_M	OAKS_R	ACT_M	ACT_E	ACT_R	ACT_S	GPA	HS_F	HS_Att
1	1														
2	.654 ***	1													
3	.487 ***	.723 ***	1												
4	.316 ***	.362 ***	.316 ***	1											
5	.121 *	.079	.059	-.015.	1										
6	.125 *	.143 **	.158 **	.074	.151 **	1									
7	.397 ***	.473 ***	.484 ***	.304 ***	.087	.044	1								
8	.447 ***	.471 ***	.413 ***	.244 ***	.082	.065	.555 ***	1							
9	.365 ***	.469 ***	.498 ***	.270 ***	.054	.064	.522 ***	.437 ***	1						
10	.353 ***	.466 ***	.442 ***	.260 ***	.090	-.022	.493 ***	.535 ***	.461 ***	1					
11	.351 ***	.434 ***	.440 ***	.261 ***	.061	.039	.476 ***	.518 ***	.498 ***	.478 ***	1				
12	.301 ***	.381 ***	.393 ***	.192 ***	.036	.105 *	.360 ***	.326 ***	.489 ***	.378 ***	.501 ***	1			
13	-.559 ***	-.645 ***	-.653 ***	-.362 ***	-.049	-.260 ***	-.544 ***	-.517 ***	-.494 ***	-.513 ***	-.469 ***	-.487 ***	1		
14	.496 ***	.547 ***	.502 ***	.302 ***	-.024	.107 *	.373 ***	.370 ***	.383 ***	.369 ***	.314 ***	.287 ***	-.706 ***	1	
15	-.256 ***	-.255 ***	-.232 ***	-.148 **	-.101*	-.519 ***	-.170 ***	-.140 **	-.149 **	-.115 *	-.111 *	-.126 *	.493 ***	-.250 ***	1

In preliminary analysis on Table 14, the distribution of HS_Attendance was substantially skewed. In order to complete this analysis, this variable was transformed in order to normalize its distribution, using the square root method, sqrt(-hs_att+1). The model in Table 15 explains 28.8 percent of the variance in HS_Attendance ($F(10, 405)= 17.767$, $p <.001$). In this linear regression model, only two variables are statistically significant at a significance level of .05: MS_Attendance (b=.191, p<.001) and MS_GPA (b=.056, p<.01). In addition, a third indicator, ACT_Math (b=.025, p=.099), appears to have a moderate significance level of .10. To ensure that all significant relationships are analyzed, a revised model included ACT_Math, MS_Attendance and MS_GPA.

Table 14.

Multiple Regression Analysis Summary for Middle School Risk Indicators Predicting Ninth Grade Attendance (Initial Model)

Variable	b	S.E.	Beta	t
(Constant)	.100	.009		10.966***
MS_Attendance	.191	.018	.450	10.449***
Suspension	.016	.020	.035	.773
MS_D	.020	.014	.080	1.446
MS_GPA	.056	.018	.156	3.058**
OAKS_Math	.004	.017	.012	.217
OAKS_Reading	-.011	.016	-.039	-.688
ACT_Math	.025	.014	.099	.770
ACT_English	.005	.016	.018	.337
ACT_Science	-.008	.013	-.030	-.576
ACT_Reading	.000	.024	-.003	-.058

Note. Adjusted $R^2 = .288$
*p < .05; ** p < .01; *** p < .001

The revised model on Table 15, includes ACT_Math, MS_Attendance and MS_GPA. It explains 29.8 percent of the variance ($F(3, 412)= 58.315$, $p <.001$). In this model, all three indicators are significant. Of the three indicators, the prevalence of MS_Attendance has the strongest predictive power ($b=.194$, $p<.001$). The relationship, however, between middle school and high school attendance is logical. These two variables measure the same construct, student attendance. The predictive relationship between MS_GPA ($b=.065$, $p<.001$) and attendance is also understandable. Middle school attendance may be embedded within and contribute to MS_GPA. Subsequently, the presence of MS_GPA as a risk indicator may reflect attendance as a risk factor as well. The predictive strength of ACT_Math ($b=.030$, $p<.01$), however, does not present an obvious explanation.

The following formula was utilized to retransform the results in a meaningful way: sqrt(-High school attendance rate + 1) = .099 + (.194 * Ms_Attendance) + (.065 * MS_GPA) + (.030*ACT_Math). This formula indicates that the expected high school attendance rate for the students without any risk on the three indicators is 99 percent. Calculating for each risk factor provides the following results: the expected attendance rate for students only at risk for MS_GPA is 97 percent; the expected attendance rate for students only at risk for MS_GPA is 98 percent; the expected high school attendance rate for students who were at risk only on MS_Attendance is 91 percent, which is relatively low. Using the revised model on Table 15, poor middle school attendance, MS_GPA and ACT_Math are predictors of poor high school attendance.

Table 15.

Multiple Regression Analysis Summary for Middle School Risk Indicators Predicting Ninth Grade Attendance (Revised Model)

Variable	b	S.E.	Beta	t
(Constant)	.099	.007		13.920***
MS_Attendance	.194	.018	.455	10.936***
MS_GPA	.065	.016	.182	4.079***
ACT_Math	.030	.011	.120	2.705**

Note. Adjusted R^2 = .298
$p < .05$; ** $p < .01$; *** $p < .001$

What Are the Significant Predictors of Ninth Grade Course Failure?

In the initial regression model for course failure on Table 16, the outcome measure is treated as dichotomous; coded 1 if a student failed at least one course and coded 0 if a student did not have any course failure. Logistic regression is applied. In this initial model, about 30 percent of the variance is explained according to Cox & Snell R square, and two indicators, MS_D (b=2.125, p<.001) and MS_GPA (b=1.182, p<.01), are significant (x^2 (10)=147.873, p<.001). The relationship between MS_D and course failure appears to be the strongest. A third indicator, ACT_Math (b=.675, p=.125), appears to be significant. While indicators from classroom performance and assessment may be related to course failure, none of the school behavior indicators are related to course failure. A revised model will include MS_D, MS_GPA, and ACT_Math.

Table 16.

Multiple Regression Analysis Summary for Middle School Risk Indicators Predicting Ninth Grade Course Failure (Initial Model)

Variable	b	S.E.	Wald	Odds Ratio
(Constant)	-4.066	.513	62.852	.017***
MS_Attendance	.281	.467	.363	1.325
Suspension	.553	.432	1.634	1.738
MS_D	2.125	.475	19.972	8.371***
MS_GPA	1.182	.378	9.792	3.262**
OAKS_Math	-.016	.407	.002	.984
OAKS_Reading	.326	.429	.577	1.386
ACT_Math	.675	.429	2.367	1.964
ACT_English	.418	.400	1.091	1.518
ACT_Reading	-.278	.422	.434	.757
ACT_Science	.457	.553	.682	1.579

Note. Cox & Snell R^2= .299, Nagelkerke R^2 = .477
p < .05; ** p < .01; *** p < .001

In the revised model on Table 17, all three indicators are significant (x^2 (3)=142.487, P<.001). In this model, the prevalence of grade D in middle school is highly predictive of course failure during the first semester of high school (Odds Ratio=10.182, p<.001). This indicates that those at-risk students in terms of MS_D have about ten times larger odds of having course failure in the first year of high school than those non-risk students. In addition, the prevalence of MS_GPA as a risk indicator may be moderately predictive of course failure (Odds Ration=4.067, p<.001). That is, those at-risk students in terms of middle school grade-point-average will have about four times higher odds of having high school course failure than non-risk students. The strength of these two

indicators is not necessarily surprising given the moderate strength of the correlation between these indicators and course failure (Table 13). The relationship between ACT_Math and course failure is relatively weaker than the other two indicators. Nevertheless, students who are at-risk on ACT_Math will have about 2.74 times high odds of failing a high school course in the ninth grade year. This model explains 29% of the variance in course failure according to Cox & Snell R Square.

Table 17.

Multiple Regression Analysis Summary for Middle School Risk Indicators Predicting Ninth Grade Course Failure (Revised Model)

Variable	b	S.E.	Wald	Odds Ratio
(Constant)	-3.874	.421	84.668	.021***
MS_D	2.321	.454	26.156	10.182***
MS_GPA	1.403	.354	15.697	4.067***
ACT_Math	1.009	.376	7.199	2.743**

Note. Cox & Snell $R^2 = .290$, Nagelkerke $R^2 = .463$
*p < .05; ** p < .01; *** p < .001

What Are the Significant Predictors of Ninth Grade GPA?

The initial regression model for HS_GPA, Table 18, includes the 11 middle school indicators. While the distribution of HS_GPA showed a pattern of negative skewedness, the data were not transformed to normalize the distribution, because the transformation did not change any analytic results significantly. Linear regression statistics were applied. All middle school indicators except for expulsion, ACT_Math and ACT_Reading, were significant. The strongest relationships appeared between ninth

grade grade-point-average and MS_Attendance (b=-.555, p<.001), MS_D (b=-.582, p<.001), and MS_GPA (b=-.547, p<.001). The weakest relationships in this model existed between ninth grade grade-point-average and state assessments, math (b=-.288, p<.01) and reading (b=-.207, p<.01). This initial model explained 61.8 percent of variance in HS_GPA (F(11, 404)=62.023, p <.001). A revised model excluded expulsion, ACT_Math and ACT_Reading.

Table 18.

Multiple Regression Analysis Summary for Middle School Risk Indicators Predicting Ninth Grade GPA (Initial Model)

Variable	b	S.E.	Beta	t
(Constant)	3.775	.052		72.248***
MS_Attendance	-.558	.105	-.167	-5.304***
Suspension	-.241	.116	-.069	-2.070*
MS_D	-.582	.081	-.291	-7.229***
MS_GPA	-.547	.106	-.194	-5.175***
OAKS_Math	-.288	.095	-.125	-3.033**
OAKS_Reading	-.207	.093	-.092	-2.213**
ACT_Math	-.019	.081	-.009	-.232
ACT_English	-.313	.093	-.133	-3.347**
ACT_Science	-.325	.077	-.157	-4.192***
ACT_Reading	.006	.083	.003	.069

Note. Adjusted $R^2 = .618$
*p < .05; ** p < .01; *** p < .001

With three variables removed, the revised model on Table 19 continues to explain 61.8 percent of the variance (F(8, 407)=84.932, p <.001). Classroom performance

indicators were the strongest predictors of ninth grade grade-point-average, specifically MS_D (b=-.590, p<.001) and MS_GPA (b=-.531, p<.001). While MS_Attendance (b=-.531, p<.001) was the next strongest predictor, Suspension (b=-.256, p<.05) was relatively weak. The weakest predictors in this model are the two state assessments, OAKS_Math (b=-.285, p<.01) and OAKS_Reading (b=-.207, p<.05), and Suspension (b=-.256, p<.05). The presents of the three strongest indicators might decrease HS_GPA by 1.652, and the presents of all significant indicators would decrease a student's grade-point-average to 0.737.

Table 19.

Multiple Regression Analysis Summary for Middle School Risk Indicators Predicting Ninth Grade GPA (Revised Model)

Variable	b	S.E.	Beta	t
(Constant)	3.772	.052		72.753 ***
MS_Attendance	-.531	.104	-.159	-5.112 ***
Suspension	-.256	.116	-.073	-2.212 *
MS_D	-.590	.079	-.294	-7.485 ***
MS_GPA	-.531	.105	-.188	-5.053 ***
OAKS_Math	-.285	.092	-.124	-3.095 **
OAKS_Reading	-.207	.091	-.092	-2.281 *
ACT_English	-.304	.092	-.130	-3.310 **
ACT_Science	-.331	.071	-.161	-4.644 ***

Note. Adjusted $R^2 = .618$
* p < .05; ** p < .01; *** p < .001

CHAPTER V

DISCUSSION

The purpose of this study was to examine the efficacy of 12 middle school academic risk indicators to identify struggling students entering the ninth grade. In this study, I examined the empirical relationships between these indicators and three ninth grade measures that have shown to be strong predictors of students academically at risk of dropping out of high school (Allensworth & Easton, 2007; Kennelly & Monrad, 2007; Neild & Balfanz, 2006). While this study focuses on middle school indicators, the design of this study does not allow for an analysis of the efficacy of individual interventions, such as Freshmen Achievement Teams.

As struggling students are identified in the ninth grade through the FAT process, a variety of interventions of varying intensities are applied to improve student performance. In this study, at-risk students may have received modest accommodations in each course, such as shortened assignments, preferential seating, or extended time for completing assignments. In addition, some students may have received more intensive interventions, such as direct literacy instruction or daily progress monitoring by an Intervention Specialists. Controlling for the impact of each accommodation or intervention on the outcome measures is problematic. Consequently, the accommodations and interventions

may confound the outcome measures of this study. Any threats to validity that these treatment variations may cause are dealt with in the study limitations section. My findings, as presented in Figure 4, suggest that four middle school indicators may be strong predictors of ninth grade performance.

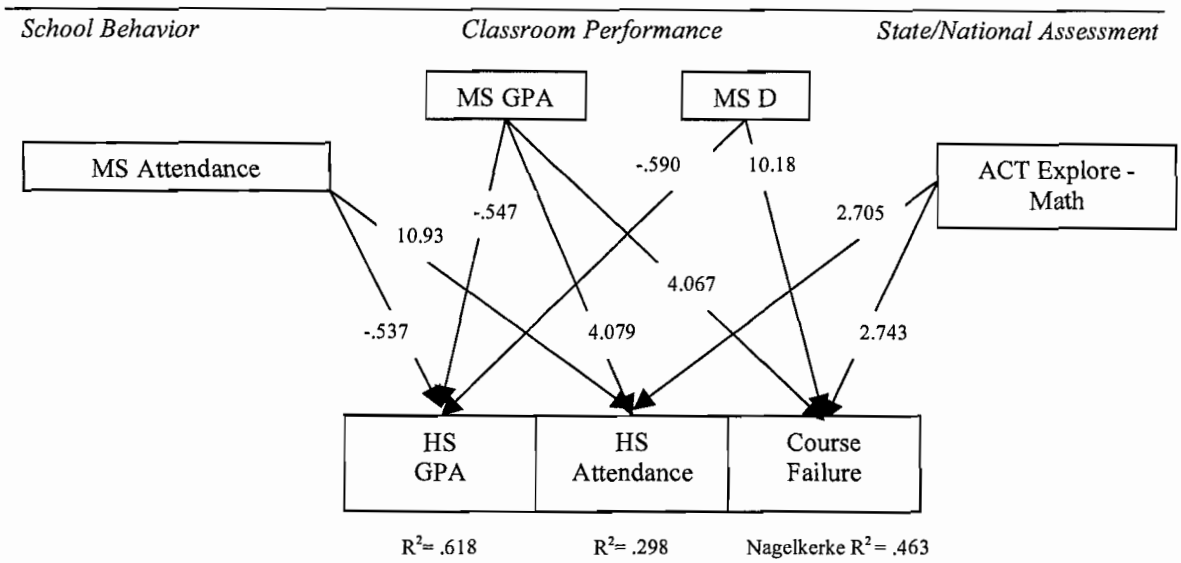

Figure 4. Significant Middle School Indicators of Ninth Grade Performance

Key Findings

Research has examined the link between dropping out of high school and academic risk factors (Lee, 2007). Pervious classroom performance, school behavior and assessment performance have identified students at risk of dropping out of school as early as the sixth grade (Balfanz, Herzog & MacIver, 2007). Early identification of these students allows schools to implement interventions that may improve student performance and keep students on track towards graduation. Allensworth and Easton

(2007) have identified three ninth grade indicators of students that are not on track for graduation. These off-track indicators include student attendance, course failure and cumulative grade-point-average.

The purpose of this study was to identify middle school performance indicators that correlate and may predict students' high school performance on these off-track indicators. The implications of these middle school indicators would be the identification of at-risk students before they enter high school. The findings for this study will be presented in two parts: (a) characteristics of at-risk students, and (b) predictors of ninth grade performance.

Characteristics of At-Risk Students

This study examined the academic performance of 416 freshmen students matriculating from three middle schools to a large suburban high school. Students were assessed as at-risk or non-risk on 12 middle school academic indicators. Students with six or more at-risk indicators were identified overall as at-risk for school failure and received intervention at the beginning of the school year. The at-risk students in this study, on average, struggled on nine of the 12 indicators. Over three-fourths of the students in this study had five or fewer risk indicators and did not receive any intervention. In fact, the majority of the students, 51.7 percent, had two or less risk indicators overall. While it may be said that the majority of students were performing very well, the students that struggled are highly at risk for school failure.

Lee (2007) identified social risk factors that are associated with school failure, including gender, ethnicity, poverty and immigration status. An analysis of the

composition of highly at-risk students in this study indicates that the majority of these students are male, 61 percent, receiving services in Special Education, 19.5 percent, and English Language Development, 35 percent. These students are predominately Hispanic/Latino, 46 percent. In comparison to the total population in the sample, these percentages are significant in telling the story of who is more likely to be at risk for dropping out (see Table 7). Hispanics, males, and English-Language-Learners students were more likely to be identified as at-risk than any other student in this study.

Allensworth and Easton (2007) suggest a strong relationship exists between student attendance and course failure. An analysis, however, of ninth grade measures by risk status (Table 10) suggests that attendance may have less of an impact on student performance. In this study, students who were identified as at-risk by middle school grade-point-average were absent nine more days over the course of a school year than non-risk students. Nevertheless, at-risk students failed nine times more courses and earned 0.87 grade-point-average lower than non-risk students in high school. In addition, students who were identified as at-risk by middle school grade F attended only six fewer days a year than non-risk students. Yet, at-risk students failed 15 times more courses and earned a grade-point-average 1.41 lower in high school than non-risk students. While difference in attendance rates between at-risk and non-risk students may be marginal, the difference in academic performance is dramatic.

Further analysis of indicators revealed that students struggled more often on ACT assessments than on any other indicator. Nearly two-thirds, 64.7 percent, of the students struggled on the ACT science assessment; over 45 percent struggled on the ACT math

assessment; and 39 percent of the students struggled with ACT reading. Designed as part of a larger curriculum assessment program, the ACT Explore scores may predict student success in college-level courses. Students were identified on these standardized assessments as at-risk based on ACT's "college ready" index (ACT, 2007). The college ready index benchmarks the ACT Explore for eighth and ninth grade students with the ACT Plan for tenth graders and the ACT for eleventh graders. Student performance was much better on the English and reading assessments than on math and science.

While more students struggled on the ACT assessment, students that were identified as at-risk by classroom performance and middle school attendance struggled more profoundly than other students. Students with lower grade-point-averages earn a full grade and a half lower in high school courses than students with higher middle school grade-point-averages. While less than 10 percent of the students were at-risk due to attendance, at-risks students attended high school 87.5 percent of the time; this is a full ten percentage point lower than other students. This may suggest that while standardized assessments are prominent indicators, classroom performance and school behavior are stronger predictors of at-risk students.

Predictors of Ninth Grade Performance

While previous academic performance and incidents of problem behavior are strong predictors of high school dropout, Allensworth and Easton (2007) suggested three ninth grade markers of students at-risk that may be more timely and responsive to intervention. These markers included absenteeism, grade-point-average, and course completion. Their study found that only 63 percent of the students missing more than five

days of class per semester graduated within four years. Comparatively, 87 percent of the students missing less than five days graduated within the same time frame. Balfanz, Herzog and MacIver (2007) also suggested that student non-attendance rates in middle school were an effective indicator of high school dropouts. Given that course attendance was the most essential requirement to avoiding course failure, absenteeism may have been the most readily identifiable indicator and the most responsive to intervention.

Course grades and failure rates were slightly better predictors of students' academic performance than attendance; they directly demonstrate whether or not a student is making progress in their courses. Students that earn a 2.5 grade point average on a 4.0 scale at the end of their freshmen year are more likely to graduate within four years than students with an average below a 2.0 (Allensworth and Easton, 2007). In addition, failing a single core course may dramatically reduce the likelihood of graduation. Core courses include English, social studies, mathematics and science. Research suggests that failure of one core course may reduce the likelihood of graduation by 28 percent. Failure of two courses may reduce the chances of graduation by 49 percent (Allensworth & Easton, 2005). Nevertheless, few students experience academic problems in only a single course. Failure in even one semester course is generally a sign of trouble in other courses as well.

Attendance. Allensworth and Easton (2007) suggest that ninth grade course attendance is highly predictive of student failure. They found that course attendance was eight times more predictive of course failure, and they also found that freshmen absences could be used to predict 63 percent of the variation in course failures. Furthermore,

course attendance was a stronger predictor than standardized test scores. In their study, students who entered high school with very low eighth grade test scores who missed less than one week of classes per semester had fewer failures, on average, than students entering with very high test scores who missed one additional week of classes. In addition, Neild and Balfanz (2006) found that of the eighth grade students who attended school less than 80 percent of the time 78 percent of them eventually dropped out of school.

This study found three predictors of ninth grade attendance; middle school attendance, middle school grade-point-average, and ACT math. Of these indicators, only middle school attendance appears to be a strong predictor ($b=.194$, $p<.001$). Students who attended middle school less than 90 percent of the time were also found to have difficulty with high school attendance. The presences of middle school attendance as a risk factor reduced high school attendance by eight percentage points to 91 percent attendance. At this level, students would miss approximately eight days of instruction during an 18-week semester and may be at risk of course failure.

The predictive power of middle school grade-point-average is relatively weaker than middle school attendance ($b=.065$, $p<.001$). Given the practical relationship between GPA and attendance, it is somewhat surprising that a stronger statistical relationship does not exist. Students with poor middle school grade-point-average were found to have a small drop in high school attendance. It stands to reason that students who are performing poorly may avoid attending class for fear of further failure and embarrassment. In fact, research has documented the process of gradual disengagement from school as student

who misses class performs poorly, and poor performance leads to student avoidance of class (Allensworth & Easton, 2007).

The weakest predictor of high school attendance is ACT math ($b=.030$, $p<.001$). ACT math is a national assessment of math achievement for eighth graders. The assessment provides information of student progress towards college readiness. While relatively weak, the mere presence of this indicator as a predictor supports the growing body of research on the importance of math as a predictor of student academic performance. Early math achievement has been shown to have strong predictive power for later achievement, and high school math achievement has been linked to college completion (Duncan, et al., 2007; Lee, et al., 2008). The findings in this study suggest that there is a relationship between student attendance and academic performance.

Course Failure. Student course failure is often a sign of trouble. Research has shown that less than half of the students who failed three or more courses during the freshmen year graduated on time (Allensworth & Easton, 2007). Failure in even one semester course may be an indication of concern. Students who failed a single course in ninth grade had graduation rate 20-percentage points lower than students who passed all of their classes (Allensworth & Easton, 2005). A student that is struggling in one course is more likely to struggle in all courses, and students who fail to earn sufficient credit to be promoted to the next grade level are far more likely to drop out of school. Neild & Balfanz (2006) found that more than half of dropouts were not promoted past the ninth or tenth grade. The three predictors in this study of ninth grade course failure are middle school grade D, middle school grade-point-average, and ACT math.

The strongest predictor of ninth grade failure is middle school grade D (b=2.321, p<.001), with an odds ratio of 10.182. This is significant given that 41 percent of the students overall were at-risk on this indicator. While a course grade of D is considered a passing grade sufficient for course credit, it is an indicator of a student struggling to master course material and concepts. In addition, the variance in teachers' grading practices to include attendance, homework, and extra credit suggest that students may earn passing grades without any true achievement (Randall & Engelhard, 2009). When combined with course failures, the number of students earning course grades of D may provide a true picture of students at risk of academic failure.

As an overall indicator of students' performance, grade-point-average is a strong predictor of student achievement (b=1.403, p<.001). As students accumulate course grades, overall trends in student achievement are apparent. If students struggle, earning low marks or even failing courses, student grade-point-averages drop precipitously. Low grade-point-average is a manifestation of weak academic skills that result in course failure. Conversely, high grade-point-average is an indication of strong academic skills. Randall and Engelhard (2009) have suggested, however, that some teacher practices, such as including attendance, extra credit and home work, may confound the grades and diminish their value as a true indicator of student achievement. Nevertheless, the findings of this study suggest that there is a strong relationship between middle school grade-point-average and high school performance.

As mentioned previously, a growing number of studies have found math to be a significant predictor of future academic outcomes (Duncan et al., 2007; Lee et al., 2008).

Similarly, the findings of this study suggest that ACT math (b=1.009, p<.01) is a powerful predictor of course failure. Students that are at-risk on this indicator are 2.5 times more likely to be at risk for course failure. This would suggest that math achievement is an important indicator of overall academic achievement.

Grade-Point-Average. Allensworth and Easton (2007) have found that grade-point-average is the most accurate for identifying students that drop out of school. In their study, 86 percent of the students with a 2.5 grade-point-average in their ninth grade year graduated within fours of entering high school. As grade-point-average declines, graduation rates also decline. Less than three-quarters of the students with a grade-point-average below a 2.0 graduated on time, and roughly one-quarter of the students with a grade-point-average below a 1.0 graduated. When combined with course failure, grade-point-average correctly identified non-graduates 80 percent of the time. Unfortunately, grade-point-average is a troubling predictor; it identifies struggling students only after they have actually failed. Strong predictors of high school grade-point-average, however, would enable schools to identify potential dropouts and implement interventions prior to actual failure. In this study, several indicators were predictors of ninth grade grade-point-average. The three strongest include middle school grade D, middle school grade-point-average, and middle school attendance.

The strongest predictor for high school grade-point-average is middle school grade D (b=-.590, p<.001). This is followed closely by middle school grade-point-average (b=-.531, p<.001) and middle school attendance (b=-.531, p<.001). The presences of these three indicators would decrease a student's high school grade-point-

average by 1.652. This is the difference between an average student at 3.0 and an at-risk student at 1.348.

Implications

Research has suggested that early identification of at-risk students is critical during the first semester of ninth grade year (Allensworth & Easton, 2007; Kennelly & Monrad, 2007; Neild & Balfanz, 2006). Early identification through key indicators will allow educators to provide targeted interventions to specific grade levels of at-risk students. While there is an extensive list of drop out prevention approaches, few are proven to be effective (Kennelly & Monrad, 2007). Interventions that are oriented around academic needs of individual students hold the most promise of combating high school dropout.

Allensworth and Easton (2005) have identified the transition from middle school to high school is a critical junction for students at risk of school failure. The findings of this study suggest that there are four middle school indicators that predict student performance in the ninth grade. These indicators include a student's grade-point-average, attendance, grade D, and ACT math scores. While background factors such as gender, ethnicity, and socio-economic status are still associated with school failure, school level indicators may be better predictors of dropout (Kennelly & Monrad, 2007). The development of an early identification system that incorporates grade-point-average, attendance, grade D and ACT math may be more effective at providing targeted interventions. Of these indicators, middle school attendance and course grade D may be more significant than previously considered.

A Model for Identifying At-Risk Ninth Grade Students

Early identification of at-risk students transitioning from middle school to high school may provide educators the opportunity to intervene prior to students failing in the ninth grade. There appears to be a window of opportunity in reaching struggling students during this transition. Kennelly and Monrad (2007) suggest that developing key indicators may assist educators in targeting resources to dropout prevention. The findings of this study suggest that two key middle school indicators that might be included in an early identification system are middle school attendance and grade D.

Middle School Attendance. Student disengagement from school has long been considered a key precursor to dropping out of school (Kennelly & Monrad, 2007). Students that have dropped out of school have often cited a lack of motivation, boredom, an unchallenging atmosphere, and an overall lack of engagement in school as key reasons for dropping out (Bridgeland, Dululio, & Morison, 2006). Balfanz, Herzog and MacIver (2007) suggest that attendance is an important indicator of school disengagement. My findings suggest that middle school attendance is a strong predictor of high school attendance and grade-point-average. Students with poor middle school attendance increase their odds of poorly attending high school by a factor of ten (Odds ratio=10.93, $p<.001$), and poor middle school may be associated with a decrease in grade-point-average by over a half grade ($b=-.531$, $p<.001$).

Given that several different factors may influence school attendance, my findings support school reforms that identify, monitor and provide specific interventions prior to student failure. While the research is sparse on high school strategies to improve

attendance, there is growing evidence to suggest that an effective strategy would include: (a) constantly recognizing and reinforcing good attendance, (b) a consistent response to the first absence, (c) the collection and analysis of student by teachers and administrators to identify struggling students, and (d) teachers, counselors and administrators meeting frequently to analyze data and develop targeted interventions (Balfanz, Herzog, & MacIver, 2007). A growing body of research suggests that interventions should include a three-tiered model that involves school-wide reforms, individually targeted interventions, and intensive interventions by specialists to address problem behaviors (Sugai & Horner, 2002).

Middle School Grade D. While the research on course failure as an indicator for dropping out is growing (Allensworth & Easton, 2007; Balfanz & Herzog, 2005), it appears that there is limited work on marginal course performance, such as grade D, as a predictor. Randall and Engelhard (2009) have noted that a simple letter grade may imply a level of precision in evaluation that is unrealistic. While grades are easily understood, student knowledge course content cannot be summed up so easily. My findings, however, indicate that a middle school grade of D may have predictive power for future course failure and high school grade-point-average. Students with a letter grade of D in middle school increase the probability of failing a course in ninth grade by 10.18 to one ($p<.001$), and a letter grade of D may be associated with a .590 decline in ninth grade grade-point-average ($p<.001$). This suggests that marginal middle school grades may be a strong predictor of ninth grade academic performance.

Study Limitations

This study utilizes a single-case exploratory case study design (Yin, 2003) with embedded quantitative statistical analysis to understand the characteristics of transitioning students who may be at risk of school failure and the relationship between middle school indicators and 9th grade performance measures. The use of case study methodology produced specific threats to the validity of the results. A discussion of the limitations to this study will include: (a) threats to internal validity, and (b) threats to external validity. While this study presents some limitations, its design lends itself to further replication research focused on these potential threats.

Internal Validity

Shadish, Cook, and Campbell (2002) emphasize that internal validity is about "causal inferences" and the extent that "causal conclusions are limited to the context of the particular treatments, outcomes, times, settings, and persons studied" (p. 54). Due to the inability to control for all extraneous variables, case study design is limited. The use of statistical analysis techniques increased the internal validity of the study. Nevertheless, the major threats to internal validity that should be considered in interrupting the results of this study are selection, regression, and maturation.

Selection. The methods section identified that the participants in this study matriculated from three different middle schools. While these schools are members of the same school district with the same expectations for implementing policy, discipline and adopted curriculum, differences between the schools persist in demographics and student performance. The inclusion in this study of all students transitioning from these middle

schools to the high school was intended to limit this threat. Nevertheless, without random assignment alternative hypotheses may be developed.

Regression. The methods section identified that six of the 12 middle school indicators are state and national assessments. These assessments, particularly in the case of math and reading, measure the same constructs. Given that there is not a perfect correlation between state and national assessments, it is possible that students may have been identified as at-risk on the state assessment and non-risk on the national assessment, or alternatively, non-risk on the state assessment and at-risk on the national assessment. The inclusion of multiple indicators was intended to limit this threat.

Maturation. The middle school measures utilized in this study, particularly in the area of classroom performance and school behavior, reflect student performance over three years of middle school. In addition, outcomes are measured at the mid-point of a student's ninth grade year. Natural growth and maturation over the course of this time may pose a threat. To limit this threat, only students of the same age and previous middle school experience were included in this study. Nevertheless, this threat may lead to alternative hypotheses.

External Validity

Shadish, Cook and Campbell (2002) defined external validity as "the extent to which a causal relationship holds over variations in persons, settings, treatments, and outcomes" (p.83). Yin (2003) suggested that generalizing results within case studies relied upon analytical generalizations of a set of results to a broader theory. This study relied on the recent work of Allensworth and Easton (2007) and Kennelly and Monrad

(2007) who developed on-track indicators to identify students at risk of not graduating from high school. Their work focused on course grades, failures and attendance in the freshmen year. The design of this case study included replication logic to test the premise of three on-track indicators and identify middle school precursors to these three indicators. While replication logic limits the threats to external validity and increases the ability to generalize the results, it is important to consider (a) the interaction of setting and treatment, and (b) the interaction of treatment variations.

Interaction of Setting and Treatment. This threat to external validity is similar to the interaction with selection threat previously discussed in the internal validity section. While trying to discern the indicators of at-risk students, student performance and experience at each middle school may be uniquely different. As with the interaction with selection, the inclusion of all students was intended to limit this particular threat. As mentioned previously, without random assignment alternative hypotheses may exist.

Interaction of Treatment Variations. Students transitioning to the high school are confronted with a new environment for learning. Each student responds to this environment differently. Subsequently, students who struggled in middle school may flourish in ninth grade, and middle school students who flourished may struggle in high school. Struggling ninth grade students receive a variety of academic and behavioral interventions to improve their performance. These interventions may range in type and intensity. The high school system may be slow to identify struggling students, and the interventions that struggling students receive may be sporadic and uneven. In addition, highly at-risk students may receive multiple interventions. These variations in treatment

for struggling students may pose a threat to external validity. As with the interaction with setting, without random assignment rival hypotheses may be developed.

Further Research

This study examined the empirical relationship between 12 middle school indicators of students' academic and behavior performance and three ninth grade measures. Given that this study focused on a single case, further study is needed on the relationship between these indicators and ninth grade performance. Particular attention should be given to the power of marginal grades in middle school to predict future high school achievement. While the variance in classroom grading practices is well documented (Randall & Engelhard, 2009), the results of this study suggest that letter grades of D in middle school may be important predictors of high school achievement.

Further study is also needed to explore the relationship between middle school indicators and high school completion. This study relied on previous research that identified ninth grade attendance, course completion and grade-point-average as indicators of high school graduation (Allensworth & Easton, 2007; Kennelly & Monrad, 2007; Neild & Balfanz, 2006). These ninth grade indicators have strong predictive power of graduation, and they have been utilized to identify students for drop out prevention. The purpose this study was to identify middle school indicators that may identify at-risk students prior to ninth grade and provide early intervention. Further research into the relationship between middle school and graduation may further strengthen the use of middle school indicators for intervention.

Finally, extensive research in school failure has identified social and academic risk factors that may contribute to dropping out of school (Croninger & Lee, 2001). Social risk was defined as the demographic factors that contribute to school failure, including gender, ethnicity, socioeconomic status, and immigration status. While this study focused on academic risk factors, the results suggest a confounding of social and academic risk factors. Of the 97 students with an overall at-risk status in this study, a large majority of them were male (60 percent), Hispanic (46 percent), and English Language Learners (35 percent). These proportions are much larger than the general population in study, suggesting the presences of social risk factors. Further research on the connection between social risk factors and the middle school indicators will strengthen our understanding of the relationship between middle school and ninth grade performance.

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