EARLY IDENTIFICATION OF STUDENTS AT-RISK FOR NONCOMPLETION

by

MELISSA J. BARRY

(Under the Direction of Amy L. Reschly)

ABSTRACT

High school completion is a national concern that fails to reach rates of 50% in some areas. Despite the need for interventions that facilitate completion, most research in this area is descriptive and focuses on interventions occurring late in education. This study examined predictors of noncompletion that are both present early in the student's development and amenable to intervention. Data from third grade students who participated in the seven-year ACT Early Project, which examined students' behavioral problems, was utilized. Two models, which included indicators of *academic, behavioral,* and *psychological/interpersonal engagement,* predicted students at-risk for noncompletion at rates as high as 88.00%. Different models were found to best predict those at-risk for noncompletion within different demographic subgroups. Classification functions for the most effective models are provided so that school districts can identify those at-risk for noncompletion in elementary school. Implications regarding early identification and recommendations for interventions are discussed.

INDEX WORDS: High school dropout, High school completion, Engagement, ACT Early

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TABLE OF CONTENTS

Page

LIST OF TABLES

Page

CHAPTER 1

DISSERTATION INTRODUCTION

High school noncompletion is a widespread problem in the United States. Every nine seconds a student drops out of high school (Lehr, Johnson, Bremer, Cosio & Thompson, 2004). The National Educational Goals Panel (2002) estimates that one in every eight children never graduates from high school. In a national examination of high school completion, the majority of states had annual event completion rates of 94.00 to 97.00% (Laird, DeBell, Chapman, 2006). The rates of completion vary widely across the United States, ranging from 89.50% in Arizona to 98.10% in Wisconsin. Additionally, completion rates deviate further from one another, ranging from 71.80% to 98.80%, when student characteristics and different methods of statistical calculation are considered (Laird et al., 2006). Regardless of which completion rate statistic is used, high school completion has high stakes for students, schools, communities, and society (Reschly & Christenson, 2006b).

The current dilemma of high school completion affects the noncompleters themselves psychologically, medically, and economically. For example, students who did not complete high school had higher rates of alcohol and drug use, received more invitations to join gangs, and participated in criminal and violent behaviors to a greater extent than their peers (Office of Juvenile Justice and Delinquency Prevention, 1995). In fact, 75% of prisoners did not complete high school (Harlow, 2003). Students who did not complete high school also had lower ratings of self-esteem and higher rates of suicide, admission to mental health programs (Tidwell, 1988), and unemployment (Beck & Muia, 1980; Timberlake, 1982). Economic opportunities for those without a high school diploma are quite limited; the average annual income of noncompleters is approximately half that of high school graduates (Coley, 1995). The unemployment rate

(32.00%) for African Americans, a group who traditionally has low completion rates, is significantly higher for those who did not complete high school than those in the same racial group who did complete (Alliance for Excellent Education, 2003).

High school completion also affects society. Given their higher rates of unemployment and lower annual incomes, students who do not complete high school bring in significantly lower tax revenues to support federal and state governmental services. Furthermore, they require more government aid in the form of social services, health services, and incarceration costs (U.S. Department of Health and Human Services, 2000). The annual cost for those that did not complete high school is at least 800 dollars per taxpayer each year (Joint Economic Committee, 1991). Kunisawa (1988) estimated this group costs United States taxpayers 75 billion dollars each year in welfare benefits and lost tax revenues. Finally, the importance of improving completion rates is supported by the finding that a one percent increase in high school completion rates would later save taxpayers 1.4 billion dollars in incarceration costs for those students (Alliance for Excellent Education, 2003).

In addition to the effects of dropout on noncompleters and society, there are also costs for educators and school districts. The National Educational Goal Panel (2002) found that most states did not reach the 90% completion benchmark set forth by the Goals 2000 federal initiative. Additionally, the completion rate for high schools is now a required indicator of Adequate Yearly Progress with Title I of No Child Left Behind (NCLB; Christenson & Thurlow, 2004). With NCLB, schools are accountable for the completion rates of all students, including those who historically have lower rates of completion (e.g., students with disabilities). The discrepancy between these standards for completion and the actual completion rates places enormous pressure on schools and educators.

On a local level, Georgia ranks poorly in high school completion rates. For example, one recent study found Georgia to have the second lowest completion rate in the United States (Greene & Winters, 2005). Furthermore, high school noncompletion costs Georgia 17 billion dollars annually in lost earning potential, tax potential, and levels of spending. Even more locally, Athens Clarke County School District, the county where the University of Georgia is located, reported a 61.00% completion rate in 2006 (Georgia Department of Education, 2006).

There are several reasons why the examination of high school completion is necessary. As previously delineated, the consequences of completion influence students, society, and schools. Additionally, there is a paucity of information in the literature establishing the relationship between predictors of completion and intervention strategies (Prevatt & Kelly, 2003; Reschly & Christenson, 2006b). Several primary tenets are crucial in order to examine high school noncompletion with intervention in mind. First, it is imperative to delineate which predictors of noncompletion are malleable to intervention. Second, given the importance of early intervention, and thus, the early identification of those students at-risk for noncompletion, it is crucial to uncover those predictors that may be identified early in development. Third, it is essential to examine the most effective targets for intervention.

CHAPTER 2

LITERATURE REVIEW

In order to fully understand which predictors of noncompletion are most malleable to intervention, it is crucial to first delineate the literature in this area. There are two primary types of research that have surfaced in the completion literature: empirical and theoretical. The majority of the literature consists of empirical research, which generally produces descriptive findings related to key differences between noncompleters and completers. The summaries of salient empirical findings in the literature are summarized in Table 1. Although empirical findings have contributed substantially to the literature, these studies (Barrington & Hendricks; 1989; Battin-Pearson, Newcomb, Abbot, Hill, Catalano, & Hawkins, 2000; Egyed, McIntosh, & Bull, 1998; Janosz, LeBlanc, Boulerice, & Tremblay, 1997; Reyes, Gillock, Kobus, & Sanchez, 2000; Smyth, 1999) generally examine completion in a piecemeal manner by focusing on only a few variables associated with completion as opposed to a more comprehensive framework. On the other hand, a few studies and models are theoretically sound and explain why high school completion occurs while taking into account characteristics of the student, school, and/or family (Anderson, Christenson, & Lehr, 2004; Christenson & Thurlow, 2004; Finn, 1989; Garnier, Stein, & Jacobs, 1997; Jimerson, Anderson, & Whipple, 2002; Reschly & Christenson, 2006a). These studies and their respective theories have been supported in the literature and will be the focus of the theoretical framework for this study.

As mentioned previously, numerous empirical studies (Barrington & Hendricks; 1989; Battin-Pearson et al., 2000; Egyed et al., 1998; Janosz et al., 1997; Reyes et al., 2000; Smyth, 1999) have attempted to describe noncompletion without explaining how or why it occurs. However, only a few theoretically-based studies (Finn, 1989; Garnier et al., 1997; Jimerson et

al., 2002; Reschly & Christenson, 2006b) have substantially aided to the understanding of this phenomenon. First, the distinction between *unalterable* and *alterable* variables is presented, followed by a description of the Participation-Identification theory of engagement and school completion. Finally, the major tenets of the engagement model are presented, including the types of engagement and links to prevention and intervention efforts (Christenson & Thurlow, 2004).

An essential distinction in the predictors of noncompletion is that of *alterable* and *unalterable* predictors (Finn, 1989). This distinction is crucial to the prevention of high school noncompletion. *Unalterable* variables, such as race and socioeconomic status, are those intrinsic to the student or their family that cannot be changed. It is important for educators to recognize the saliency of these variables due to their influence on high school completion. *Alterable* variables, such as disruptiveness and homework completion, are those that are amenable to change. *Alterable* variables are informative to educators for developing prevention and intervention strategies that may increase the likelihood of high school completion.

Several aspects of the student's family background, such as race, socioeconomic status (SES), and household characteristics, have been shown to influence high school completion. A student's race has been found to be associated with high school completion in several studies (Laird et al., 2006; Reschly & Christenson, 2006b). More specifically, high school completion rates are lower for African American and Hispanic students when compared to Caucasian and Asian students (Laird et al, 2006). For instance, the 2004 status completion rates were 96.40% for Asians, 93.20% for Caucasians, 88.20% for African Americans, and 76.20% for Hispanics.

It is difficult to disentangle the effects of race and socioeconomic status on high school completion. Some studies have found that race does not predict high school completion when SES is controlled for (Rumberger, 1995). However, other researchers found race does predict

high school completion after controlling for SES (Cairns, Cairns, & Neckerman, 1989). Students from low-income households finish high school at a much lower rate (Anderson et al., 2004; Battin-Pearson et al., 2000; Ensminger & Slusarcick, 1992; Rumberger, 1995). In particular, low-income families have an event completion rate of 89.60% whereas students from middle- and high-income families have rates of 95.40% and 97.50%, respectively (Laird et al, 2006).

Other familial aspects are also believed to influence risk for noncompletion. For instance, students from single-parent households have lower completion rates than their peers (Anderson et al., 2004). Kleine (1994) found that poor parenting, marital problems, substandard housing, a large number of children in the family, and parents' minimal interest in education all independently increased the likelihood of high school noncompletion. Students whose parents did not communicate with their child's school are also less likely to complete high school (Baker & Stevenson, 1986). Finally, students who have a high level of school mobility are also at a higher risk for noncompletion (Alexander, Entwisle, & Horsey, 1997).

Several *unalterable variables* intrinsic to a student also place him or her at risk for high school noncompletion. Students who have been diagnosed with a disability also have lower completion rates. The event completion rates for students with disabilities ranged from 4.00% to 92.50% depending on a number of factors, including state, race, gender, and special education classification. The data for a number of disability categories also indicate lower completion rates. Specifically, the completion rates for children with an Emotional Behavioral Disorder (EBD), a Speech/Language Disorder, or Specific Learning Disability (SLD) are currently 35.41%, 57.37%, and 59.20%, respectively (U.S. Department of Education, 2007). Students for whom English is not their first language also have lower high school completion rates than their peers (Rosenthal, 1998).

Unalterable features of the school the child attends also influence his or her risk for high school noncompletion. Students from urban schools or those in a western or southern region had lower completion rates (Laird et al., 2006). Large city school districts were more likely to have high school completion rates of less than 60.00% whereas most suburbs of large and mid-size cities had completion rates greater than 80.00% (Kaufman, Alt, & Chapman, 2004). Additionally, schools with more than 1,000 students, high student-teacher ratios, poor or uninteresting curricula, low expectations, and high truancy rates were more likely to have lower levels of completion (Alexander, Entwisle, & Kabbani, 2001; Lehr et al., 2004; Reschly & Christenson, 2006b). Further, completion rates for African American students in an urban setting often fail to reach 50.00% (Eckenrode, Rowe, Kaurd & Braithwaite, 1995).

Given the abundant research on predictors of completion that are not amenable to intervention, the current study will predominantly focus on *alterable* characteristics. By doing so, it is expected that more effective interventions and prevention strategies can be developed. However, it is important not to disregard the saliency of *unalterable* variables in the life of a student. In particular, interventions targeting *alterable* variables should be made available for those students for whom several *unalterable* risk factors have been identified (Lehr, Hansen, Sinclair, & Christenson, 2003). The literature related to *alterable* characteristics will be discussed within the context of the leading theories of high school noncompletion.

Engagement

Finn's (1989) Participation-Identification model focuses on student involvement in classroom and school-wide activities. The main principle of this model is that students who are willing participants of the school facilitate both a positive sense of identification and belonging with the school as well as the realization of the importance of education. Although the student is

the primary unit of analysis, Finn argues that the interactive nature of student characteristics and school policies is important. Additionally, this model addresses the importance of both behavioral and emotional indicators of identification with the school environment.

Finn (1989) outlined four levels of school involvement, which range from minimal participation to involvement that has a positive impact on the student's engagement. Level one, which generally surfaces in the early years of education, includes basic classroom participation, such as attending to instruction, completing assignments, and responding to questions. The second level includes students' initiating conversation and relationships with their teacher(s) and peers as well as completing challenging assignments. The third level of participation involves a student's increased sense of autonomy as displayed by following his or her own school-related interests and participation in extracurricular activities. The final level of participation involves participation in activities, such as student government and community services, indicative of a sense of belongingness and valuing of the school.

The Participation-Identification model (Finn, 1993) has an important role in the understanding of high school completion. Finn argued those students who participated in school and classroom activities identify and feel a sense of belongingness with the school and, consequently, were more likely to complete their degree. He suggested belongingness, or feeling accepted by teachers and peers in the classroom, is essential for ensuring high school completion. On the other hand, Finn argued those students who do not participate in classroom and school functions are less likely to experience a sense of identification with and belongingness at the school and, thus, are less likely to complete high school. This argument has been supported in the literature as student feelings of belongingness are negatively related to both absenteeism and noncompletion (Osterman, 2000). Belongingness is also positively related to positive attitudes

toward education, engagement, and participation in the classroom. Researchers have found that indicators of belongingness distinguish completers and noncompleters among at-risk students. For instance, Finn and Cox (1992) found completers and noncompleters differed in their levels of participation in elementary school. In particular, researchers concluded that students with a low socioeconomic status may have lower high school completion rates because they do not participate, and thus, presumably fail to fully identify with the school and classroom (Miller-Cribbs, Cronen, Davis, & Johnson, 2002).

Based on Finn's Participation-Identification model, the engagement theoretical framework reinforces the importance of a positive relationship between the school and the student. Engagement is a multidimensional construct involving a student's motivation in initiating and completing educational tasks and is described as *"…the key to noncompletion on the personal side of the equation*" (Alexander, Entwisle, & Horsey, 1997, p. 89). Engagement is also an *alterable* characteristic, and, thus may be influenced by interventions.

The engagement model has been widely supported in the completion literature (Anderson et al., 2004; Appleton, Christenson, Kim, & Reschly, 2006; Christenson & Thurlow, 2004; Reschly & Christenson, 2006b) and there is evidence of its predictive validity. Several indicators of engagement in early elementary school predict noncompletion in high school (Alexander et al., 1997; Barrington & Hendricks, 1989; Ensminger & Slusarcick, 1992). More specifically, student disruptiveness (Vitaro, Larocque, Janosz, & Tremblay, 1997), attachment to school, and attendance (Alexander et al., 1997) in first grade predict noncompletion. Additionally, there is support that noncompletion is a process based on the confluence of four interacting types of engagement (Reschly & Christenson, 2006b).

Four types of engagement are considered influential in high school completion (Finn, 1993; McPartland, 1994; Reschly & Christenson, 2006b; Sinclair, Christenson, Lehr & Anderson, 2004). *Academic* and *behavioral engagement* are both based on the importance of participation in the classroom and school and are measured through observable indicators. *Academic engagement* refers to the amount of time a student spends on academic tasks. *Behavioral engagement* refers to behaviors (e.g., attendance and involvement in classroom activities) observed both inside and outside of the classroom. On the other hand, *cognitive and psychological/interpersonal engagement* are internal and more difficult to observe. *Cognitive engagement* refers to self-regulation and the degree to which a student believes education is important to his or her future. *Psychological/Interpersonal engagement* refers to the student's identification with the school and classroom, sense of belongingness, and relationships with peers and teachers. The types of engagement are described in more detail below.

Academic engagement consists of overt behaviors involving the participation of the student in the classroom. Time spent participating in classroom activities, completion of academic tasks, and academic progress are the primary indicators of *academic engagement* (Christenson et al., 2008). In support of this type of engagement, academic achievement in math and science is strongly related to *academic engagement* (Singh, Granville, & Dika, 2002). Specifically, time on task increased when students were provided with a wide variety of classroom assignments, perceived assignments as valuable, and were given clear directions in the classroom (Gettinger & Seibert, 2002). Additionally, methods that increased the likelihood of student participation in the classroom also promoted more time on task (Greenwood, Horton, & Utely, 2002). For example, cooperative learning, group instruction, and utilizing worksheets and computers increased students' time on task.

Behavioral engagement also entails observable behaviors indicative of student participation. Examples of *behavioral engagement* include attendance, number of suspensions, and behavioral problems (Christenson et al., 2008; Christenson & Thurlow, 2004). Attendance is a particularly important variable. One study found that noncompleters and completers differed in their number of absences in the first grade (16 vs. 10, respectively; Alexander et al., 1997). Additionally, students classified as active participants attended school more than their peers (Finn & Cox, 1992).

Other researchers, whose primary theoretical framework was not engagement, have also supported the significance of observable behaviors in high school noncompletion. Specifically, disruptiveness in kindergarten was related to noncompletion after controlling for SES and intelligence test scores (Vitaro et al., 1997). Additionally, aggressive behaviors in first grade later predicted noncompletion (Cairns et al., 1989; Ensminger & Slusarick, 1992) and noncompleters participated in fewer high school activities than peers (Lan & Lanther, 2003).

Cognitive engagement is based on the underlying idea that education is an investment that will bring positive opportunities (Finn, 1993). This belief allows students to willfully exert the effort required for the completion of academic tasks. Self-determination, which refers to the student's understanding of the value of a high school diploma such that this belief facilitates motivation for completion, is a central principle of *cognitive engagement*. Self-determination has been found to be associated with engagement and persistence in high school (Hardre & Reeve, 2003). Additionally, flexible problem solving and preference for challenging assignments are also aspects of *cognitive engagement* (Connell and Wellborn, 1991).

Support for the importance of c*ognitive engagement* in education is buttressed in the literature. Kaplan, Peck, and Kaplan (1997) found noncompleters previously had the perception

that education was of little utility to them, which was evidenced by lower levels of motivation. Even more alarming, students with low levels of motivation and identification with the school were more likely to fail to complete their degrees even if they considered themselves academically competent (Vallerand, Fortier, & Guay, 1997). In a study utilizing the National Education Longitudinal Study of 1988 dataset, many noncompleters listed *cognitive engagement* characteristics as reasons for dropping out. For instance, 44.00% of noncompleters listed their attitude toward school as the primary reason for leaving high school (Thompson, 1995). Lastly, it has been hypothesized that more minorities leave school because they did not make the connection between education and economic opportunities (Miller-Cribbs et al., 2002).

Psychological/Interpersonal engagement refers to internal indicators, such as feelings of belongingness and the social climate of the school. Peers are one of the primary socializing agents of engagement. More specifically, students often behave similarly to their peers and internalize their beliefs about education from their social network. For instance, rejection from conventional peers and association with deviant peers has been associated with high school noncompletion. In fact, children who were rejected by their peers in elementary school were less likely to complete their degrees (Ollendick, Weist, Borden, & Greene, 1992). Additionally, Battin-Pearson et al. (2000) found deviant behavior and bonding with antisocial peers increased the risk of noncompletion even if the student was performing well academically. Other peer-related risks for noncompletion include lower levels of belongingness (Jordon, Lara, & McPartland, 1996) as well as social difficulties and unpopularity (Cairns et al., 1989).

Psychological/Interpersonal engagement also involves students' relationships with teachers. Thirty-five percent of noncompleters listed their poor relationships with teachers (e.g., "I couldn't get along with teachers") as their primary reason for leaving high school (Lan &

Lanther, 2003). Furthermore, at-risk students' positive perceptions of teachers decreased prior to their decision to drop out. In addition to relationships, the psychological characteristics of the student, as well as features of the school, can influence his or her engagement, and indirectly, high school completion. Concerning the student's mental health, low self-esteem, particularly when related to academics, is associated with noncompletion (Finn & Rock, 1997; Rumberger, 1987). Additionally, students who fail to complete generally have a more external locus of control (Rumberger, 1983). With regard to psychological facilitators of the school, a positive school climate and students' positive attitudes toward school are associated with higher completion rates (Cairns et al., 1989).

Thus, in order to examine noncompletion with intervention in mind, it is important to recognize the degree to which predictors are malleable. Although *unalterable* predictors of noncompletion cannot inform intervention efforts, students possessing such characteristics may be targeted in prevention programs. The four types of *engagement* are, however, alterable and may provide links to interventions. In addition to targeting *alterable* predictors of noncompletion, the importance of the early identification of students at-risk for noncompletion should be a priority.

Early Identification and Intervention

Disengagement and its probabilistic consequence of noncompletion is a process beginning in early childhood (Alexander et al., 2001; Englund & Luckner, 2004; Jimerson et al., 2002; Jimerson, Egeland, Sroufe, & Carlson, 2000; Lehr et al., 2003; Vallerand et al., 1997). Developmental history is important because a student's experiences both at home and in the classroom influence how he or she will approach and act upon later experiences (Sameroff, 1992). Later decisions by a student, such as whether or not to complete high school, are

influenced by all prior transactions with the environment (Jimerson et al., 2000). Additionally, the role of education and the school system in the process of facilitating either engagement or disengagement is crucial as "how children comport themselves at the beginning of the schooling process anticipates how they fare toward the end" (Garnier et al., 1997, p. 95).

Given the importance of early events in the process of noncompletion, it is important to identify those at-risk for noncompletion prior to the commencement of disengagement and withdrawal. A few longitudinal and prospective studies have provided information regarding early predictors of noncompletion. Garnier et al. (1997) found the cumulative influence of family stressors, such as early exposure to drug use, divorce, low socioeconomic status, and single parent households, are predictive of noncompletion. Additionally, early student characteristics, such as low academic achievement (Garnier et al., 1997) and disruptiveness (Vitaro et al., 1997), are also associated with noncompletion.

Although several predictors of noncompletion are available early in the child's development, more research in this area is necessary to inform comprehensive early interventions. In particular, some types of engagement (e.g., *academic* and *behavioral*) are observable early in development (Garnier et al., 1997) and in early elementary school (Alexander et al., 1997). However given a child's developmental level and understanding of one's self, it may be useful to also collect data from others in order to measure the more inferential types of engagement (e.g., *cognitive* and *psychological/interpersonal*). Consequently, reports from others are necessary in order to measure these more inferential types of engagement. As will be discussed in detail later, the current study utilized teacher reports of students' engagement in the classroom in order to identify at-risk students early in their educational experience.

Early intervention is complimentary to the need for early identification. Once students are identified as possessing risk factors for noncompletion, intervention must occur promptly. Although the importance of early intervention is salient, the majority of school-based interventions target high school students (Lehr et al., 2003), a time when problems are the most severe and interventions least likely to be effective. Thus, due to the need for early identification coupled with early intervention, this study examined possible predictors of noncompletion that can be measured in elementary school.

The Importance of Context

In addition to recognizing the importance of early identification and intervention, it is also crucial to determine the most effective contextual targets for intervention. Engagement is thought to be a mediator between environment and student outcomes, such as completion (Appleton et al., 2006; Christenson et al., 2008; Fredricks, Blumenfield, & Paris, 2004). In other words, the interaction of myriad variables related to noncompletion that are found in the home, such as low socioeconomic status, numerous siblings, low maternal age, single-parent families, transience, and parents' attitudes toward education (Alexander et al., 1997), and at school, such as aggression, social network, behavioral modeling, retention, and low achievement, (Alexander et al., 1997; Cairns et al., 1989; Christenson et al., 2008; Ensminger & Slusarick, 1992) influence engagement which, in turn, impacts noncompletion.

Concerning these contextual variables, the *Push/Pull* distinction model for noncompletion also helps to explain the role of the school in noncompletion (Jordon et al., 1996). *Push* effects are characteristics within the context of the school that negatively influence completion. For instance, negative relationships with peers and teachers, the perception that education is not important, and/or school polices of retention for low academic progress or

suspension for behavioral difficulties compound the student's disengagement with education. *Pull* effects are home characteristics that inhibit engagement and, thus, also negatively influence completion. Examples of *pull effects* include pregnancy and the need for employment (Reschly & Christenson, 2006b).

Despite the recognition that completion is a product of multiple contexts, there is support for the school environment as the primary source for intervention for those at-risk for noncompletion. First, many of the leading predictors of noncompletion (e.g., retention, absenteeism, disruptiveness and low academic achievement) can be measured in the school environment (Janosz et al., 1997). Additionally, school-related characteristics are generally given as reasons for not attending school (Railsback, 2004). Janosz et al. (1997) examined the various trajectories to noncompletion and found that student characteristics that are present in the school setting (e.g., low achievement, retention, and association with deviant peers) were common among all heterogeneous groups of noncompleters.

Both the malleability of some school variables and findings from the intervention literature support interventions targeting the school context. First, unlike the *Pull* effects occurring outside the school environment, *Push* effects are more amenable to change by school policy and intervention (Reschly & Christenson, 2006b). It is easier for school personnel to target predictors of noncompletion occurring within the school than to intervene in all other contexts. Second, although the majority of interventions focused on the home rather than the school environment (Lehr et al., 2003), researchers often recommend school-based strategies (Christenson & Thurlow, 2004; Janosz et al., 1997). Additionally, Temple, Reynolds, and Miedel (2000) found early school-based intervention does decrease noncompletion rates. Given the importance of student and school characteristics that are present in the school context, it is

crucial for interventions to target this environment. In order to develop a greater understanding for the development of school-based interventions, the current study examined possible predictors present in the school context.

Purpose and Significance

The overarching purpose of the current study was to improve the understanding of high school noncompletion using the engagement framework. Findings from this study may also be utilized to both accurately identify those at risk for noncompletion and further inform the development of early interventions. For these purposes, *alterable* predictors that are present both early in development and within the context of the school environment were particularly important. The research questions and hypotheses included the following:

Question 1: Do the two populations (i.e., completers and noncompleters) differ in terms of the engagement-based variables examined? *Based on the literature review, it was expected that there would be significant differences between the two groups. In particular, the completers were expected to have higher ratings of engagement-based characteristics that were predictive of completion compared to the noncompleters.*

Question 2: Is the association between the predictors and the two groups (i.e., completers and noncompleters) statistically significant? The strength of this relationship is indicative of how accurately the two groups of students can be predicted. *It was expected that engagement-based characteristics would significantly predict differences between the completers and the noncompleters.*

Question 3: Do predictors have different degrees of influence for various demographic groups of students? *Based on the literature in this area, it was expected that the predictive influence of certain variables would vary for different demographic subgroups of students.*

It is important to note the possible contributions of this study to the research literature. First, most studies examining high school completion do so in a piecemeal manner by focusing on either aspects of the student *or* school; however, the influence of multiple contexts on noncompletion is apparent in the literature. Thus, this study intended to examine the confluent roles of multiple environments. Second, this topic is generally not examined in its entirety due to the lengthy nature of high school completion. For instance, many studies include intention to complete rather than the final completion status as the outcome variable (e.g., Miller-Cribbs et al., 2002; Vallerand et al., 1997). This results in inaccurate completion data and the potentially invalid interpretation of results. Others include completion data, but do not possess data from elementary school, which compromises the importance of both early identification and intervention. However, in the current study both the early characteristics of students and their eventual completion status were utilized. Third, given the importance of early intervention, this study focused on *alterable* variables apparent early in development.

CHAPTER 3

METHODS

Overview of ACT Early

This study utilized data from the longitudinal ACT Early Project *(Advancing the Competencies of Teachers for Early Behavioral Interventions of At-Risk Children*; Baker, Kamphaus, & Horne, 1999). The ACT Early Project was designed to identify at-risk children in elementary school by evaluating behavioral difficulties, classroom climate, and instructional methods as perceived by the students, their parents, and their teachers. From the data that were collected, a behavioral typology based on the BASC was developed in order to facilitate a more valid child behavior classification system.

The sample of teachers and students for the ACT Early Project was drawn from mainstream classrooms of four public elementary schools in the same school district. This school district was located in a small, southeastern city. District enrollment at this time was approximately 11,000 students. The participating school district possessed several indicators of educating a large proportion of students at-risk for noncompletion. For instance, 60% of the students were classified as low SES as indicated by free or reduced lunch status. Additionally, 70% of the school district's population was from a minority background. The district also has a high school completion rate of 61%, which is far below the national average and standards set by No Child Left Behind Act (2001) (Georgia Department of Education, 2006).

Two types of participants were involved with this study- regular education teachers and their students. Sixty-five mainstream elementary school teachers participated in the project across all seven years. Teachers varied in terms of grade level taught, experience, degrees earned, and demographic characteristics. The distribution of grade level taught was fairly even

from kindergarten to fifth grade. The proportions of teachers within each category of teaching experience were as follows: one year of experience, 4%; two to six years, 38%; seven to 11 years, 12%; 12 to 16 years, 12%; and more than 16 years, 34%. Additionally, the following proportions represent the highest degree earned of the participating teachers: 44% Bachelors, 46% Master's, 8% Specialist, and 2% Doctoral degree. Ninety-six percent of participating teachers were female. Concerning the racial classifications of the teachers, 84% were Caucasian, 14% were African American, and 2% were 'Other.'

There were 1,643 participating students (51% male, 49% female) in kindergarten through fifth grade general education classrooms of the teachers participating in the ACT Early Project. Each grade had approximately the same proportion of participating students. The ethnicities of the students were distributed in the following manner: 55.00% African American, 36.30% Caucasian, 4.00% Hispanic, 2.70% Asian/Pacific Islander, 1.90% Multiracial, and 0.10% 'Other.'

Although the participating students' distribution of percentiles on the Iowa Test of Basic Skills (ITBS) ranged from 8 to 99%, many faced academic and/or behavioral difficulties. For instance, during the seven years of the project 20% of the students were referred to a Student Support Team intervention due to academic and/or behavioral difficulties. Fifteen percent of participating students qualified for and received special education services during the project. An additional 15% of the students who did not qualify for special education received remedial small-group interventions. It is important to note that only students in general education classrooms were included; data were not collected for those students placed in a self-contained special education classroom.

Current Study

As seen earlier, the estimates for rates of completion vary widely as researchers classify this construct differently. First, there is an important distinction between using the terms *dropout* and *graduate* versus *noncompleter* and *completer*. Those who classify students using the former terms are focusing on "preventing a negative outcome" (i.e., dropout) rather than "promoting a positive one" (i.e., completion) (Reschly & Christenson, 2006b, p. 9). Second, the operational definitions for completion and non-completion vary drastically by study and method of calculation. For instance, several of the following issues may affect the overall completion rate: whether or not special education students are included in the sample, school or district policy for classifying students who complete or leave during the summer, student transience, and the time at which a noncompleter is classified as such (Wolman, Bruininks, & Thurlow, 1989). Last, there are three types of completion rates used by various researchers (Kaufman et al., 2004). Specifically, *event* rates include students in a certain age group who leave school each year whereas the *status* rate statistic is a cumulative measure of dropout within the same age group. On the other hand, the *cohort* rate statistic follows a group of students across multiple years. Due to such variations, all completion rates should be interpreted with careful inspection.

The current study examined this crisis from the perspective of completion rather than dropout and classified students into two groups- completers and noncompleters. The *cohort* statistic method was used to calculate the noncompletion statistic. Completers were defined as those students who graduated from high school with a College Preparatory, Technical, or Combination Diploma. Noncompleters were those students who did not earn a traditional High School diploma. Parallel to the definitions utilized by NCLB (2001), this group included students who did not complete high school, earned a Graduate Equivalency Diploma (GED), or

earned a Special Education Diploma. Transfer students are those who either transferred to another school district, private school, or the home school environment. The composition of the outcomes (i.e., completion and noncompletion) of this group is unknown, precluding their inclusion in an analysis of completers and noncompleters.

Although the group of transfer students (n=149) were removed from the current study's sample for theoretical reasons, the potential differences between the transfer students and the eligible participants in this study (i.e., the completers and noncompleters) (n=268) were examined. Chi-square and *t*-test analyses revealed that the participants in the current study and the transfer students (i.e., those that transferred to another district) did not differ significantly on the majority of independent measures (Table 2). However, the two groups did vary (χ^2 (4)=15.425, p=0.00) with regard to the proportion of each race in the sample. Specifically, a greater proportion of African American students remained in the sample compared to the transfer group (Table 3).

After listwise deletion for missing data, the final sample of participants (n= 201, 43.80% male, 56.20% female) examined in the current study includes students who were in third grade during year one or year two of data collection. These students were eligible for high school degree completion in May of 2006 and May of 2007, respectively. The participating students were from the following racial backgrounds: Caucasian (38.30%), African American (58.20%), Hispanic (3.0%), and Asian/Pacific Islander (0.50%). Further, participants met the requirements for the following special education classifications by the time of the original data collection in third grade: Speech Impairment (n= 14, 6.21%), Attention-Deficit/Hyperactivity Disorder (ADHD) (n= 15, 4.73%), Behavior Disorder (BD) (n= 7, 3.08%), Learning Disability (LD) (n= 6, 2.67%), Intellectual Disability (ID) (n= 6, 2.67%), and Autism (n=1, <1.00%). No

participants were reportedly classified in the Traumatic Brain Injury (TBI) category and there were invalid results for the Other Health Impaired (OHI) category.

Concerning sample size, the $N=3Jp$ formula is recommended to determine the minimum sample size and a higher ratio is optimal if the expected hit rate is small (Huberty & Olejnik, 2006). As noted previously, the final sample size (n=201) that included noncompleters and completers was significantly lower than the original sample size due to both the exclusion of transfer students and listwise deletion for missing data. However, a sample size of only 84 participants was needed based on the formula above with predictor variables ($p=14$) and two groups ($J=2$). Thus, the sample size was adequate for the analyses. Additionally, missing data is a common occurrence with archival school data (Morris, Ehren, & Lenz, 1991).

Numerous instruments were utilized by ACT Early during its seven-year data collection process. Although the current study considered all variables that were examined, a systematic approach was exercised to omit unnecessary variables. Three steps, which are described later in more detail, were conducted to determine which variables to include in data analysis. The first step involved the inclusion of only those variables that are associated with completion in the literature. The second step involved the omission of variables with poor psychometric and descriptive properties, including low variance, inadequate frequency counts, and missing data. The third step consisted of determining whether the values of the remaining variables were statistically significant for completers and noncompleters. The determination of group differences is necessary prior to examining the variables further through Predictive Discriminant Analysis.

First, the author chose variables that have been linked to noncompletion in previous studies and/or have the potential to be predictive of completion status based on theory. This step

resulted in the selection of both *student*- and *school-level* characteristics and represented both *alterable* and *unalterable* categories.

Second, the remaining variables were examined for their psychometric integrity and only those that indicated appropriate levels of sample variance, frequency counts, and missing data were included in the final analysis. For instance, all *school-level* variables were excluded due to low variance. Various *student-level* variables from school records were also not included due to low frequency counts and/or high levels of missing data. Variables that were omitted due to low frequency counts included whether or not the student: a) was classified as a transient student within the district (i.e., frequently changed schools within the same district), b) received disciplinary actions, c) received free or reduced lunch (i.e., SES), and d) was retained at least one grade level.

Third, each of the remaining variables was assessed to determine if statistically significant group differences were present. Chi-Square and *t*-test analyses (Table 4) revealed significant differences between noncompleters and completers on the following variables: gender, race, Adaptive Skills Composite, Behavioral Symptoms Index, Externalizing Composite, Internalizing Composite, School Problems Composite, ITBS Battery, SST referral, attendance, and work habits. However, significant differences between completers and noncompleters were not present for school, special education referral, and special education placement. Thus, the final variables selected included the following characteristics from school records: race, gender, attendance, whether or not the student was referred for a Student Support Team (SST) meeting, ITBS Battery Composite, and teacher ratings of student work habits. Additionally, the Behavioral Symptoms Index, Adaptive Skills, Externalizing Behaviors, Internalizing Behaviors, and School Problems Composites were the final variables included from the BASC TRS-C.

More in depth information regarding the two instruments utilized (i.e., School Records and the BASC TRS-C) are described below.

The Behavior Assessment System for Children (*BASC*; Reynolds & Kamphaus, 1992) was designed to examine the behavior of children and consisted of several different forms. The Teacher Report Scale-Children (TRS-C) form was used because teacher ratings are consistently more reliable than those by parents or students. In addition, the *BASC TRS-C* can be used with children six to 11 years old, which was consistent with the current study's goal of identifying potential risk factors for noncompletion among early elementary school students. The *BASC TRS-C* consisted of 148 items, each of which consisted of a statement referring to a certain behavior. Each item was rated on a four-point Likert scale ranging from *never* to *almost always*.

There are 10 subscales of the *BASC TRS-C*. The scores from each subscale were reported as *t*-scores with a mean of 50 and a standard deviation of 10. The subscales of *BASC TRS-C* comprised several composite scores illustrating different types of behavior difficulties. For instance, the externalizing composite contained the Aggression, Hyperactivity, and Conduct Problems subscales. The internalizing composite consisted of the Anxiety, Depression, and Somatization subscales. Attention and learning problems are included in the school problems composite. Lastly, the Adaptability, Social Skills, Leadership, and Study Skills subscales comprised the Adaptive Skills Composite. The *BASC TRS-C* was used to examine the *student-level* variables associated with high school noncompletion.

The *BASC TRS-C* rating scales have been studied extensively and support exists for their reliability and validity. For instance, the coefficient alphas for the 10 subscales range from 0.76 to 0.94, giving the *BASC TRS-C* moderate to high internal consistency (Reynolds & Kamphaus, 1992). The *BASC TRS-C* also demonstrated high test-retest reliability (median value of .91) and

interrater reliability (coefficients ranging from 0.70 to 0.90). The thorough development of the *BASC TRS-C* lends itself to high indicators of validity. A factor analytic study determined the *BASC TRS-C* demonstrated construct validity as the items loaded highly on their appropriate subscales and composites. Support for the concurrent validity of this instrument was found when compared to other teacher rating scales, including the Behavioral Symptoms Index of the Teacher Rating Form (.92 correlation) (Achenbach, 1991; Reynolds & Kamphaus, 1992). The validity of the *BASC TRS-C* was also supported because behavioral clusters were found across several elementary schools across the U.S. based upon the instrument's subscales (DiStefano, Kamphaus, Horne, & Winsor, 2003; Kamphaus, Huberty, DiStefano, & Petoskey, 1997).

School records provided information related to academic achievement, demographic information, and selection for additional intervention. The following *student-level* variables were collected from the school records: completion status, race, gender, attendance, whether a Student Support Team (SST) meeting was held, and Iowa Test of Basic Skills (ITBS) scores. All variables except for completion status represented characteristics of the data collection year only. The completion status variable was cumulative up to the individual student's expected year of graduation. As previously mentioned, several variables from school records, such as grade retention and an indicator of SES, were not included due to a large amount of missing data.

The Iowa Tests of Basic Skills (ITBS) is a group-administered test that measures academic achievement for students in kindergarten through ninth grade. The ITBS examines the student's performance in the following areas, which comprise the scales: vocabulary, word analysis, reading comprehension, listening, language, and mathematics. The current study utilized the third grade ITBS Battery Score, which is comprised of the Math, Reading, and Language Arts Composite Scores. The Composite and Battery Scores were in the form of

Developmental Standard Scores, which compares the student's performance with the norm group cohort. The psychometric properties of this instrument are more than adequate. The test-retest coefficients were in the 0.80s and 0.90s whereas the alpha coefficients are all above 0.95 (Canivez & Konold, 2001). Additionally, the ITBS is both highly correlated with the Cognitive Abilities Tests and can predict future test scores, grades, and future ITBS scores (Cross, 1998).

After the Institutional Review Board (IRB) and participating school district approved the Act Early Project, teachers were recruited via individual school professional development meetings during which the project was introduced and explained. The teachers were informed that their participation was voluntary and signed a consent form if they agreed to partake in the study. Teachers received a $200 stipend for participating in the project. Based on these guidelines, three of the schools had a participation rate of 100% while the fourth had a rate of 70%.

The purpose and goals of the voluntary project were then explained to the parents or guardians of the students. As with the teachers, the parents were given the opportunity to sign a consent form if they permitted for their child to participate. It is important to note that Spanish forms were provided in order to ensure the participation of Hispanic children. The consent of the guardian allowed the student's demographic and academic information to be released to the researchers as well as to participate in the student questionnaires. A classroom was able to participate if 50% of the students in his or her classroom consented. All students in a participating classroom received a pencil for participating in the project. Student participation ranged from 68-71% at the four schools.

In April of each year of the study teachers completed the *BASC TRS-C* for the participating students. Teachers also completed other measures for the ACT Early Project that

were not included in the current study. Additionally, information relating to achievement, social development, referral to special education, admittance to special education, and several demographic variables were received from the students' files.

Additionally, various steps were followed in order to acquire high school completion data of the participating students. IRB approval was granted from the University of Georgia in October of 2006. The participating school district's approval was granted in February of 2007 under several conditions. First, the school district requested that the researcher provide the identification numbers of participating students, which were supplied in March of 2007. In June of 2007, the district provided the researcher with a report indicating which participating students were completers, transfer students, and noncompleters. Second, the researcher agreed to conduct an information session for the district upon completion of the study during which results and conclusions were communicated.

The purpose of the current study was to examine which variables predict completion status. The statistical methods allowed for the comparison of predicted group membership with actual group membership. Specifically, Predictive Discriminant Analysis (PDA) was used to classify group membership (i.e., completion status) based on a classification function. The distance between the individual scores and the group means was used to determine group membership. The accuracy of the predicted group membership is then compared with the actual group membership to determine a "hit" rate (i.e., the proportion of individuals correctly identified as being a group member). This comparison allowed for the examination of the effectiveness of the discriminate function to predict completion and noncompletion (Huberty & Olejnik, 2006).

The statistical analysis in the current study required several steps. First, the Morris program (Huberty & Olejnik, 2006) was used to compare the hit rates of various combinations of variables. Four models with the highest hit rates for each subgroup (e.g., males, females, Caucasians, and African Americans) were developed. Next, the four models were compared for variable similarities, which resulted in two models. The two leading models were then analyzed through Predictive Discriminant Analysis in SAS. Specifically, each model was applied to the entire sample as well as each of the previously mentioned subgroups. The model(s) and variables that best predicted completion status were then determined through statistical values (e.g., Improvement Over Chance and *Z* statistic) and by taking practical implications into account. Each step in this process and their findings are described in detail in the Results section.

CHAPTER 4

RESULTS

The descriptive information and psychometric properties of variables drawn from the data sources (i.e., School Records and the *BASC TRS-C*) may be found in Tables 5 and 6, respectively. An examination of the descriptive statistics revealed that the range of each variable varied according to distribution of the scale. Likewise, the mean and standard deviation varied from 11.44 to 180.04 and 1.27 to 30.03, respectively, as it was also dependent on the scale distribution (Table 7). Correlations between the variables ranged from -0.56 (between the School Problems Composite and ITBS score) to 0.79 (between the Behavioral Symptoms Index (BSI) and the Internalizing Behaviors Composite). This can be explained by the fact that some variables, such as some of the *BASC TRS-C* composite scores, were not theoretically related, and should not be significantly correlated to one another whereas other constructs, such as the BSI and Internalizing Behaviors Composite, are theoretically and practically related and should be correlated (Reynolds & Kamphaus, 1992). No variables were characterized as skewed using the De Carlo method with an absolute value greater than two as a cutoff (Huberty & Olejnik, 2006). Cases with missing values were eliminated via the listwise procedure.

Concerning reliability for the current study, the alpha values for the *BASC TRS-C* ranged from 0.65 to 0.97 for the *BASC TRS-C* scales and from 0.91 to 0.99 for the *BASC TRS-C* composite scores. The overall reliability for the *BASC TRS-C* scales ($\alpha = 0.78$) is appropriate considering the wide range of emotional and behavioral constructs examined by the scales. Because item level information for the ITBS instrument was not available for the current study, the reliability coefficients were drawn from a review in the Mental Measurements Yearbook (Cross, 1998). Reported alpha values for all the composite scores were greater than 0.95.

The Morris Program (Huberty & Olejnik, 2006) was used to determine the predictor variable sets with the highest hit rates. This program utilizes the Leave-One-Out (L-O-O) method of external cross-validation with the linear rule. Due to known differences in completion rates (Christenson & Thurlow, 2004; Kaufman et al., 2004) and potential differences in the most effective models for gender and racial groups, several analyses were implemented to examine subgroups of students separately. It is important to note that when determining which model had the highest hit rate, the total hit rate, completer hit rate, noncompleter hit rate were examined. However, the latter statistic is particularly salient due to implications of utility for identifying students at-risk for noncompletion. The priors (0.39 for noncompleters and 0.61 for completers) are based on the Georgia Department of Education No Child Left Behind (2006) calculation of graduation rate for the school district from which the participants were sampled.

Based on the above criteria, the models with the highest hit rates for each subsample were examined (Table 8). The model with the highest hit rates for males included the ITBS Battery Composite and teacher ratings of student's work habits (total hit rate (HR)) = 74.00%, noncompleter HR = 76.47%, and completer HR = 68.75%) whereas the model with the highest hit rates for females included the Behavioral Symptoms Index, the School Problems Composite, ITBS Battery, and teacher ratings of student's work habits (total HR = 85.00%, noncompleter HR = 83.00%, and completer HR = 87.00%). Because the models for male and female students were similar, a model containing a combination of their models was created and named the "Gender model." The Gender model consists of the Behavioral Symptoms Index, the School Problems Composite, ITBS Battery, and teacher ratings of student's work habits.

Similarly, the models with the highest hit rates for Caucasian and African American students were found using the Morris Program (Huberty & Olejnik, 2006). For Caucasian

students, the model containing gender, the Externalizing Composite, the School Problems Composite, and referral for a Student Support Team (SST) meeting has the highest hit rates (total HR = 74.47%, noncompleter HR = 76.47%, and completer HR = 73.33%). Gender, the Adaptive Skills Composite, the Externalizing Composite, the School Problems Composite, and referral for a Student Support Team (SST) meeting comprised the model with the highest hit rates (total HR = 81.82%, noncompleter HR = 87.95%, and completer HR = 71.43 %) for African American participants. A final model named the "Race model," which includes the leading variables (e.g., gender, the Adaptive Skills Composite, the Externalizing Composite, the School Problems Composite, and referral for a Student Support Team (SST) meeting) from both the Caucasian and African American models was created.

Thus, the two leading models are different and predict completion status differentially. However, the School Problems Composite was present in both models. It is also important to note that although attendance, which is an indicator of *behavioral engagement,* was significantly different for completers and noncompleters, it was not included in either of the two leading models. It is also important to note that many of the models predicted noncompletion and completion status better than chance. I did not include a written interpretation of every possible model for several reasons. First, I did not want to detract the reader from the main point of the study- that several academic and behavioral characteristics in the current study were important predictors. Second, there were many models for each demographic subgroup that predicted completion status at rates better than chance. This is informative because many of the scales on the BASC *TRS-C* and the other variables were found to be predictive of noncompletion.

The two leading models derived from the Morris Program (Huberty & Olejnik, 2006) were then examined utilizing SAS DISCRIM version 9. Prior to the prediction analyses, several

decisions were necessary to determine classification rules, cross-validation method, and prior probabilities. An *external* classification rule is used so that different samples would be available for the development and evaluation of the model, which allows for cross-validation. Specifically, the L-O-O method of sample splitting was utilized. This method omits one participant and creates the classification function on the remaining participants. The classification function is then used to classify the omitted unit into a group. The L-O-O procedure continues until all participants have been omitted and, then, classified. The quadratic rule is appropriate as the logarithms of the covariance matrices were 12.48 for completers and 15.74 for noncompleters and tests of equality of the covariance matrices reveal they were significantly different ($\underline{F}(10,165130)= 91.17$, $p=0.00$). The same priors (0.39 for noncompleters and 0.61 for completers) were used.

The Gender and Race models were each applied to the entire sample and each demographic group separately to determine the model that best predicted completion status (Table 9). The Gender model (Table 10) hit rates are 50.00% for completers and 86.00% for noncompleters whereas the Race model (Table 11) hit rates are 61.40% for completers and 79.65% for noncompleters. When the individual gender groups are examined separately, males (Table 12) have hit rates of 53.00% and 76.00% for completers and noncompleters, respectively, for the Gender model and 56.00% and 76.00%, respectively, for the Race model (Table 13). On the other hand, the hit rates for females are 54.00% for completers and 88.00% for noncompleters for the Gender model (Table 14) whereas their hit rates for the Race model are 56.00% for completers and 82.00% for noncompleters (Table 15). Regarding African American students, the Gender model hit rates are 45.00% for completers and 82.40% for noncompleters (Table 16) whereas the Race model hit rates are 61.00% for completers and 75.40% for

noncompleters (Table 17). The Gender model hit rates are 38.00% for completers and 75.00% for noncompleters (Table 18) for Caucasians whereas their Race model hit rates are 52.00% for completers and 82.00% for noncompleters (Table 19). It is important to note that Tables 10-19 include details about hit and miss rates for each sample subgroup and for each predictive model.

The total hit rate's Improvement Over Chance (Huberty & Olejnik, 2006) was calculated for each model and population (Table 9). For the entire sample, the Improvement Over Chance was 41.87% and 44.77% for the Gender and Race models, respectively. In other words, the Gender model predicted completion 41.87% better than chance and the Race model predicted completion 44.77% better than chance. For males, the Gender and Race models have a 22.32% and 27.03% Improvement Over Chance, respectively. For females, the Gender model is 57.19% more accurate than chance whereas the Race model was 50.60% better than chance. The Gender model is 22.84% better than chance and the Race model was 34.33% better than chance for African Americans. For Caucasian students, the Improvement Over Chance is 36.17% and 52.72% for the Gender and Race models, respectively.

The *Z*-statistic was also calculated to determine if the models predicted those at-risk of noncompletion at or beyond the level of statistical significance. The two leading models, the Gender and Race models, were applied to the entire sample and each subgroup (Table 9). Both the Gender and Race models predicted completion status for the entire sample, males, females, and African American students at $p < 0.01$. With regard to the Caucasian subgroup, the Race model and Gender model reached statistical significance at the levels of $p < 0.01$ and $p < 0.10$, respectively.

In order to determine which predictor variable is most important for correctly classifying noncompleters, Huberty and Olejnik (2006) suggest omitting each variable and determining how

much the hit rate decreases. One variable is dropped at a time and the hit rate is examined for changes. A variable is considered more important the more the hit rate declines when a variable is omitted from the full model. The noncompleter hit rate for the Gender model decreased from 86.00% for the full model to 83.19% when the School Problems Composite was removed (Table 20). Similarly, the noncompleter hit rate declined to 83.19% when the ITBS Battery variable was removed from the full Gender model. The noncompleter hit rate decreases from 86.00% for the full model to 84.07% when the Behavioral Symptoms Index is not included. Likewise, the noncompleter hit rate declined to 84.07% when the work habits variable is not included. Hence, the School Problems Composite and ITBS Battery are considered the most important variables and share a rank of 1.5. The Behavioral Symptoms Index and work habits share a rank of 3.5. Therefore, the ITBS Battery and School Problems Composite scores best predict those at-risk for noncompletion when utilizing the Gender model.

A similar procedure was conducted to determine the predictive power of the individual variables in the Race model (Table 20). When the School Problems Composite was removed from the full model, the noncompleter hit rate decreased from 79.65% to 74.65%. The noncompleter hit rate also showed a decline (76.42%) when the Adaptive Skills Composite was removed. However, the noncompleter hit rate remained the same or increased when the Externalizing Behaviors Composite (79.65%), Gender (80.53%), or SST Referral (80.53%) were removed successively. Based on changes in the noncompleter hit rate when variables were removed from the model, the following rankings were established: School Problems Composite (1), Adaptive Skills Composite (2), Externalizing Composite (3), Gender (4.5), and SST Referral (4.5). Thus, the School Problems and Adaptive Composites were the most powerful variables in the Race model for predicting noncompleters.

The quadratic classification function was also calculated for each group and model. The following is the Gender model's quadratic function for the noncompleters:

$$Z = -128.90 + 0.09X_1 + 1.57X_2 + 0.42X_3 + 7.23X_4$$
$$- 0.01X_1^2 - 0.01X_2^2 - 0.001X_3^2 - 0.21X_4^2$$
$$+ 0.01X_1 X_2 + 0.001X_1 X_3 - 0.001X_1 X_4$$
$$- 0.001X_2 X_3 - 0.02X_2 X_4 - 0.001X_3 X_4$$

where X_1 = Behavioral Symptoms Index, X_2 = School Problems Composite, X_3 = ITBS, and X_4 = student work habits.

The following is the Gender model's quadratic function for the completers:

$$Z = -336.98 + 0.07X_1 + 3.59X_2 + 1.20X_3 + 22.47X_4$$
$$- 0.02X_1^2 - 0.03X_2^2 - 0.002X_3^2 - 0.77X_4^2$$
$$+ 0.01X_1 X_2 + 0.001X_1 X_3 - 0.01X_1 X_4$$
$$- 0.01X_2 X_3 - 0.03X_2 X_4 - 0.003X_3 X_4$$

where X_1 = Behavioral Symptoms Index, X_2 = School Problems Composite, X_3 = ITBS, and X_4 = student work habits.

The following is the Race model's quadratic function for the noncompleters:

$$Z = -115.60 + 6.59X_1 + 2.34X_2 + 0.74X_3 + 1.41X_4 - 3.37X_5$$
$$- 2.19X_1^2 - 0.02X_2^2 - 0.01X_3^2 - 0.01X_4^2 - 2.45X_5^2$$
$$- 0.02X_1 X_2 - 0.04X_1 X_3 + 0.01X_1 X_4 - 0.03X_1 X_5$$
$$- 0.003X_2 X_3 - 0.01X_2 X_4 - 0.02X_2 X_5 - 0.003X_3 X_4 - 0.002X_3 X_5 + 0.03X_4 X_5$$

where X_1 = Gender, X_2 = Adaptive Skills Composite, X_3 = Externalizing Behavior Composite, X_4 = School Problems Composite, and X_5 = Referral for SST.

The following is the Race model's quadratic function for the completers:

$$Z = -216.67 + 7.85X_1 + 3.43X_2 + 1.06X_3 + 4.19X_4 - 11.30X_5$$

$$- 2.30X_1^2 - 0.02X_2^2 - 0.01X_3^2 - 0.03X_4^2 - 5.44X_5^2$$

$$- 0.02X_1 X_2 + 0.01X_1 X_3 - 0.04X_1 X_4 + 0.17X_1 X_5$$

$$- 0.003X_2 X_3 - 0.02X_2 X_4 + 0.02X_2 X_5 + 0.003X_3 X_4 + 0.05X_3 X_5 + 0.07X_4 X_5$$

where X_1 = Gender, X_2 = Adaptive Skills Composite, X_3 = Externalizing Behavior Composite, X_4 = School Problems Composite, and X_5 = Referral for SST.

Both models were examined for "fence riders," which are participants who have similar posterior probabilities for both the noncompleter and completer group classifications. Similar posterior probabilities indicate the participant's "score vector is about the same distance from centroids of two groups" (Huberty & Olejnik, 2006, p. 288). A large proportion of "fence riders" in a sample could indicate that another group exists. For the current sample, a "fence rider" was classified as such if the difference in the posterior probabilities for both groups was less than 0.10.

"Fence riders" were examined independently for the two leading models. Four participants out of the entire sample (n=201) were classified as "fence riders" for the Race model. Three of these in-doubt units were predicted to be completers when they were actually noncompleters and the remaining "fence rider" was predicted to be a noncompleter even though he or she was actually a completer. Concerning the Gender model, six participants in the sample were classified as "fence riders." Three of the participants were misclassified as noncompleters and three were misclassified as completers. These findings suggest there is not an additional, underlying group in the sample. Additionally, the "fence riders" for the Race model were not the same participants as those for the Gender model.

Both models were also examined for outliers. An example of an outlier in the current sample would be if a participant's posterior probability is higher for the noncompleter group, but the typicality probability is low for the noncompleter group and vice versa. It is important to note that outliers are misclassified as a "hit" in Predictive Discriminant Analysis. However, potential outliers should be examined because a lager proportion of outliers may suggest there is another population independent of the initial groups. There were seven participants that could be classified as outliers for the Gender model and four participants that could be classified as such in the Race model. All outliers in both groups were noncompleters.

CHAPTER 5

DISCUSSION

Summary of Findings

Once it was determined that separate models best predicted completion status for different groups of students, two models with the highest hit rates for the gender and race subgroups were examined. The Gender model consisted of the Behavioral Symptoms Index (BSI), the School Problems Composite, ITBS Battery, and teacher ratings of student work habits. The Race model was comprised of the gender, the Adaptive Skills Composite, the Externalizing Composite, the School Problems Composite, and referral for a Student Support Team (SST) meeting variables. These models were then applied to the entire sample as well as to the different racial and gender subgroups to determine which model best predicted those at-risk for noncompletion.

There are two methods for determining which model is more effective at predicting high school completion. First, one can examine the model's total hit rate through the *Z*-statistic and the Improvement Over Chance statistic. Concerning the *Z*-statistic, both the Gender and Race models were statistically significant at the $p < 0.01$ level for the entire sample and the male, female, and African American subgroups. For the Caucasian subgroup, the Race model also reached statistical significance at the level of $p < 0.01$ whereas the Gender model's significance was $p < 0.10$. This finding suggests that both the Gender and Race models can predict completion status at an acceptable level of statistical significance for the majority of students.

With regard to the Improvement Over Chance statistic (I), the Gender model has the highest I values for female students (I=57.19%). However, the Race model accounts for the largest Improvement Over Chance for the entire sample (I=44.77%), Males (I=27.03%), African

Americans (I=34.33%), and Caucasians (I=52.72%). Based on these findings, it is conclusive that the two models are differentially effective for various subgroups of students. Additionally, due to the wide range of Improvement Over Chance statistics, it is evident that the completion status of some students is easier to predict. Specifically, it is more difficult to predict the completion status of males as the Improvement Over Chance values are relatively low at I=22.32% for the Gender Model and I=27.03% for the Race Model. Concerning racial groups, the ability to predict the completion status of African American students (I=22.84% for the Gender Model; I=34.33% for the Race Model) is somewhat lower than for Caucasian students (I=36.17% for the Gender Model; I=52.72% for the Race Model). This finding is particularly important to consider as more male and African American students do not complete high school compared to their female and Caucasian counterparts (Laird et al., 2006). Thus, it would be helpful to identify the best model based on its success at predicting the noncompleters themselves.

Accordingly, the second method for determining the most effective model takes into account how the data will potentially be utilized. Given that these findings could be used to make recommendations for interventions that target those at-risk for noncompletion, the hit rates for the noncompleters are of substantial interest. As stated by Morris et al. (1991, p.289), the "negative impact of missing a potential dropout by classifying the child as a persister seems more severe than classifying a few extra persisters as dropouts." In other words, the hit rates of the noncompleters should be the focus as this method provides the most utility for both identifying those at-risk for noncompletion and designing interventions. The Gender model has the highest noncompleter hit rate for the entire sample (86.00%), female students (88.00%), and African American students (82.40%) whereas the Race model yields the largest noncompleter hit

rate for Caucasians (82.00%). The noncompleter hit rate (76.00%) for males is the equivalent for both models. Although both models have noncompleter hit rates that are an improvement over pure chance, the Gender model is more accurate at predicting those at-risk for noncompletion for the entire sample and the majority of demographic subgroups that were examined. However, it may be of substantial utility to consider utilizing both models for males due to their higher rates of noncompletion in comparison to female students. Therefore, the noncompleter hit rates will take precedence in determining recommendations as this group of students should be the primary target for intervention efforts.

In addition to considering the models as a whole, analyses were conducted to determine the most important variables. Specifically, the ITBS Battery and School Problems Composite scores were the most important variables from the Gender model. The School Problems Composite and Adaptive Skills Composite were the most important variables from the Race model. Thus, the ITBS Battery, School Problems Composite, and Adaptive Skills Composite scores offer the most utility in identifying those at-risk for noncompletion and efforts should be made to increase these scores in potential noncompleters.

In conclusion, there are several general recommendations based on the findings from the current study. The classification functions explained in the Results section could be utilized in order to predict students at-risk for high school noncompletion given the scores on the *BASC TRS-C*, ITBS, and other variables were collected. Both the Gender and Race models were statistically significant for all sample subgroups, with the exception of the Race model being the only significant model for Caucasian students. Specifically, the Race model should be considered the most effective for predicting students at-risk for noncompletion for the whole sample, males, African Americans, and Caucasians whereas the Gender model best predicts

those at-risk for noncompletion for females. Additionally, school administration and psychologists should consider that the ITBS Battery score, the School Problems Composite score, and the Adaptive Skills Composite score offer the most utility in predicting noncompleters for the current sample.

The hit rates and models produced in the current study are comparable with those of similar prior studies. Barrington & Hendricks (2001), who examined student achievement characteristics, correctly predicted completion status at rates of 66.00% and 85.00% in the third and ninth grades, respectively. Rumberger (1995) utilized *student-* and *school-level* characteristics measured from first grade through tenth grade to correctly predict completion status at a rate of 42.00%. In particular, individual attributes of the students, such as grade retention, SES, attendance, behavioral problems, and academic performance, explained 38.00% of the differences and structural, organizational, and school climate variables accounted for the remaining 4.00%. However, the degree to which the model explained the variance in completion status decreased to 29.00% when examining solely lower SES schools. A separate analysis of each ethnic group revealed a more complex framework for examining high school completion. SES predicted completion for Hispanic and Caucasian students, but not for African Americans. Behavioral problems, school transience, and low academic performance decreased the likelihood of completion for African Americans and Caucasians, but not for Hispanics.

The findings of both Barrington and Hendricks (2001) and Rumberger (1995) form two conclusions that are also present in the current study. First, completion status was successfully predicted when utilizing models that included academic and behavioral characteristics of the student. Second, there were significant differences in the prediction of completion status for

various racial groups. This reinforces the current study's recommendation that differential models for identifying those at-risk for noncompletion from separate subgroups may be helpful.

Additionally, Morris et al. (1991) examined characteristics in fourth through eighth graders that predicted completion. Although different models were established for each grade level, the majority of the models included the following variables: absences, family structure (i.e., who lived in the household), reading and social studies achievement scores, number of failed classes, and number of retentions. The hit rates ranged from 73.00% to 88.00% for noncompleters and 73.00% to 86.00% for completers. Although the hit rates for completers from the Morris et al. (1991) study were higher than those found in the current study, the hit rates for noncompleters are similar. A common predictor examined in both studies was achievement scores; however, the other characteristics in the models differed.

Reschly and Christenson (2006a) examined predictors of completion for both regular education students and students who received special education services. The covariates in the study, which were grade retention, SES, and standardized tests scores in mathematics and reading, correctly classified 70.70% of the students diagnosed with an Emotional Behavioral Disorder (EBD), 77.0% of the students with a Learning Disability (LD), and 84.00% of students who were not receiving special education services. Furthermore, the classification rates increased to 82.3%, 80.00%, and 86.00% for EBD, LD, and students not receiving special education services, respectively, when *behavioral engagement* variables were added to the model. Although the classification rates did increase to 82.70%, 81.00%, and 85.80%, respectively, when all variables were added to model, they did not significantly improve the classification of students. The hit rates in the current study are comparable to those found by Reschly & Christenson (2006a) and shared the common predictor of achievement test scores.

Implications

The overarching purpose of this study is to examine early predictors of noncompletion that are conducive to both early identification and early intervention. Despite the uncertainty of the impact of most intervention programs, salient characteristics for improvement strategies have been suggested. Specifically, the importance of early identification and intervention, *unalterable* and *alterable* variables, and multiple contextual influences are delineated in the literature and buttressed by the current study.

There is clearly a consensus in the literature that early intervention efforts are more influential than those completed later (Sinclair et al., 2003). The importance of early intervention is also supported by the finding that various student characteristics, such as disruptiveness and work habits, that are measurable in early development can predict noncompletion (Alexander et al., 1997; Barrington & Hendricks, 2001; Vitaro et al., 2001). Additionally, Jimerson et al. (2000), who studied a group of children from infancy to the end of high school, noted the important distinction between early and late markers of completion. For example, truancy, disciplinary sanctions, and failing grades in high school are indicative of a later stage of noncompletion as opposed to early elementary school predictors of noncompletion, which are more salient in developing interventions for those students at-risk. Given the importance of early identification and the impact of development, programs should focus on reliable methods for identifying those students who demonstrate probable trajectories for noncompletion. Despite this suggestion, most research and interventions involving noncompletion occur in middle and/or high school (Prevatt & Kelly, 2003; Reschly, Appleton, & Christenson, 2007). Findings from the current study are of utility as all of the salient predictors are observable and measurable early in the student's education.

In addition to early identification, researchers agree interventions should integrate multiple aspects of the student's life because multiple factors and contexts influence completion. For instance, Dynarski and Gleason (2002) suggested a multi-faceted approach encompassing academic, social, and individual difficulties. As previously noted, all contextual variables in the current study were not included in the analyses due to their poor psychometric properties. However, due to the support of such characteristics in the literature, the multiple contexts of the student's life are influential and should be considered in future studies and intervention development (Reschly & Christenson, 2006b).

The literature has also addressed the need for a *data-based, systematic* intervention that monitors predictive indicators of *engagement* (Anderson et al., 2004; Lehr et al., 2003). The current study offers several implications for interventions based on student engagement. The most effective predictive models in this study included engagement-based indicators and their outcomes. Specifically, in discussing the potential practical implications, particular attention is given to the recommended approaches for targeting *unalterable* and *alterable* variables as well as the different types of engagement.

Unalterable variables, such as special education classification, location, race, and gender, are documented as being significant predictors of completion in high school completion (Anderson et al., 2004; Cairns et al., 1989; Kaufman at al., 2004; Reschly & Christenson, 2006b; Rumberger, 1995). Due to their nature, *unalterable* variables are generally not targeted directly in interventions. However, students who possess these characteristics that are predictive of noncompletion may be targeted based on these risk factors. Thus, although these *unalterable* variables are not malleable to intervention, they are salient for identifying those at-risk for noncompletion and developing recommendations for interventions.

Two *unalterable* variables, gender and a SST referral, are included in the models with the highest hit rates. Gender independently predicts completion status at a rate of 64.29%, which concurs with past findings that gender is predictive of completion (Laird et al., 2006). Specifically, both the literature and the current findings purport that males are more likely to be noncompleters. Gender is not only a salient characteristic due to its predictive power, it is also important because the best predictive models for males and females differ in our sample. Although the School Problems Composite is integral in predicting completion status for both genders, ITBS scores, the Behavioral Symptoms Index, and work habits also comprise the most predictive model for females whereas the Adaptive Skills Composite, the Externalizing Composite, and SST Referral are also part of the most effective model for males. Each of these characteristics will be addressed individually later; however, it may be helpful to consider gender when determining which predictive model best identifies those students at-risk for noncompletion and which interventions are most appropriate.

Similarly, whether or not a student was referred for a Student Support Team (SST) meeting is also predictive of completion status in the Race model. More specifically, male students who were referred for a SST meeting are at greater risk for noncompletion. In fact, this variable independently predicted completion status at a rate of 61.61%. These meetings, which occur prior to a special education referral when academic and/or behavioral difficulties are present, have not been examined in the noncompletion literature. However, students receiving special education services do have higher rates of noncompletion indicative of issues or difficulties that may be appropriate targets of intervention (Reschly & Christenson, 2006a; U.S. Department of Education, 2007). Consequently, it may be helpful for educators and psychologists to view a SST meeting referral as an *unalterable* predictor of noncompletion.

With this perspective, students who require an SST meeting should also be identified as at-risk for noncompletion and targeted in interventions.

It is also important to note that the current study did not produce the same findings as the literature concerning several *unalterable* variables that are usually predictive of completion. For instance, despite the support for their importance in the literature (Alexander et al., 1997; U.S. Department of Education, 2007) there were no significant differences between completers and noncompleters for the special education referral and special education placement variables. Although no definite explanation for these findings exists, it is possible that the district sampled in the current study had substantially different special education trends than those of other studies. Specifically, a larger proportion of students in the sample received special education services as compared to the national average (U.S. Department of Education, 2007). Moreover, due to a large amount of missing data, group differences for retention and socioeconomic status (SES), which are both associated with completion in the literature, could not be examined (Alexander et al., 1997; Anderson et al., 2004; Battin-Pearson et al., 2000; Ensminger & Slusarcick, 1992; Rumberger, 1995). Although retention and SES data were not available for all participants, it is likely that these characteristics were illustrated through other variables for which the data were intact. In particular, due to the strong relationship between academic achievement and grade retention, it is possible that students who were retained were also identified through low ITBS scores and high ratings of behavioral problems.

Alterable variables that are predictive of high school completion are of particular interest to this study for two reasons. First, like *unalterable* characteristics, *alterable* predictors of noncompletion are also salient for identifying which students are at-risk for noncompletion. In addition, *alterable* variables, by nature, are potentially yielding to interventions. Thus, *alterable*

characteristics that place students at a greater risk for noncompletion should be targeted in interventions. Although all four types of engagement are believed to be influential to completing high school, the variables involved in the current study were in the areas of *academic*, *behavioral*, and *psychological/interpersonal engagement*.

Several indicators and/or outcomes of *academic engagement* are included in the most predictive models for the current sample. The ITBS Battery score, which is considered an outcome of *academic engagement*, is one of the most predictive independent variables in this study. Additionally, the School Problems Composite, which is a salient predictor in both leading models, is the most predictive variable in both models from the current study. It is important to note that although the School Problems Composite is associated with *academic engagement* due to ratings involving time on task in the Attention Problems scale, this variable is also involved in *behavioral engagement.*

The finding that academic achievement is critical to earning a high school diploma buttresses the findings of past studies (Christenson et al., 2008; Singh, Granville, & Dika, 2002). In particular, researchers agree that academic achievement in the areas of math and reading predicts completion when measured as early as first grade (Alexander et al., 2001; Garnier et al., 1997; Vitaro et al., 2001). Concerning the ability of achievement outcomes in predicting completion, noncompleters were differentiated in third grade with 66.00% accuracy and in ninth grade with 85.00% accuracy partially based on ITBS scores (Barrington & Hendricks, 2001). In order words, both Barrington and Hendricks and the current study predicted completion at rates better than chance in part because of performance on achievement measures from as early as the third grade. Due to past findings and those of the current study, the ITBS Battery Score and

School Problems Composite may be helpful for identifying those at-risk for noncompletion and who may benefit from interventions.

Many achievement strategies that target *academic engagement* are supported in the literature. *School-level* interventions include encouraging academic support as well as focusing on effective instruction and classroom structure. In particular, the implementation of an interdisciplinary curriculum rather than teaching separate classes for different subjects is supported (Baker et al., 2004). *Student-level* interventions include tutoring in the student's problem area(s) and individualized instruction (Lehr et al., 2004; Reschly, et al., 2007). Specifically, Wehlage and Rutter (1986) suggest curriculum should be relevant to students' lives and students should decide which courses to take based on their individual interests. Furthermore, academic achievement for homework assignments can be facilitated through the utilization of agendas, ensuring adequate school supplies are provided at home, and communication between the teacher and parents (Reschly et al., 2007).

Several indicators of *behavioral engagement* [e.g., teacher ratings of work habits, School Problems Composite, Behavioral Symptoms Index (BSI), Adaptive Skills Composite, and Externalizing Behaviors Composite] also comprise the leading models that predict high school completion status. In particular, the BSI is a measure of both internalizing and externalizing behaviors and is comprised of behaviors associated with hyperactivity, aggression, depression, inattention, atypicality, and withdrawal. The Adaptive Skills Composite includes adaptability skills, social skills, leadership behaviors, and study skills whereas the Externalizing Composite includes behaviors associated with hyperactivity, aggression, and conduct problems.

The saliency of work habits, the School Problems Composite, the BSI, the Adaptive Skills Composite, and the Externalizing Behaviors Composite in predicting completion status in

the current study concurs with previous examinations of these characteristics. Similarly to the current study, teacher ratings of the student's work habits, which were derived from report cards throughout the first grade year, were associated with completion (Alexander et al., 1997). Concerning externalizing symptoms, disruptive behaviors in boys at age six predicted completion based on teacher ratings using the Social Behavior Questionnaire (Vitaro et al., 2001). Problem behaviors, such as aggressiveness, were found to be predictive of completion in first grade (Ensminger & Slusarcick, 1992; Jimerson et al., 2000). Additionally, Alexander et al. (1997) tracked students throughout their education beginning in first grade. Teacher ratings of externalizing and adaptive behaviors using an unstandardized rating scale differentiated completers and noncompleters. Moreover, ratings of adaptive skills, internalizing behaviors, and externalizing behaviors on the Child Behavior Checklist predicted completion in late elementary school and were the best predictor of completion when measured in sixth grade (Jimerson et al., 2000). Although the prior studies utilized instruments other than the *BASC TRS-C* to examine completion, there is now support for consistency among these measures in terms of measuring internalizing, externalizing, and adaptive behaviors as well as their usefulness as a tool for predicting completion. Thus, the teacher reports of work habits on report cards and several *BASC TRS-C* composite (e.g., BSI, Adaptive Skills Composite, Externalizing Behaviors Composite, and School Problems Composite) scores would be helpful for identifying those at-risk for noncompletion and may be useful in the development of interventions.

Various *school-* and *student-level* interventions that focus on improving *behavioral engagement* are supported in the literature. For instance, many researchers suggest examining *school-level* policies, such as suspension and expulsion, that facilitate the *push* effects that can lead to disengagement (Reschly & Christenson, 2006b). S*tudent-level* interventions, including

monitoring behaviors, implementing behavior contracts, providing behavioral training, and positively reinforcing appropriate behaviors are also suggested as intervention strategies (Reschly et al., 2007). Specific *student-level* behavioral difficulties can also be addressed with empirically-based interventions for the appropriate clinical population(s). For example, the Keep Your Cool program, which entails cognitive behavioral management, demonstrates a high level of efficacy for ameliorating aggressive behaviors (Finch, Nelson, & Moss, 1993). Additionally, the *Behavior Assessment Scales for Children- Second Edition Intervention Guide* (Reynolds & Kamphaus, in press) offers comprehensive recommendations through progress monitoring, instructional planning, and other strategies related to each scale of this instrument.

Indicators of *psychological/interpersonal engagement* from the current study are also predictive of completion status. It is important to note that many of the composites (e.g., Behavioral Symptoms Index, the School Problems Composite, and the Externalizing Behaviors Composite) associated with this type of engagement also overlap with some of the scales that comprise the *behavioral engagement* construct. This is expected as a child who exhibits high levels of aggressive or disruptive behavior (i.e., a type of *behavioral engagement)* in the classroom is less likely to demonstrate high levels of *psychological/interpersonal engagement.* Nonetheless, characteristics of *psychological/interpersonal engagement* were found to predict completion in the current study as well as in others. For example, Vitaro et al. (2001) found that high ratings of male students' interpersonal behavior when measured via the Social Behavior Questionnaire were associated with completion. Additionally, ratings of peer competence in late elementary school through a portion of the Child Behavior Checklist were predictive of completion (Jimerson et al., 2000). Thus, indicators of *psychological/interpersonal engagement* should also be examined in developing interventions.

There are several interventions supported in the literature that focus solely on *psychological/interpersonal engagement*. *School-level* intervention strategies, which focus on improving school climate so that students can identify with their school and peers, are recommended to target this type of engagement. In particular, schools can reduce classroom size (Reschly et al., 2007) and include cooperative instruction (Reschly & Christenson, 2006b), both of which promote interaction with teachers and peers. Additionally, *student-level* interventions should include the systematic monitoring of *psychological/interpersonal engagement* characteristics coupled with individual interventions targeting students with lower levels of engagement. Specifically, cooperative learning strategies, mentoring programs, social skills training, and the positive reinforcement of appropriate interpersonal behaviors are suggested (McPartland, 1994; Reschly & Christenson, 2006b; Vitaro, Larocque, Janosz, & Tremblay, 2001). One program, the School Transition Environment Project, which focused on efforts to improve interpersonal relationships, found that being included in a fixed cohort of students was beneficial. Additionally, programs targeting specific *psychological/interpersonal engagement* indicators, such as self-esteem and interpersonal relationships, were positively influential (Lehr et al., 2004).

In summation, both *unalterable* and *alterable* variables should be considered when identifying those at-risk for noncompletion and in intervention development. Additionally, the *academic, behavioral,* and *psychological/interpersonal engagement* predictors should be systemically monitored from the beginning of schooling in order to provide effective identification and intervention for potential noncompleters. Although interventions related to the predictors of noncompletion are reviewed in this study, see Christenson et al. (2008) and Reschly et al. (2007) for a more comprehensive list of prevention and intervention practices.

Limitations of this study

Despite the potential utility of the results from this study, its limitations should be considered. First, the sample utilized may not be representative of a national sample. Specifically, the sample was drawn from only one school district, which had a higher than average noncompletion rate. The racial demographic of students was also not parallel to national norms. Furthermore, due to the listwise deletion method that was used for missing data, the final sample size was smaller than initially expected; however, it was still adequate for the analyses used based on guidelines delineated by Huberty and Olejnik (2006). Also, the sample included students who were placed in general education classrooms. It would be helpful for future studies to examine these research questions using a sample that is demographically representative of the national population. Additionally, the transferability of the current study's findings may be limited. As noted by McPartland (1994), a universal intervention plan may be ineffective due to the unique needs of individual districts, schools, and students. However, the findings from this study may be particularly important for identifying noncompleters and developing interventions for similar "high-risk" students.

Second, although the plans for current study were to examine a comprehensive list of both *school*- and *student-level* variables, some of these characteristics were not available to be included in the analyses. In particular, several *school-level* facilitators of engagement that exhibited low levels of variance and/or reliability were not included. Additionally, there were not adequate data for the examination of facilitators of engagement found at home. However, given the impact of the school and home environments on completion, characteristics that facilitate completion in both contexts should be examined (Reschly & Christenson, 2006b).

Thus, the current study's examination of solely *student-level* characteristics should be considered a limitation.

Third, because the data were not originally collected for the purpose of examining the role of engagement in predicting high school completion, there is not a clear demarcation between the variables studied and the different types of engagement. For instance, the data utilized in the current study did not include an indicator of *cognitive engagement*. Additionally, although there were indicators and/or outcomes associated with the other types of engagement, the variables often demonstrated overlapping associations. For example, the Behavioral Symptoms Index could be an indicator of *academic engagement* due to its involvement with time on task as well as *behavioral engagement* due to its inclusion of hyperactive and disruptive symptoms, amongst others. Because the variables in this study did not include each type of engagement and the types that were included may have overlapped with one another, a limitation of this study was that the types of engagement were selected piecemeal from the existing measures. This problem is common among the dropout literature and calls for the examination of these characteristics through a comprehensive measure of engagement (Reschly & Christenson, 2006b). One such tool, the Student Engagement Instrument (SEI), is currently in development and has demonstrated support for measuring engagement in a comprehensive, rather than "piecemeal," manner (Appleton et al., 2006). Additionally, the SEI directly links results in areas of the measure to the development of both reform initiatives and specific intervention plans.

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APPENDIX

Table 1

Salient empirical studies

Author(s) & Years	Participants	Measures	Findings
Barrington & Hendricks (1989)	N=651; two moderately-sized high schools serving a small city	IQ scores, Achievement test scores, Reading Test scores, days absent, GPA, teacher comments in elementary school	The typical Noncompleter has poor achievement by 3rd grade, poor attendance by middle school, and low grades by 9th grade
Morris, Ehren, & Lenz (1991)	N=785; from six school districts	Achievement test scores & school records	Hit rates ranging from 73-88% when models included absences, family, achievement, grades, & retention.
Janosz, LeBlanc, Boulerice, & Tremblay (1997)	N=1582 Canadian French-speaking	Questionnaire assessing psychological adjustment before leaving school	School, family, behavioral, social, and personality variables predict noncompletion
Vallerand, Fortier, & Guay (1997)	N=4537, 50% male, 50% female; 9th and 10th graders; Montreal high schools	Questionnaire assessing Autonomy of authority figures, perceived self-competence, academic motivation, and future school intentions	Strong support for self-determination model, of high school noncompletion
Egyed, McIntosh, & Bull (1998)	N=444 School Psychologists; 55% male, 45% female	42-item School Psychologist's Noncompletion Survey	Participants believe noncompletion occurs due to school conflicts and family responsibilities
Smyth (1999)	N=116 schools in Ireland using stratified random sampling	Questionnaires assessing school climate and teacher-student relationships	Absenteeism and noncompletion are lower in schools with higher academic progress and positive teacher-student relationships

Battin-Pearson, Abbot, Hill, Catalano, Hawkins, & Newcomb (2000)	N=808; 51% males, 49% females; Caucasian 46%, African American 24%, Asian Americans 21%	Questionnaires assessing deviance, bonding to antisocial peers, parental expectations, sexual involvement, parent's education	Poor academic achievement is the strongest predictor of noncompletion; Deviance, bonding to antisocial peers, and low SES associated with noncompletion
Reyes, Gillock, Kobus, & Sanchez (2000)	N=235; 8th grade students from 2 inner-city schools; predominately Latino (76%)	Self-Perception Profile for Adolescents, School Sentiment Index, Social Support, Performance	Completers were more active in the school system, had higher grades, less social support from teachers, higher self-perception
Vitaro, Larocque, Janosz, & Tremblay (2001)	N=751 boys; disadvantaged areas in Montreal; All Caucasians	Socio-familial adversity scale, Social Behavior Questionnaire, Academic performance, Pupil Evaluation Inventory, Ratings of Parental Support, Ratings of Friends' deviancy	Early disruptiveness, academic performance, and affiliation with deviant friends predicts noncompletion
Miller-Cribbs, Cronen, Davis, & Johnson (2002)	N=231; 45% male, 55% female; 9th grade African American students	Questionnaires assessing attitudes about completion, perceptions of others, barriers, and school variables	Barriers to completion were family issues, academic problems, and personal issues; Opinion of family members was top reason for staying in school
Hardre & Reeve (2003)	N=483; 52% female, 28% male; 95% Caucasian; low SES	Questionnaire assessing teacher autonomy support, self-determination, competence, performance, and intention to persist	Self-determination and competence related to completion
Lan & Lantheir (2003)	Data from National Educational Longitudinal Study of 1988; N=25,000	Questionnaires assessing performance, teacher and peer relationships, perceptions of school, participation, motivation, effort, and self-esteem	Noncompleters ' academic performance, relationships with teachers, perception of school, motivation, and participation were lower in 10th and 12th grades

Table 2

Comparison of transfer students and study participants

Adaptive Skills Comp.	-0.14	420	0.99	48.05	48.07	10.99	10.53	0.00
Behavioral Symptoms	-0.81	420	0.42	46.94	47.73	9.57	9.68	0.05
Externalizing Comp.	-0.68	420	0.50	48.59	49.32	10.12	11.09	0.03
Internalizing Comp.	-1.39	420	0.17	44.45	45.56	7.65	8.11	0.07
School Problems	0.53	420	0.59	50.78	50.20	10.88	10.44	-0.03
ITBS Reading	-0.81	275	0.42	179.70	182.84	25.84	35.31	0.05
ITBS Language Arts	0.47	268	0.64	180.83	178.83	27.33	39.85	-0.03
ITBS Math	-0.05	273	0.96	185.73	186.01	44.28	31.77	0.00
ITBS Battery	-0.93	257	0.35	182.03	185.69	25.86	33.17	0.06
Work Habits	-0.96	284	0.50	11.29	11.47	1.50	1.30	0.06
Attendance	1.39	274	0.17	0.97	0.96	3.34	3.20	-0.08
Independent Measure	χ^2	df	*p*	In Mean	Out Mean	In Range	Out Range	CC
Gender	1.75	1	0.19	M=48.00%, F=52.00%	M=54.00%, F=46.00%	(0,1)	(0,1)	0.06
Race	15.43	4	0.00*	C=36.71%, AA=59.56%, H=2.62%, API=1.11%	C=49.26%, AA=41.18%, H=5.88%, API=2.94%, MR=0.74%	(0,3)	(0,4)	0.19
SST Referral	0.38	1	0.54	No=67.35%, Yes=32.65	No=72.13%, Yes=27.87%	(0,1)	(0,1)	0.25

In=In sample
Out= Out of Sample
MD= Std. Mean Diff.
CC=Contingency Coef.
M=Male
F=Female
C=Caucasian
AA=African American
H=Hispanic
API=Asian/Pac. Isla.
MR=Multiracial

*$p < .05$

Table 3

Proportion of each racial group in the sample

Racial Group	Remain in Sample (%)	Did not Remain in sample (%)
Caucasian	59.39	40.61
African American	73.95	26.05
Hispanic	46.67	53.33
Asian/Pacific Islander	42.86	57.14
Multiracial	50.00	50.00

Table 4

Comparison of group differences for each variable

Variable	*t*	df	*p*	Comp. Mean	Non. Mean	Comp. SD	Non. SD	MD
Adaptive Skills	-7.13	199	0.00*	52.87	43.17	10.38	8.41	0.45
Behavioral Symptoms	5.00	199	0.00*	44.02	50.17	7.54	9.90	-0.33
Externalizing	4.39	199	0.00*	45.73	51.50	7.86	10.74	-0.30
Internalizing	3.7	199	0.00*	42.73	46.60	6.05	8.76	0.45
School Problems	8.24	199	0.00*	45.68	56.20	7.72	10.38	0.64
ITBS Battery	-7.65	199	0.00*	192.01	167.65	20.22	24.91	0.76
Work Habits	-4.19	199	0.00*	11.67	10.83	0.87	1.90	0.28
Attendance	-2.78	199	0.00*	97.29	95.99	2.62	3.96	0.19
Variable	X^2	df	*p*	Comp. Mean	Non. Mean	Comp. Range	Non. Range	CC
Gender	12.78	1	0.00*	M=32.74%, F=67.26%	M=57.95%, F=42.05%	(0,1)	(0,1)	0.25
Race	16.70	3	0.00*	C=49.56%, AA=46.02%, H=2.65%, API=1.77%	C=23.86%, AA=73.87%, H=2.27%	(0,3)	(0,2)	0.29
SST Referral	11.41	1	0.02*	N=77.14%, Y=22.86%	N=58.44%, Y=41.56%	(0,1)	(0,1)	-0.24
School	6.88	3	0.08	1=22.58%, 2=35.48%, 3=34.29%, 4=8.57%	1=22.86%, 2=34.29%, 3=34.29%, 4=8.57%	(0,3)	(0,3)	0.21
Spec. Ed. Referral	0.00	1	0.67	N=89.58%, Y=10.42%	N=78.57%, Y=21.43%	(0,1)	(0,1)	0.00
Placed in Spec. Ed.	0.83	1	0.30	N=89.80%, Y=10.20	N=78.57%, Y=21.43%	(0,1)	(0,1)	-0.09

Comp.=Completers
Non.=Noncompleters
MD=Std. Mean Diff.
CC=Contingency Coef.
M=Male
F=Female
C=Caucasian
AA=African American
H=Hispanic
API=Asian/Pac. Isla.
MR=Multiracial

*$p \leq .05$

Table 5

Detailed information about included variables

Variables	Type	Method	Scale	Other Information
Adaptive Skills	Alterable, Academic & Behavioral Engagement	BASC TRS-C	*t*-score	Includes the Adaptability, Social Skills, Leadership & Study Skills scales
Behav. Symp. Index	Alterable, Psychological/Interpersonal & Behavioral Engagement	BASC TRS-C	*t* -score	Includes the Hyperactivity, Aggression, Depression, Attention Problems, Atypicality & Withdrawal scales
Externalizing	Alterable, Psychological/Interpersonal & Behavioral Engagement	BASC TRS-C	*t* -score	Includes the Aggression, Hyperactivity & Conduct Problems scales
Internalizing	Alterable, Psychological/Interpersonal & Behavioral Engagement	BASC TRS-C	*t* -score	Includes the Anxiety, Depression, & Somatization scales
School Problems	Alterable, Academic & Behavioral Engagement	BASC TRS-C	*t* -score	Includes the Attention & Learning Problems scales
ITBS Battery	Alterable, Outcome of Academic Engagement	ITBS	Standardized	Index of the Reading, Language Arts & Math Composite Scores
Work Habits	Alterable, Academic & Behavioral Engagement	School Records	Likert	Sum of teacher ratings of the student's work habits across all four quarters
Attendance	Alterable, Behavioral Engagement	School Records	Percentage	Percentage of time the student attended school in the 180 day school year
Gender	Unalterable	School Records	Dichotomous	N/A
Race	Unalterable	School Records	Nominal	N/A
Completion Status	Outcome	District Records	Nominal	County records of the student's high school completion status or transfer information

Table 6

Descriptive information of included variables

Variables	Mean	Standard Deviation	Reliability
BASC Composites			
Adaptive Skills	39.17	21.33	0.97
Behavioral Symptoms Index	51.12	11.04	0.96
Externalizing	52.36	11.47	0.91
Internalizing	47.86	10.13	0.99
School Problems	51.45	10.92	0.94
	Mean	Standard Deviation	
ITBS Battery	180.04	30.03	
Work Habits	11.44	1.27	
	Range	Central Tendency	
Attendance	77-100%	50th percentile = 96.62 %	
Gender	(0,1)	56% female, 44% male	
Race	(0,3)	Caucasian 38%, African American 58%, Hispanic 3%, & Asian <1%	
Completion Status	(0,1)	56% Completer, 44% Noncompleter	

Table 7

Correlations of included variables

	AC	BSI	Ext.	Int.	SP	ITBS	W. Habits	Atten.
AC	1							
BSI	-0.21	1						
Ext.	-0.24	0.64	1					
Int.	-0.18	0.79	0.28	1				
SP	-0.31	0.71	0.41	0.54	1			
ITBS Battery	0.3	-0.27	-0.16	-0.2	-0.56	1		
Work Habits	0.15	-0.31	-0.3	-0.11	-0.44	0.27	1	
Attendance	-0.19	-0.18	-0.15	-0.19	-0.23	0.17	0.11	1

Key
AC=Adaptive Skills
BSI=Behavioral Symptoms Index
Ext.=Externalizing Composite
Int.=Internalizing Composite
SP=School Problems

Table 8

Subgroup Models with the Highest Hit Rates

Sample	ITBS	Work Habits	BSI	SP	Ext.	Gender	SST	Adaptive Skills
Males	X	X						
Females	X	X	X	X				
Caucasians				X	X	X	X	
African Americans				X	X	X	X	X
Gender Model	X	X	X	X				
Race Model				X	X	X	X	X

Key
BSI=Behavioral Symptoms Index
SP=School Problems
Ext.=Externalizing Composite
SST= SST Referral

Table 9

Comparison of Gender and Race models for sample subgroups

Sample	Model	Completer HR (%)	Noncompleter HR (%)	Improvement Over Chance (%)	*Z*
Whole Sample	Gender	50	86	41.87	5.32**
Whole Sample	Race	61.4	79.65	44.77	5.75**
Males	Gender	53	76	22.32	2.67**
Males	Race	56	76	27.03	3.10**
Females	Gender	54	88	57.19	4.95**
Females	Race	56	82	50.60	4.19**
African Americans	Gender	45	82.4	22.84	2.89**
African Americans	Race	61	75.4	34.33	4.15**
Caucasians	Gender	38	75	36.17	1.75*
Caucasians	Race	52	82	52.72	4.04**

** $p < .01$
* $p < .10$

Table 10

Gender model for entire sample

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	44 (50.00)	44 (50.00)	88
	Noncompleter	16 (14.16)	97 (85.84)	113
				201

Table 11

Race model for entire sample

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	54 (61.36)	34 (38.64)	88
	Noncompleter	23 (20.35)	90 (79.65)	113
				201

Table 12

Gender model for males

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	27 (52.94)	24 (47.06)	51
	Noncompleter	9 (24.32)	28 (75.68)	37
				88

Table 13

Race model for males

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	29 (56.86)	22 (43.14)	51
	Noncompleter	9 (24.32)	28 (75.68)	37
				88

Table 14

Gender model for females

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	20 (54.05)	17 (45.95)	37
	Noncompleter	9 (11.84)	67 (88.16)	76
				113

Table 15

Race model for females

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	21 (56.76)	16 (43.24)	37
	Noncompleter	14 (18.42)	62 (81.58)	76
				113

Table 16

Gender model for African Americans

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	30 (44.78)	37 (55.22)	67
	Noncompleter	10 (17.54)	47 (82.46)	57
				124

Table 17

Race model for African Americans

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	41 (61.19)	26 (38.81)	67
	Noncompleter	14 (24.56)	43 (75.44)	57
				124

Table 18

Gender model for Caucasians

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	8 (38.10)	13 (61.90)	21
	Noncompleter	14 (25.00)	42 (75.00)	56
				77

Table 19

Race model for Caucasians

		To Status n(%)		
		Completer	Noncompleter	Total
From Status	Completer	11 (52.38)	10 (47.62)	21
	Noncompleter	10 (17.86)	46 (82.14)	56
				77

Table 20

Most important variables

Gender Model		
Predictor deleted	Noncompleter HR	Rank
None	86.00	
School Problems	83.19	1.5
ITBS Battery	83.19	1.5
Behavioral Symptoms	84.07	3.5
Work Habits	84.07	3.5
Race Model		
Predictor deleted	Noncompleter HR	Rank
None	79.65	
School Problems	74.65	1
Adaptive Skills	76.42	2
Externalizing	79.65	3
Gender	80.53	4.5
SST Referral	80.53	4.5