A CONSTRUCT VALIDITY STUDY OF THE STUDENT ENGAGEMENT INSTRUMENT: FIT WITH AT-RISK YOUTH AND DEGREE OF ASSOCIATION WITH BEHAVIORAL INDICATORS OF DISENGAGEMENT

by

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(Under the Direction of Amy L. Reschly)

ABSTRACT

School failure is a substantial problem in the United States, particularly for various at-risk demographics. In dropout prevention efforts, student engagement has emerged as an area of focus. While generally considered to be a behavioral, cognitive, and affective multifactor construct, studies of student engagement primarily center on its behavioral aspects. However, indicators of cognitive and affective engagement may have distinct or additive value if incorporated into multiple-factor risk models. In order to investigate such possibilities, however, the construct validity of measures of such indicators must be sufficiently supported. The present study evaluated the Student Engagement Instrument (SEI), a self-report measure of cognitive and affective engagement. The results of confirmatory factor analyses supported the use of the SEI with various at-risk populations. Furthermore, results of rate and proportion analyses suggested considerable and highly consistent associations in expected directions between extreme scores on the SEI and indicators of behavioral disengagement.

INDEX WORDS: Student engagement, Dropout, School failure, At-risk youth, Confirmatory factor analysis, Degree of association, Construct validity

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CHAPTER 1: INTRODUCTION

Though national estimates of current high school completion rates vary by study and data source, they commonly range from around 66% to 85% (Educational Testing Service, 2005; Kaufman, Kwon, & Klein, 2000; Reschly & Christenson, 2006a). Nonetheless, majority graduation rates in America have not always been the norm. In fact, a century ago, public high schools were typically considered selective institutions that graduated only a small minority of the population (Kaufman, 2001). By the 1950s, however, the majority of Americans were finishing high school (Snyder, 1993), and by the 1970s, graduation was common across all broad population categories (Dorn, 1996). Such enormous advancements in secondary schooling trends in recent American history might intuitively suggest that, as a social issue, school failure should not be prioritized as highly as it was in the 1960s, when the term "dropout" first entered into common vernacular (Dorn, 1996). Although it is unquestionable that remarkable achievements have been made, arguably, the degree of the dropout problem has worsened over time. For instance, due to increasing labor market demands for highly trained workers, readiness for post-secondary education is more important than ever before (Murnane & Levy, 1996). Furthermore, while overall rates of high school dropout are at historic lows (National Center for Education Statistics, 2000), rates for specific demographic groups (e.g., children from low-income families, students with learning disabilities, foreign born Latin-American students) remain unacceptably high (U.S. Department of Education, 2006, 2009). In addition, within various specific locales, such as cities like Baltimore, where there are large numbers of students living in urban poverty, the dropout rate often approaches or exceeds 30% (Alexander, Entwisle,

& Horsey, 1997). And, when following one group of ninth graders over time, it is common for less than half of those in such areas to eventually finish with a high school diploma (National Research Council and Institute of Medicine, 2004).

Because twenty-first century youth belong to an age in which substantial social and economic significance is associated with school completion (Fasick, 1988; Kaufman, 2001), those who fail to reach this standard are at a considerable disadvantage. Dropouts are excluded from many employment opportunities that could provide them with economic independence (Murnane & Levy, 1996), and those who do find employment tend to earn significantly less than high school graduates. For instance, comparing median earnings among workers in 2007, dropouts earned 28% less annually than workers with only a high school diploma or equivalent credential, and less than 60% of that earned by workers with only some college or an associate's degree (U.S. Census Bureau, 2009). Beyond problems with unemployment and underemployment, dropouts are more likely to have health problems, live in poverty, depend on public assistance, commit crimes, and serve time in prison (Christenson, Sinclair, Lehr, & Hurley, 2000). Moreover, beyond consequences to the individual, correlates of school failure are also detrimental to society. As an economic illustration of this point, through income and tax revenue losses alone, it is estimated that each cohort of dropouts costs the United States over $200 billion over the course of their lifetimes (Rouse, 2005).

A Note on Interpreting Dropout Statistics

Variation both in how dropout is defined and in the methods used to calculate its prevalence is a substantial contributor to the aforementioned wide discrepancies in graduation rate estimates. For instance, in its annual report on dropout estimates, the National Center for Education Statistics (NCES) reports three distinct categories of dropout rates: event, status, and

cohort (Cataldi, Laird, & KewalRamani, 2009). Event dropout rates refer to the percentage of students who leave high school within an academic year without graduating; while status rates refer to the percentage of people within a given age range not in school and without a degree; and cohort rates (e.g., averaged freshman graduation rate) follow the same group of students over time, describing the percentage of those who graduate or drop out within a given time frame, such as over a 4-year period (Cataldi et al., 2009; Reschly & Christenson, 2006b).

Furthermore, it is important to distinguish high school *graduation*, which is specific to earning a regular diploma, from high school *completion*, which includes graduation as well as those students who earn an equivalent credential, such as a GED. Findings on the benefits of an equivalency degree are mixed (Cameron & Heckman, 1993; Clark & Jaeger, 2006; Heckman & LaFontaine, 2006). Some argue that, while possessing a GED provides an individual with more opportunities than dropouts for postsecondary training, there is evidence that the outcomes for GED recipients are not otherwise substantially improved over those of dropouts (Cameron & Heckman, 1993; Murnane, Willet, & Tyler, 2000). For example, in a labor economics study, Cameron and Heckman (1993) examined whether the economic payoff of earning a high school equivalency degree was comparable to finishing with a traditional high school diploma. Their results indicated that financial outcomes for regular graduates and GED earners were significantly different, but that GED earners were indistinguishable from dropouts in many relevant labor market dimensions. Furthermore, they found that differences in wages among graduates, GED recipients, and dropouts were better accounted for by years of schooling attained than by their degree status – evidence which supports Roderick's (1993) assertion that students reaching graduation without ever leaving is preferable to dropout, even when followed by a later return to school or enrollment in an alternative program. On the other hand, while not

inconsistent with Roderick's point, others argue that results from labor market studies of the GED are mixed (Clark & Jaeger, 2006; Ou, 2008), and furthermore, that such studies disregard the nonmarket, or social, benefits of education (Ou, 2008). For instance, viewing the GED as a positive and valuable credential for many disadvantaged populations and considering indicators of adult well-being, Ou (2008) found significant differences between GED earners and dropouts in the areas of quarterly income, life satisfaction, future optimism, depression, and substance abuse.

In the last decade, trends in education and economics have shifted to a focus on graduation and post-secondary readiness. For instance, the passage of the No Child Left Behind (NCLB) Act of 2001, which mandated that all states adopt systems of performance-based accountability for public schools, signified a federal policy shift from school completion to graduation. That is, NCLB requires states to use graduation rates, in addition to achievement testing, as measures of adequate yearly progress (AYP) at the secondary level, and it defines graduation rates as "the percentage of students who graduate…with a regular diploma in the standard number of years" (NCLB, 2002, § 1111(b)(2)(C)(vi)). In line with these shifts, the operational definitions of school dropout used in this paper were developed with respect to recent trends in legislation and practice, that is, with a focus on graduation. As such, in the present study, outcomes such as transferring to an equivalency degree program were considered under the purview of leaving for unfavorable reasons, and thus have been defined as dropout.

Preventing Dropout

Results of research on dropout prevention indicate the potential benefit of efforts to identify and intervene with those at risk. Hammond, Linton, Smink, and Drew (2007), for example, conducted an extensive, systematic review of 25 years of dropout research with the

purposes of (a) identifying risk factors and conditions that significantly increase the chances of dropout and (b) reviewing estimable, evidence-based dropout prevention and intervention programs. Through their review, they uncovered a number of general trends in research findings on variables associated with risk for dropout. First, there are numerous risk factors with clear associations to dropout, which based on a dropout risk factor framework posited by Rumberger (2004), may be classified into four domains: (1) individual, (2) family, (3) school, and (4) community/peers. Second, while any one risk factor is singly a poor predictor of which students will drop out, accuracy is enhanced when combinations of multiple risk factors are taken into account. Third, dropouts are a heterogeneous group, which can be organized into subgroups based on the onset, combination, and influence of risk factors. Fourth, self-reported reasons for dropout typically include multiple domains and complex interactions among factors. Finally, dropout is typically conceptualized by researchers as a process of disengagement from school, not a single event. In most cases, this process is long-term in nature, sometimes beginning before the child first enters school, with risk factors building and compounding along the way.

Focusing their attention on individual and family factors, Hammond et al. (2007) identified 25 significant, evidence-based risk factors, which they further grouped into eight subcategories. Furthermore, they examined the relevance of these factors by school level, using a graphic similar to Table 1.1 below to summarize their review. As the information in Table 1.1 indicates, all factors were identified by at least one source in elementary, middle, or high school. Notably, all factors, by one or more sources, and nearly three-fourths, by two or more sources, were identified at the middle or high school level. Many individual and family risk factors were also identified by multiple sources in elementary school, albeit fewer than at the secondary level.

Finally, Hammond et al. (2007) reported several themes among effective dropout programs gleaned from their study of systematic, evidence-based prevention. First, these programs addressed multiple risk factors across multiple domains. Second, they incorporated a variety of intervention strategies. Lastly, when being developed, effective programs had been designed to include evidence-based strategies for addressing risk factors and for evaluating program effectiveness.

The research summarized by Hammond et al. (2007) regarding known risk factors and their identified predictive trends by school level suggest that efforts to prevent dropout and other unfavorable outcomes should involve a systematic, evidence-based identification and intervention program, which begins early and continues throughout the primary and secondary years. Arguably, such early identification and intervention efforts increase the probability of improved outcomes for at-risk youth by allowing stakeholders to respond proactively to those who are most in need of intervention. In fact, a crucial element of such preventative programs is the use of timely, efficient, and accurate screening for at-risk youth (O'Shaughnessy, Lane, Gresham, & Frankenberger, 2003).

Student Engagement

Predictors of dropout may be further arranged beyond the levels of classification described above. For instance, Lehr, Johnson, Bremer, Cosio, and Thompson (2004) distinguished predictors of dropout by the degree to which they are amenable to change. This broader categorization is similar to the distinction psychologists often make between states and traits according to the extent of a variable's stability across time, where traits are considered relatively enduring, and states, in contrast, are likely to fluctuate (Leary, 1999). Like traits, status variables are predictors of dropout that are unlikely to change, such as socioeconomic

Table 1.1

Hammond et al. (2007) summary of significant risk factors by school level

Risk Category and Risk Factor	Elementary School	Middle School	High School
Individual Background Characteristics			
Has learning disability or emotional disturbance		✓	✓
Early Adult Responsibilities			
High number of work hours		✓	✓*
Parenthood			✓*
Social Attitudes, Values, & Behavior			
High-risk peer group		✓*	✓
High-risk social behavior		✓*	✓
Highly social outside of school			✓
School Performance			
Low achievement	✓*	✓*	✓*
Retention/over-age for grade	✓*	✓*	✓*
Student Engagement			
Poor attendance	✓*	✓*	✓*
Low educational outcomes		✓*	✓*
Lack of effort		✓	✓
Low commitment to school		✓	✓*
No extracurricular participation		✓	✓*
School Behavior			
Misbehavior	✓	✓	✓*
Early aggression	✓	✓	
Family Background Characteristics			
Low SES	✓*	✓*	✓*
High family mobility		✓*	
Parents with low education level	✓	✓	✓*
Large number of siblings	✓		✓
Not living with both natural parents	✓	✓	✓*
Family disruption	✓		
Family Engagement/Commitment to Education			
Low educational expectations		✓*	
Sibling has dropped out		✓	✓
Low contact with the school		✓*	
Lack of conversations about school		✓*	✓

Note: ✓= risk factor was significantly related to dropout in one study at the $p \leq .10$ level; ✓ = risk factor found to be significantly related to dropout in two or more studies at the $p \leq .10$ level*

status, disability status, and family structure; whereas, alterable variables (e.g., attendance, sense of belonging), like states, are more likely to be influenced by changes in the environment. Because alterable variables are more likely to be responsive to intervention, these factors tend to feature prominently in dropout efforts (Lehr et al., 2004).

As suggested above in the findings by Hammond et al. (2007), research shows that screening for dropout risk is most accurate when multiple factors are considered. One alterable variable that should be considered in such efforts is student engagement, which has featured prominently in dropout research and intervention programs (e.g., Alexander et al., 1997; Jimerson, Egeland, Sroufe, & Carlson, 2000; Sinclair, Christenson, Evelo, & Hurley, 1998). Indeed, the National Research Council and the Institute of Medicine (2004) reported that addressing underlying variables related to student engagement (e.g., competence and control, beliefs about the value of education, sense of belonging) is a common theme among secondary level programs that have successfully engaged at-risk students and led them to achieve at high levels.

Like definitions of dropout, descriptions of student engagement also vary considerably across studies (Jimerson, Campos, & Greif, 2003). Still, a common thread runs through research related to student engagement, that is, that it tends to be considered a multidimensional construct, and that these multifaceted models include both overt and covert indicators (Appleton, Christenson, Kim, & Reschly, 2006; Fredricks, Blumenfeld, & Paris, 2004; Jimerson et al., 2003; Newman, Wehlage, & Lamborn, 1992). For example, Fredricks et al. (2004), in what has become a seminal review of engagement research, identified three broad dimensions found among researchers' conceptions of engagement: behavioral, affective, and cognitive. According to Fredricks et al., behavioral engagement refers to observable aspects of the construct, like rule

following and the absence of problematic and disruptive behaviors (e.g., numerous absences, office referrals), as well as involvement in academic tasks (e.g., persistence, asking questions, and participation in class discussion) and participation in extracurricular activities (e.g., school athletics or school government). Next, affective engagement refers to students' internal emotional experiences related to school, such as interest, happiness, emotional reactions to the school and teacher, and the degree to which a student feels a sense of belonging to their school. The third category, cognitive engagement, also represents internal, less observable aspects of the construct, referring to psychological investment in learning (e.g., preference to be challenged and to exceed basic academic requirements) and self-regulation (e.g., using metacognitive strategies when accomplishing academic tasks, purposefully suppressing distractions in the process of managing and controlling effort on a task).

Although many studies have investigated the predictive value of student engagement via behavioral indicators of the construct, less research has studied the distinct or additive value of measuring aspects of cognitive and affective engagement (Fredricks et al., 2004; Jimerson et al., 2003). For instance, Fredricks et al. (2004) identified a number of studies showing the links between behavioral disengagement and subsequent dropout, but found primarily theoretical research regarding connections between affective engagement and dropout. Furthermore, no studies were found regarding cognitive engagement and dropout. This deficiency in what is known regarding cognitive and affective engagement as precursors to dropout represents a noteworthy gap in the engagement literature, because findings from several studies that include examples of cognitive and affective student disengagement (e.g., Ekstom, Goertz, Pollack, & Rock, 1986; Jordon, Lara, & McPartland, 1994; Wehlage & Rutter, 1986) suggest associations with increased risk for dropout. In light of this, it is reasonable to consider that including

cognitive and affective engagement indicators in multifactor predictive screening for dropout and other unfavorable educational outcomes may lead to improved identification accuracy; however, to investigate such possibilities, substantial evidence must be gathered regarding the construct validity (Cronbach & Meehl, 1955) of reliable measures of these engagement variables.

The Student Engagement Instrument

The Student Engagement Instrument (SEI) is a 33-item survey designed to measure a student's self-perception of engagement in school (Appleton et al., 2006). The SEI measures facets of cognitive and affective student engagement through a five-factor model, which is represented below in Figure 1.1 The SEI Five-Factor Model consists, namely, of Teacher-Student Relationships (TSR), Control and Relevance of School Work (CRSW), Peer Support for Learning (PSL), Future Goals and Aspirations (FG), and Family Support for Learning (FSL). TSR, PSL, and FSL measure aspects of affective engagement, whereas CRSW and FG are related to cognitive engagement.

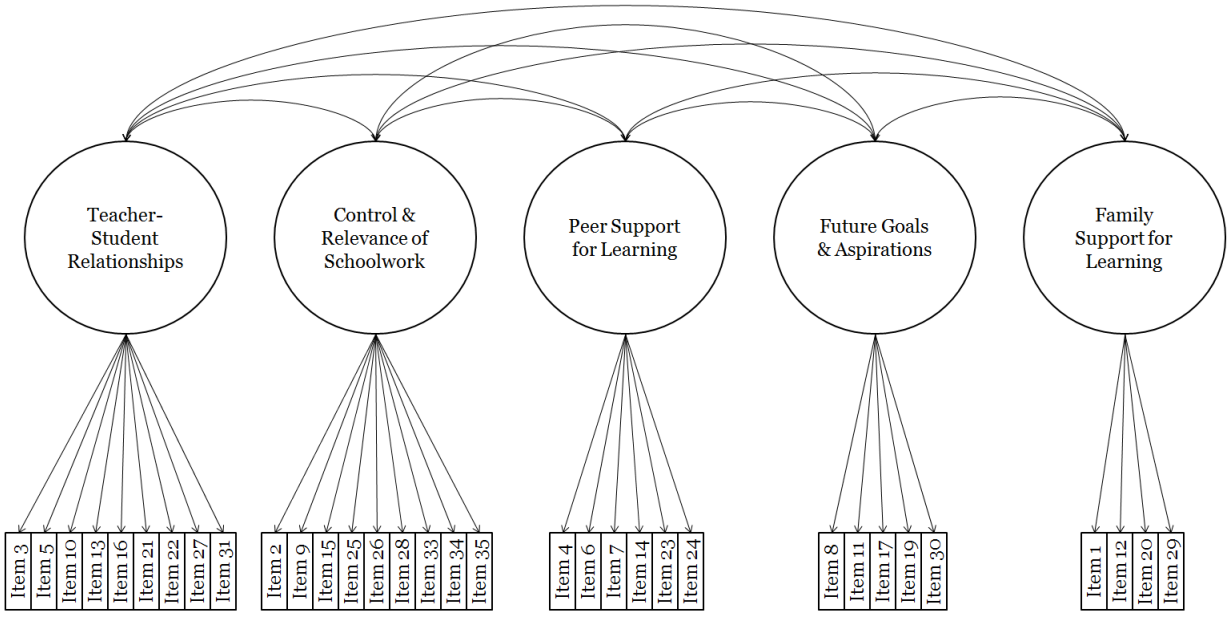

Figure 1.1. *The SEI Five-Factor Model*

Appleton et al. (2006) developed the initial items on the SEI after a review of relevant literature, and later refined the items through pilot studies on diverse focus groups. The SEI's factor structure (which initially included an additional factor called Extrinsic Motivation) was discovered through exploratory factor analysis (i.e., principal axis factoring with oblique rotations) of the SEI's latent structure using the polychoric correlation matrix of the SEI responses of a sample of 1,931 ninth graders. Decisions regarding the number of factors to retain were initially conducted through a combination of scree plot analysis and the K1 procedure (see Gorsuch, 1983), which suggested retaining four to six factors. Further decisions about factor structure and which items to drop were made through an iterative review of four-, five-, and six-factor structures with EFAs until all items loaded at .40 or higher. These models were subsequently subjected to CFAs, which suggested that the five- and six-factor models fit the data better than the four-factor model. The six-factor model with 35 items was retained initially, but the Extrinsic Motivation factor and its two corresponding items were later removed due to poor factor overdetermination (i.e., too few items loaded). Internal consistency estimates for the SEI ranged from coefficient alpha (α) = .72 to α = .88. Additionally, in an analysis of convergent and divergent validity, Appleton et al. reported moderate correlations (range r = .284 to .506, mean r = .404) in expected directions between the five SEI factors and small correlations (range r = |.001| to |.253|, mean r = |.120|) generally in expected directions between SEI factors and several educational outcomes (i.e., GPA, standardized achievement scores, and suspensions).

Betts, Appleton, Reschly, Christenson, & Huebner (in press) conducted a subsequent analysis of the reliability and factorial invariance of the SEI across multiple grade levels on a sample of 2,416 sixth to twelfth grade students drawn from school districts in the rural Southeastern and Upper Midwestern United States. Factorial structure was again explored.

Nine models with factors ranging from one to nine were analyzed with exploratory factor analyses (EFAs) with oblique rotations. Using the Comparative Fit Index of 0.95 and a Root Mean Square Error of Approximation at or below 0.05 as statistical criteria, and with the goal of structural parsimony in mind (i.e., the lowest number of factors that met statistical criteria), results suggested a five-factor model as a good fit for the data. Further analyses, including investigations of the loading patterns of indicator variables on the latent factors and analysis of a restricted model with non-significant loadings set to zero, further specified the Five-factor model with items and factors conforming to the original SEI validation study. Using multiple statistical criteria to judge the invariance of the model across grade levels, the Five-Factor Model with a consistent structure was found to fit well across students in grades 6 to 12.

Purpose of the Present Study

A broad and long-held principle within general theories of experimentation is an emphasis on basing interpretation of findings on collective evidence rather than on once-and-for-all definitive studies (Campbell & Stanley, 1963). This axiom certainly also applies to the subsumed process of measurement validation. For instance, according to the American Educational Research Association's (AERA) Standards for Educational and Psychological Testing (1999), the validation of a measurement tool does not occur through one study, but instead involves the accumulation of scientific evidence, which may then form a framework through which a given measure's scores can be interpreted. With this standard of scientific practice in mind, although promising evidence has been uncovered thus far regarding the general construct validity of the SEI, studies of it are few, and for that reason more evidence is needed to better assess the interpretability of SEI scores.

Furthermore, the AERA (1999) recommended that when scores are used for purposes or with populations beyond what prior validation studies have evaluated, each new intended use should be studied, rather than making the assumption that an instrument's utility will generalize. For example, in the case of the SEI, on which prior studies have evaluated construct validity through responses of general populations only, studies need to be conducted regarding use of the SEI with more specific groups. Of particular importance are studies of groups for which there is reason to believe that responses may differ from those of students in the general population. This question of dissimilarity of group response styles relates to construct bias, a concept in the psychometric literature that describes instances when group membership affects which construct a test measures (Van de Vijver & Poortinga, 1997). It is important to consider and investigate the possibility that an issue like construct bias may affect the interpretability of the SEI with specific groups of interest, because such evidence contributes to the degree of confidence that may be placed on the construct validity of a measurement tool (Cronbach & Meehl, 1955). As described above, previous studies of the SEI have evaluated its reliability, factor structure, and measurement invariance across grades 6 through 12 (Appleton et al., 2006; Betts et al., in press); however, the validity of the SEI Five-Factor Model for use with students considered at-risk of dropout has not been investigated – nor has its use with students who, in fact, later drop out of school. Therefore, evidence that the SEI Five-Factor Structure is suitable with students likely to be in the process of disengagement would contribute to confidence in its construct validity.

Additionally, although previous factor structure analysis results lend credence to the construct validity of the SEI (Appleton et al., 2006; Betts et al., in press), the low and not fully consistent correlations reported by Appleton et al. between SEI scores and outcome variables of

interest raise questions about the convergent and divergent validity of the SEI – in essence, questions about its construct validity and practical value as a measurement tool (Cronbach & Meehl, 1955). Evidence regarding the degree of association between SEI scores and overt indicators of disengagement (e.g., numerous absences, disciplinary referrals, subsequent failure or dropout), would contribute to our understanding of the concurrent and predictive validity of the SEI, as well as suggest the potential of including psychological engagement indicators in school failure and dropout prevention efforts.

Taking these points and the literature reviewed above into consideration, the purpose of the present study was to extend what is known about the construct validity of the SEI in two ways: first, by investigating the fit of the SEI Five-Factor Model with students at risk of dropout and failure; and, second, by further exploring the degree of association between SEI scores and behavioral indicators of disengagement. Specifically, the following research questions were addressed:

1. Does the SEI Five-Factor Model fit the response data of:
    a. Students in a general education setting? That is, will current results replicate those of previous factor analysis studies?
    b. Students that, based on national estimates, are considered at higher than average risk of dropout, namely, students with SLD, EBD, or SLI (U.S. Department of Education, 2006)?
    c. Students who later dropped out or who left the regular education setting for unfavorable reasons?

2. If results suggest reasonable SEI model fit with at-risk populations, do SEI scores demonstrate associations of reasonable magnitude with indicators of theoretically associated engagement constructs, such as behavioral engagement? Specifically:
    a. What is the degree of association between SEI scores and various indicators of behavioral disengagement?
        i. Is there excess risk for unfavorable outcomes among students whose SEI scores suggest low levels of cognitive and affective engagement?
        ii. Is there reduced risk for unfavorable outcomes among students whose SEI scores suggest high levels of cognitive and affective engagement?
    b. If a degree of association between SEI scores and unfavorable outcomes is indicated:
        i. What is the practical magnitude of this degree of association? That is, what is the level of excess risk associated with self-reporting low levels of cognitive and affective engagement?
    c. Considering various conditional probabilities among students who show various signs of behavioral disengagement, is there a higher likelihood of scoring in the lower extremes of SEI percentile ranks, and less of a likelihood of scoring in the upper extremes?

CHAPTER 2: METHOD

Participants

All data included in this study were archival, collected during September 2007 in a large school district near a metropolitan city in the southeastern United States as part of a district-wide initiative geared toward improving student engagement. For the purposes of the present study, these de-identified data were obtained with permission from the school district's Research and Evaluation department. The data were originally collected by each middle and high school within the district, including all responses from sixth through twelfth graders surveyed with the Student Engagement Instrument (SEI) in September 2007, as well as other requested de-identified student information, such as demographic characteristics, standardized achievement test performance, and records of attendance and discipline referrals. The total sample size in the original dataset was 60,035 students. Following the data screening and preparation procedures described below, the total was reduced by 3.8% to 57,766.

Participants consisted of nearly all sixth through twelfth grade students within the district, from which three non-overlapping samples were drawn for this study. With regard to the external validity of potential findings reported, each sample was representative of district demographics; therefore, while the generalizability of results may be considered valid for the school district, further generalizations should be made with caution and limited to populations similar to that of the studied samples (Campbell & Stanley, 1963). Complete demographic data of the participants may be found in Tables 2.1, 2.2, and 2.3. Regarding Sample 3, which was intended to represent students who in fact left or dropped out of the regular education setting during the 2007-2008 school year, it should be clarified that this categorization

Table 2.1
Description of participants – Sample sizes and percentages

Demographic Variables		Sample 1	Sample 2	Sample 3
		Sample Size / Percentage	Sample Size / Percentage	Sample Size / Percentage
Sample Size		53,407	3,406	953
Male		25,521 / 47.8	2,182 / 64.1	653 / 68.5
Female		27,886 / 52.2	1,224 / 35.9	300 / 31.5
Race:	White	20,759 / 38.9	1,197 / 35.1	181 / 19.0
	Black	14,458 / 27.1	1,167 / 34.3	353 / 37.0
	Hispanic	9,767 / 18.3	759 / 22.3	335 / 35.2
	Asian/Pac. Islander	6,621 / 12.4	148 / 4.3	46 / 4.8
	Native American	53 / 0.1	3 / 0.1	1 / 0.1
	Multi-Racial	1,749 / 3.3	132 / 3.9	37 / 3.9
Primary Language:	English	41,996 / 78.6	2,687 / 78.9	678 / 71.1
	Other	11,411 / 21.4	719 / 21.1	275 / 28.9
FRL Status:	Eligible	19,315 / 36.2	1,801 / 52.9	616 / 64.6
	Ineligible	34,092 / 63.8	1,605 / 47.1	337 / 35.4
PAE:	SLD	N/A	2,373 / 69.7	63 / 6.6
	EBD	N/A	625 / 18.3	41 / 4.3
	SLI	N/A	408 / 12.0	6 / 0.6
Grade Level:	6	9,032 / 16.9	736 / 21.6	63 / 6.6
	7	9,343 / 17.5	650 / 19.1	151 / 15.8
	8	7,770 / 14.5	550 / 16.1	125 / 13.1
	9	8,384 / 15.7	620 / 18.2	256 / 26.9
	10	7,817 / 14.6	451 / 13.2	186 / 19.5
	11	6,062 / 11.4	261 / 7.7	115 / 12.1
	12	4,850 / 9.1	138 / 4.1	57 / 6.0

PAE = Primary Area of Exceptionality
SLD = Specific Learning Disability
EBD = Emotional/Behavioral Disability
SLI = Speech/Language Impairment
FRL = Free/Reduced-Price Lunch

implies an event dropout rate calculation (i.e., any single instance of dropout within the academic year) and, considering the literature reviewed above in the introduction, includes students enrolling in an alternative degree program (e.g., GED).

Sample 1: Students in general education. Sample 1 represented a cohort of students without an identified disability who remained in a regular education setting for the duration of the 2007-2008 academic year (N=53,407). This sample was limited to any student without a documented primary area of exceptionality, who was not withdrawn from, and who did not drop out of, the regular education setting during the 2007-2008 school year, and who completed more than 75% of the SEI in September 2007. In Sample 1, the proportion of female (52.2%) to male students was nearly even. With regard to broad ethnic categories, the largest proportion of students were identified as White Non-Hispanic (38.9%), whereas 27.1% were identified as Black Non-Hispanic, 18.3% as Hispanic, 12.4% as Asian/Pacific Islander, 3.3% as Multi-Racial, and less than 1% as American Indian/Alaskan Native. With regard to free or reduced-price lunch (FRL) status, the majority of students (63.8%) were identified as ineligible. The distribution of students in Sample 1 was relatively even across grades six (16.9%), seven (17.5%), eight (14.5%), nine (15.7%), and ten (14.6%), with noticeably smaller percentages in grades eleven (11.4%) and twelve (9.1%). The grade level of 149 students (0.3%) was not identified. About one fifth (21.5%) of Sample 1 learned English as a second language.

Sample 2: Students with SLD, EBD, or SLI. To draw a sample representative of students typically assumed to be at a higher than average risk for dropout, Sample 2 (N = 3,406; see Table 2.2) was composed of students belonging to special education categories with longstanding associations with inordinately high dropout rates based on national estimates. This sample was limited to any student completing more than 75% of the SEI in September 2007, who was not

withdrawn from, or who did not drop out of, the general education setting during the 2007-2008 academic year, and who was identified with a primary area of exceptionality of Emotional/ Behavioral Disorder (EBD), Specific Learning Disability (SLD), or Speech-Language

Table 2.2

Description of participants in Sample 2 – Sample sizes and percentages

Demographic Variables		SLD N / %	EBD N / %	SLI N / %
Sample Size (Total N = 3,406)		2,373 / 69.7	625 / 18.3	408 / 12.0
Gender:	Male	1,470 / 61.9	451 / 72.2	261 / 64.0
	Female	903 / 38.1	174 / 27.8	147 / 36.0
Race:	White	823 / 34.7	283 / 45.3	91 / 22.3
	Black	824 / 34.7	217 / 34.7	126 / 30.9
	Hispanic	554 / 23.3	67 / 10.7	138 / 33.8
	Asian/Pac. Islander	89 / 3.8	19 / 3.0	40 / 9.8
	Native American	3 / 0.1	0 / 0.0	0 / 0.0
	Multi-Racial	80 / 3.4	39 / 6.2	13 / 3.2
Primary Lang.:	English	1,869 / 78.8	554 / 88.6	264 / 64.7
	Other	504 / 21.2	71 / 11.4	144 / 35.3
FRL Eligibility:	Ineligible	1,127 / 47.5	321 / 51.4	157 / 38.5
	Eligible	1,246 / 52.5	304 / 48.6	251 / 61.5
Grade Level:	6	460 / 19.4	122 / 19.5	154 / 37.7
	7	434 / 18.3	113 / 18.1	103 / 25.2
	8	395 / 16.6	107 / 17.1	48 / 11.8
	9	444 / 18.7	126 / 20.2	50 / 12.3
	10	330 / 13.9	91 / 14.6	30 / 7.4
	11	204 / 8.6	41 / 6.6	16 / 3.9
	12	106 / 4.5	25 / 4.0	7 / 1.7

SLD = Specific Learning Disability
EBD = Emotional/Behavioral Disability
SLI = Speech/Language Impairment
FRL = Free/Reduced-Price Lunch

Impairment (SLI). The majority of Sample 2 (69.7%) was identified with SLD (N = 2,373), 18.3% was identified with EBD (N = 625), and 12.0% was identified with SLI (N = 408). Similar to national estimates, males (64.1%) represented a notably larger portion of Sample 2. Other proportional differences between Samples 1 and 2 were noted with regard to ethnicity. Specifically, Sample 2 included larger proportions of students identified as Black Non-Hispanic (34.3%), Hispanic (22.3%), and Multi-Racial (3.9%); whereas, Asian/Pacific Islander (4.3%) and White Non-Hispanic (35.1%) students represented smaller proportions in Sample 2. Students identified as American Indian/Alaskan Native (0.1%) were equally proportional across both samples. Also in contrast to Sample 1, just over half (52.9%) of students in Sample 2 were eligible for FRL status. Similarities were also noted between samples. For example, as in Sample 1, students in lower grades represented higher proportions of Sample 2, with typically larger percentages in grades six through ten than in grades eleven and twelve. However, compared with Sample 1, the percentages of Sample 2 students in grades eleven (7.7%) and twelve (4.1%) were considerably smaller, suggesting either that students with EBD, SLI, or SLD are more likely to test out of their special education eligibility after tenth grade, or less likely to remain in the general education setting as they progress through high school, or less likely to drop out. Finally, as with Sample 1, about one fifth (21.1%) of students in Sample 2 spoke a primary language other than English.

Sample 3: Students leaving without a diploma in 2007-2008. Sample 3 was comprised of students who left the regular education setting during the 2007-2008 academic year for unfavorable reasons (N = 953; see Table 2.3). This sample was limited to students completing more than 75% of the SEI in September 2007, who were identified as being withdrawn from or dropping out of the general education setting, whether briefly or indefinitely. Withdrawing from

Table 2.3

Description of participants in Sample 3 – Sample sizes and percentages

Demographic Variables		Reason for Leaving General Education Setting Sample Size / Percentage				
		Marriage/ Parenthood	Expelled/ Suspended	Financial Hardship/ Work	Incarcerated	Alternative Placement
Sample Size (Total N = 953)		7 / 0.7	34 / 3.6	4 / 0.4	18 / 1.9	507 / 53.2
Gender:	Male	0 / 0.0	27 / 79.4	4 / 100	16 / 88.9	374 / 73.8
	Female	7 / 100	7 / 20.6	0 / 0.0	2 / 11.1	133 / 26.2
Race:	White	0 / 0.0	5 / 14.7	2 / 50	3 / 16.7	76 / 15
	Black	0 / 0.0	14 / 41.2	0 / 0.0	13 / 72.2	232 / 45.8
	Hispanic	7 / 100	13 / 38.2	2 / 50	2 / 11.1	167 / 32.9
	Asian/Pac. Islander	0 / 0.0	2 / 5.9	0 / 0.0	0 / 0.0	11 / 2.2
	Native American	0 / 0.0	0 / 0.0	0 / 0.0	0 / 0.0	1 / 0.2
	Multi-Racial	0 / 0.0	0 / 0.0	0 / 0.0	0 / 0.0	20 / 3.9
Language:	English	2 / 28.6	25 / 73.5	2 / 50	17 / 94.4	374 / 73.8
	Other	5 / 71.4	9 / 26.5	2 / 50	1 / 0.6	133 / 26.2
FRL:	Ineligible	1 / 14.3	11 / 32.4	1 / 25	4 / 22.2	153 / 30.2
	Eligible	6 / 85.7	23 / 67.6	3 / 75	14 / 77.8	354 / 69.8
Grade Level:	6	0 / 0.0	2 / 5.9	0 / 0.0	0 / 0.0	52 / 10.3
	7	0 / 0.0	2 / 5.9	0 / 0.0	4 / 22.2	117 / 23.1
	8	0 / 0.0	3 / 8.8	0 / 0.0	2 / 11.1	98 / 19.3
	9	3 / 42.9	16 / 47.1	1 / 25	5 / 27.8	140 / 27.6
	10	1 / 14.3	10 / 29.4	2 / 50	3 / 16.7	67 / 13.2
	11	2 / 28.6	0 / 0.0	1 / 25	4 / 22.2	25 / 4.9
	12	1 / 14.3	1 / 2.9	0 / 0.0	0 / 0.0	8 / 1.6
PAE:	SLD	1 / 14.3	1 / 2.9	0 / 0.0	1 / 0.6	45 / 8.9
	EBD	0 / 0.0	0 / 0.0	0 / 0.0	2 / 11.1	29 / 5.7
	SLI	0 / 0.0	0 / 0.0	0 / 0.0	0 / 0.0	4 / 0.8

PAE = Primary Area of Exceptionality
SLD = Specific Learning Disability
EBD = Emotional/Behavioral Disability
SLI = Speech/Language Impairment
FRL = Free/Reduced-Price Lunch

Table 2.3 continued

Description of participants in Sample 3 – Sample sizes and percentages

Demographic Variables		Reason for Leaving General Education Setting Sample Size / Percentage Low Grades/ Failure	Adult Education	Non- Attendance	Unknown
Sample Size (Total N = 953)		4 / 0.4	112 / 11.8	236 / 24.8	31 / 3.3
Gender:	Male	2 / 50	72 / 64.3	142 / 60.2	16 / 51.6
	Female	2 / 50	40 / 35.7	94 / 39.8	15 / 48.4
Race:	White	1 / 25	37 / 33.0	55 / 23.3	2 / 6.5
	Black	0 / 0.0	33 / 29.5	49 / 20.8	12 / 38.7
	Hispanic	3 / 75	29 / 25.9	98 / 41.5	14 / 45.2
	Asian/Pac. Islander	0 / 0.0	8 / 7.1	25 / 10.6	0 / 0.0
	Native American	0 / 0.0	0 / 0.0	0 / 0.0	0 / 0.0
	Multi-Racial	0 / 0.0	5 / 4.5	9 / 3.8	3 / 9.7
Language:	English	2 / 50	84 / 75	148 / 62.7	24 / 77.4
	Other	2 / 50	28 / 25	88 / 37.3	7 / 22.6
FRL:	Ineligible	3 / 75	53 / 47.3	102 / 43.2	9 / 29
	Eligible	1 / 25	59 / 52.7	134 / 56.8	22 / 71
Grade Level:	6	0 / 0.0	0 / 0.0	6 / 2.5	3 / 9.7
	7	0 / 0.0	0 / 0.0	19 / 8.1	9 / 29
	8	0 / 0.0	1 / 0.9	14 / 5.9	7 / 22.6
	9	1 / 25	31 / 27.7	57 / 24.2	2 / 6.5
	10	0 / 0.0	36 / 32.1	63 / 26.7	4 / 12.9
	11	3 / 75	31 / 27.7	47 / 19.9	2 / 6.5
	12	0 / 0.0	13 / 11.6	30 / 12.7	4 / 12.9
PAE:	SLD	0 / 0.0	10 / 8.9	5 / 2.1	0 / 0.0
	EBD	0 / 0.0	6 / 5.4	4 / 1.7	0 / 0.0
	SLI	0 / 0.0	0 / 0.0	2 / 0.8	0 / 0.0

PAE = Primary Area of Exceptionality
SLD = Specific Learning Disability
EBD = Emotional/Behavioral Disability
SLI = Speech/Language Impairment
FRL = Free/Reduced-Price Lunch

the regular education setting included being transferred to an alternative placement, which constituted just over half of the sample (53.2%). The remainder of Sample 3 was identified as being withdrawn from, or dropping out of, the general education setting for a variety of reasons: about one fourth were removed from enrollment records for non-attendance; about 2% were removed for incarceration; 3.6% were expelled or suspended; 11.8% left to enroll in an adult education curriculum; 3.3% left for unknown reasons; and very small proportions left for reasons related to marriage or parenting (<1%), financial hardship (<1%), joining the workforce or military (<1%), or low grades or failure (<1%). Compared with Samples 1 and 2, marked differences were noted in Sample 3 demographic proportions. For example, males constituted over two thirds (68.5%) of Sample 3. Black Non-Hispanic and Hispanic students (37% and 35.2%, respectively) represented much larger proportions than in Samples 1 or 2, whereas White (19%) and Asian (4.8%) students were underrepresented. Proportionally, more students in Sample 3 were eligible for FRL (64.6%) than in Samples 1 or 2. Furthermore, whereas students with a primary exceptionality of SLD, EBD, or SLI represented 6.1% of the entire population of students included in this study (i.e., 3,516 out of 57,766 students), the ratio of these students to the whole was almost twice as large within Sample 3 (i.e., 110 out of 953 students, or 11.5%). Regarding grade level, most students in Sample 3 were high-schoolers, with the largest proportions in grades nine (26.9%) and ten (19.5%). Just over one third of Sample 3 consisted of middle schoolers (i.e., grades 6 to 8). Notably, when comparing specific categories more representative of dropout (i.e., marriage, financial hardship/work, incarceration, low grades/failure, adult education) to categories less representative of indefinite withdrawal from the general education setting (i.e., alternative placement, expulsion/suspension, non-attendance, unknown), the majority of middle schoolers in Sample 3 fell into categories more closely related

to the latter. For example, 83.4% of the middle schoolers in Sample 3 were identified as being transferred to an alternative placement; whereas, only 39% of high schoolers – half of which were ninth graders – fell into this category. Similar to national trends, compared with Sample 1 or 2, a larger portion of Sample 3 spoke a primary language other than English.

Data Screening and Preparation

Missing values and case exclusions. Prior to conducting analyses, several actions were taken to screen and organize the provided data used in this study. First, though there is no well-established method for determining whether data are missing at random (Weston & Gore, 2006), attempts were made to uncover evidence of any systematic patterns of missing response values on the SEI. Separate two-way contingency table analyses of whether data were missing within an item (coded NO = 0, YES = 1) according to gender, grade level, ethnicity, native language, free/reduced-price lunch eligibility, and primary area of exceptionality revealed no significant correlations between group factors and missing values for each item on the SEI (all computed phi coefficients < |.08|). Furthermore, mean differences of missing value sums were examined through one-way analyses of variance (ANOVA) using the same between-subjects factors as above. A main effect was discovered for ethnicity ($F(5, 60{,}029) = 14.186$, $p < .01$) , and post hoc comparisons using Dunnett's C test revealed that the average sum of missing values for White respondents differed significantly from that of Black and Hispanic respondents, and the average sum of missing values for Black respondents differed significantly from that of Asian and Hispanic respondents; however, the partial eta for this effect indicated that the relationship between ethnicity and the sum of missing values was not of practical significance (partial $\eta^2 = .003$). No other categorical main effects were observed. Given the above findings, it was

concluded that there was not substantial evidence to suggest the existence of systematically missing responses to items on the SEI within the response data.

Next, in order to avoid missing value substitution for cases with unreasonably large sums of missing responses, a threshold of missing responses by case was arbitrarily set for inclusion in the study. Specifically, students with fewer than 25 of 33 SEI items completed (i.e., students who completed < 75% of the survey) were excluded from further analyses, which came to a total of 439 students, less than 1% of the cases included in the initial dataset. With regard to other case selection criteria, to better address the research questions, students were excluded from further analyses if they were identified with a primary area of exceptionality that was (a) not historically or demographically associated with high risk for dropout, (b) representative of a potentially severe developmental or medical disability, or (c) not of an adequately representative sample size. Specifically, cases who were identified with Autism (n = 189), Traumatic Brain Injury (n = 16), Intellectual Disability (n = 136), Orthopedic Impairment (n = 27), Visual Impairment (n = 15), Other Health Impairment (n = 1,390), or identified as Deaf or Hearing Impaired (n = 53), or as enrolled in a Psychoeducational Program (n = 4), were subtracted from the dataset. These students represented 34.7% of the sample of students in special education and 3.1% of the total sample. Before missing value substitution was completed, the three samples described above were created in preparation for analysis. The missing responses within each sample were then substituted with the median values of the respective items within each sample. Of the 1,906,278 total expected responses in the dataset (57,766 participants * 33 items), 5,362 responses were missing and subsequently replaced, which constituted less than 1% of the total response data.

Central tendency, distribution, and outliers. Spread and distribution of item responses on the SEI were examined for each sample prior to analysis to screen for items with abnormal distributions and outliers. The mean, standard deviation, skew, and kurtosis for items across each sample can be found in Appendix A. Using criteria of ≥ 3.0 for skew and ≥ 8.0 for kurtosis (Kline, 2005), no items in any of the samples demonstrated evidence of being extremely skewed or kurtotic. While nearly all items were negatively skewed, most items were positively kurtotic. Respectively, skew and kurtosis ranged from -2.227 to -.231 and from -0.615 to 5.623 for Sample 1; from -1.666 to 0.040 and from -0.938 to 3.350 for Sample 2; and from -1.565 to 0.267 and from -.990 to 2.605 for Sample 3.

Each sample was screened for outliers by examining Mahalanobis squared distances (D^2) for each respondent. For Sample 1, comparing distances to a conservative critical F (.01/n) level of 91.81, 1,048 outliers (2.0% of the sample) were identified with D^2 values ranging from 91.84 to 289.74. In Sample 2, 86 outliers (2.5%) were identified (F = 82.87) with D^2 values ranging from 83.59 to 178.58. Among Sample 3 students, there were 33 outliers (3.5%) compared to a critical F of 77.54, with D^2 values ranging from 77.69 to 132.10. All outliers were included in the analyses to avoid excluding participants that may represent valid response styles of those at more extreme points on a continuum of student engagement.

Measure

The Student Engagement Instrument. The Student Engagement Instrument (SEI) is a 33-item survey that was designed to measure a student's self-perception of their cognitive and affective engagement in school (Appleton et al., 2006). Administration of the SEI includes standardized procedures, such as oral administration to limit unwanted effects from differing reading levels among students. The SEI measures five facets of cognitive and affective student

engagement, namely: Teacher-Student Relationships (TSR), Control and Relevance of School Work (CRSW), Peer Support for Learning (PSL), Future Aspirations and Goals (FG), and Family Support for Learning (FSL). TSR, PSL, and FSL were formulated to measure aspects of affective engagement, whereas CRSW and FG are related to cognitive engagement. The scale uses a four-point scale ranging from 0 = Strongly Disagree to 4 = Strongly Agree, and it is coded so that higher scores signify higher levels of engagement.

For more detailed information about the development and psychometric properties of the SEI, please refer to the discussion of it above in the Introduction, or to Appleton et al. (2006) and to Betts et al. (in press). For reference throughout the remainder of this study, the items on the SEI, their corresponding item numbers, and their factor loadings as reported by Betts et al. are presented in Appendix B. Items 18 and 32 were on the SEI at the time the respondents completed it in Fall 2007; however, these items were subsequently removed and therefore were not included in the analyses.

Analytic Method for SEI Model Goodness-of-Fit

The goodness-of-fit of the SEI Five-Factor Model for general and higher risk students was investigated through a step-wise procedure. First, a confirmatory factor analysis (CFA) was conducted on Sample 1 response data to investigate the assumption of model fit of the five-factor structure with a general education population. Next, two separate CFAs were conducted on student responses for Samples 2 and 3 to test SEI Five-Factor Model fit with (a) students with SLD, EBD, or SLI and (b) students who were withdrawn from, or who dropped out of, the general education setting during the 2007-2008 academic year. If any of the above steps indicated clear evidence of poor fit with any sample's data, alternative factor structures for that population would then be investigated through exploratory factor analysis (EFA) procedures.

Because EFAs would be performed only to investigate potential reasons of poor fit found by CFAs, it was deemed unnecessary to take precautions to avoid conducting CFAs and EFAs using the same students' responses (see Hurley et al., 1997); therefore, CFAs were conducted using the entire set of response data for each sample.

Although items using Likert-style response options, like those used on the SEI, are often treated as continuous variables in factor analysis studies, it is commonly recommended to avoid assumptions of multivariate and univariate normality when factor analyzing non-continuous data (Berstein & Teng, 1989; Muthén & Kaplan, 1985; Nunnally & Bernstein, 1994); therefore, an item level factor analytic approach was used in all factor analyses involved in this study (Panter, Swygert, Dahlstrom, & Tanaka, 1997), in which SEI item responses were analyzed as ordered categorical variables. The polychoric correlation matrix used in the following factor analyses is available from the author upon request. In addition, prior to conducting factor analyses, to assess internal consistency, coefficient alphas (α) were computed for SEI scaled scores and each subscale score across all three samples.

Analytic Method for SEI Associations with Behavioral Indicators

Relative risk. Although previously conducted factor structure analysis results lend credence to the construct validity of the SEI (Appleton et al., 2006; Betts et al., in press), small correlations between SEI factors and outcome variables of interest raise questions about the concurrent and predictive validity of the SEI. As an alternate method of further investigating such relationships, the associated relative risk between SEI total scores and unfavorable educational outcomes were examined. Relative risk (RR), similar to the odds ratio (OR), is an effect size estimate commonly used in epidemiology studies to measure the association between a risk factor and the cumulative incidence of an unfavorable outcome (Fleiss, Levin & Paik,

2003; Sistrom & Garvan, 2004). While ORs compare the relative *odds* (e.g., 2 to 1 vs. 5 to 2) of an event occurring in one group as opposed to another, RR ratios compare the relative *rates* or *probability* (e.g., 33% vs. 58%) of the event in each group, allowing for a more intuitive interpretation. Because the data in the present study allowed for a retrospective cohort design, RR ratios could be computed to assess the degree of association between a binary grouping factor (e.g., low SEI total score: Y=1, N=0) and the cumulative incidence of an adverse educational outcome, such as dropout (Sistrom & Garvan, 2004). RR was chosen over the perhaps more commonly used phi coefficient, because: (a) it was assumed that these correlations would be small, as in the correlational study by Appleton et al. (2006), and (b) the phi coefficient's basis on the chi square statistic causes it to lack invariance across sampling methods, unlike ORs and RR ratios, which tend to remain consistent independent of sampling method (Fleiss et al., 2003).

To assess the statistical significance of RR ratios, 95% Confidence Intervals (CIs) were computed for each RR ratio using formulas described by Medina & Zurakowski (2003). RR ratios with CIs that did not include 1.0 were interpreted as being statistically significantly different ($p < .05$). The formulas used to calculate RR and 95% CIs for RR are shown in Figure 2.1 below.

To investigate predictive convergent validity, RR was computed for the cumulative incidence of each unfavorable outcome (i.e., dropout, withdrawing or dropping out, and failure to pass required annual reading and math achievement tests) among students whose SEI total scores were at or below the 5^{th} percentile versus those whose scores were above the 5^{th} percentile. Divergent predictive validity was investigated by computing the RR for the presence of each unfavorable outcome among students whose SEI total scores were at or higher than the 95^{th}

percentile versus those who scored below it. Additionally, to compare the degree of these associations over that of readily available data, the RR was computed for the cumulative incidence of each unfavorable outcome among students identified with a known status risk factor based on district demographic data (i.e., SLD or EBD classification).

RR

$$RR = \frac{A/(A+B)}{C/(C+D)}$$

RR 95% CI

$$95\%\ CI\ Lower\ Limit = e^{ln(RR)-\left[1.96\sqrt{\frac{1}{A}+\frac{1}{B}+\frac{1}{C}+\frac{1}{D}}\right]}$$

$$95\%\ CI\ Upper\ Limit = e^{ln(RR)+\left[1.96\sqrt{\frac{1}{A}+\frac{1}{B}+\frac{1}{C}+\frac{1}{D}}\right]}$$

Where A, B, C, and D correspond to cells A through D in the 2 x 2 contingency table below, in which each cell represents the number within the total sample meeting cell criteria:

		Adverse Outcome: Yes	Adverse Outcome: No
Explanatory Variable	Present	*A*	*B*
	Absent	*C*	*D*

Figure 2.1. *Relative risk ratio and 95% Confidence Interval formulas*

Excess risk. Next, another measure of degree of association was computed to address limitations associated with RR ratio interpretation. Specifically, because the RR ratio does not take the levels of rates into account, which could potentially lead to an overestimation of the magnitude of an association if overall differences of proportion are not also considered (Berkson,

1958; Feinstein, 1973), Shep's estimate of excess risk, as described by Fleiss et al. (2003), was computed to provide a clearer picture of the practical magnitude of the SEI's association with withdrawing and dropping out.

Conditional probability. Finally, in an effort to explore trends found in the RR ratio analyses from an alternate perspective, conditional probabilities were computed for students' percentile rankings given the presence or absence of various indicators of behavioral disengagement. Conditional probability (Fleiss et al., 2003) refers to the chances that an individual possesses characteristic *X* (e.g., SEI score below the 5th percentile) given that he or she also has characteristic *Y* (e.g., received 2 or more disciplinary referrals during the fall semester). Although such measures of association, commonly referred to as sensitivity and specificity, are typically used in the evaluation of screening instruments (Fleiss et al., 2003), these conditional probabilities were computed in the present study as an alternative means of investigating the consistency of the trends suggested in the relative risk analyses above.

In order to compare conditional probabilities between groups within specific grade levels, SEI Total Score percentile cutoffs were computed separately for each grade used in this analysis based on the specific norms for each grade. For example, the percentile cutoff scores for grade 8 were computed using the responses of all students in that grade only, while percentiles for grade 12 were computed using the response data of all twelfth graders. Using grade-specific norms, rather than comparing student scores to the entire 6th through 12th grade population norms, allowed specific group conditional probabilities to be compared to those that would be expected to occur for randomly selected individuals in that grade by chance alone. For instance, if there were no relationship between SEI scores and an indicator of behavioral disengagement like numerous discipline referrals, then the conditional probability of a student scoring in the lower

5th percentile given the presence of many referrals should approach .050, that is, the probability that a student within a group would self-report below the 5th percentile by chance alone. However, since it is expected that indicators of behavioral engagement would correlate with cognitive and affective engagement, it is reasonable to anticipate that the proportion of students with many discipline referrals scoring in the lower 5th percentile would noticeably and consistently exceed .050 across a variety of indicators of behavioral disengagement. Likewise, if such a relationship were consistent, it would be reasonable to expect that students with many discipline referrals would furthermore be underrepresented in the higher percentile ranks. That is, while 5.0% of students with many referrals would be expected to fall above the 95th percentile by chance alone, a significantly smaller percentage than 5.0%, along with similar trends at other percentile rankings, would suggest consistency in the associations between indicators of behavioral disengagement and the extremes of SEI scores.

Regarding the composition of samples used in the above three methods of studying degrees of association, in the RR analyses, to better approximate an actual district-wide screening scenario, Samples 1, 2, and 3 were combined into one group (N = 57,766) and analyzed without median substitution for missing values. In the excess risk analysis, for purposes of enhanced interpretability, 1,000 students were randomly selected both from the entire pool of students who scored at or below the 5th percentile on the SEI and the entire pool of students who scored above the 5th percentile. Finally, in the conditional probability analyses, for convenience of comparison and to avoid potential confounding effects from extreme disparities in sample size, a random sample equal in size to the group demonstrating behavioral disengagement was drawn from the whole of each of the comparison groups, which tended to number in the tens of thousands.

CHAPTER 3: RESULTS

Internal Consistency

To estimate how well items hung together overall on the SEI, as well as within each of the five factors, coefficient alphas (α) were computed across samples for the SEI Total Score and for each SEI subscale (i.e., TSR, CRSW, PSL, FG, and FSL). The results of these reliability estimates are summarized below in Table 3.1. Overall, internal consistency was best for the SEI Total Score (range α = .91 - .92), while each subscale also demonstrated acceptable to good reliability for each sample (subscale range α = .75 to .88). These results are similar to those found by Appleton et al. (2006), suggesting good reliability across groups for the Total Score and most subscales.

Table 3.1
Internal consistency estimates for SEI Total Score and subscales by sample

	coefficient alpha (α)		
Scale	Sample 1	Sample 2	Sample 3
SEI TS	α = .92	α = .92	α = .91
TSR	α = .88	α = .87	α = .86
CRSW	α = .81	α = .81	α = .80
PSL	α = .82	α = .82	α = .78
FG	α = .80	α = .78	α = .83
FSL	α = .77	α = .75	α = .78

SET TS = SEI Total Score
TSR = Teacher-Student Relationships
CRSW = Control & Relevance of Schoolwork
PSL = Peer Support for Learning
FG = Future Goals & Aspirations
FSL = Family Support for Learning

SEI Five-Factor Model Goodness-of-Fit

Confirmatory factor analyses. The SEI Five-Factor Model was tested for model fit through CFAs using item polychoric correlations from the response data for each sample. As recommended by Kline (2005), the following fit indexes were computed to interpret the results of CFA with each sample: the model chi-square, the root mean square error of approximation (RMSEA) with its 90% confidence interval, the comparative fit index (CFI), and the standardized root mean square residual (SRMR). The fit indexes for Samples 1 through 3 are reported in Table 3.2 below. The chi-square values for the models were significant in each sample, indicating failure to reject the null hypothesis that the model is a perfect fit in the population. However, as chi-square is substantially affected by sample size (Kline, 2005), little weight should be placed on this finding given the large samples involved. The RMSEA values for each sample fit criteria of less than .08 for reasonable error of approximation (Browne & Cudeck, 1993), suggesting reasonable model fit. Furthermore, the upper bound of the 90% CI for each sample's RMSEA does not exceed .08, suggesting that the null hypothesis of poor model fit can be rejected. The CFI values for each sample all were equal to or greater than .95, where values greater than .90 may indicate reasonably good model fit to the data (Hu & Bentler, 1999). Using a criterion of less than .10 (Kline, 2005), the SRMR values for each sample, which ranged from 0.053 to 0.061, suggest good model fit to the data. Overall, fit index results did not suggest poor fit of the SEI Five-Factor Model for Samples 1, 2, or 3. Given these results, for the remainder of the study, SEI scores were considered reasonably interpretable for students belonging to specific categories associated with higher risk for dropout (i.e., students with EBD, SLD, or SLI, and students who later left or dropped out of the general education setting).

Table 3.2

SEI Five-Factor Model fit indexes for each sample

Sample	*n*	χ^2	*df*	RMSEA	90% CI for RMSEA	CFI	SRMR
1	53,407	108333.74	485	0.069	0.068-0.069	0.97	0.054
2	3,406	6162.50	485	0.062	0.061-0.063	0.97	0.050
3	953	2648.44	485	0.072	0.070-0.075	0.95	0.061
Recommended values:		*near 0.0*		*<.08*[1]		*>.90*[2]	*<.10*[3]

*$p<.001$; χ^2 = chi-square; *df* = degrees of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; SRMR = standardized root mean square residual; (1) Browne & Cudeck, 1993; (2) Hu & Bentler, 1999; (3) Kline, 2005

Degree of Association with Behavioral Indicators of Disengagement

Relative risk ratio analyses. Relative risk (RR) ratios for the cumulative incidence of adverse outcomes were computed using two potential risk factors and one potential protective factor to investigate predictive convergent and divergent validity of the SEI. Results of RR analyses are presented in Table 3.3. RR ratios indicated that each investigated risk/protective factor demonstrated a considerable degree of association with each adverse outcome of interest in its expected direction, as well as evidence of statistical significance ($p < .05$). Specifically, students whose self-ratings resulted in an SEI Total Score at or below the 5th percentile in September 2007 were 3.7 times more likely to later leave the general education setting during the 2007-2008 school year than students with scores higher than the 5th percentile. Furthermore, they were 2.3 times more likely to drop out, as well as 2.5 and 1.4 times more likely, respectively, to fail state reading and math achievement tests taken later in Spring 2008. Regarding evidence of predictive divergent validity, SEI Total Scores at or higher than the 95th percentile were inversely associated with unfavorable outcomes, demonstrating potential as a protective factor. For example, the risk of leaving in 2007-2008 was 5 times less (RR = 0.2) for

students who indicated student engagement in the extremely high range in September 2007, as opposed to students who scored below the 95th percentile. Finally, students identified with EBD or SLD as a primary area of exceptionality were more likely to leave or drop out (RRs = 2.3, 1.8) and far more likely to fail Spring 2008 state reading and math standardized achievement tests (RRs = 7.3 and 4.2, respectively) than the rest of the student population. Thus relative risk for indicators of withdrawal and dropout was highest for students self-reporting in the extremely low ranges of student engagement, and relative risk for poor standardized achievement was greatest for students with a known status risk factor. Overall, results suggested a strong degree of association between the extreme poles of SEI scores and future educational outcomes of interest, providing supporting evidence of both the convergent and divergent validity of the SEI.

Table 3.3
Relative risk ratios (RR) and 95% Confidence Intervals (CI)

	Adverse Outcome			
Risk/Protective Factor	Leave	Dropout[a]	Fail CRCT RD[b]	Fail CRCT MA[b]
SEI TS ≤ 5%ile	3.7* (CI: 3.1–4.5)	2.3* (CI: 2.2–3.3)	2.5* (CI: 1.9–3.3)	1.4* (CI: 1.1–1.8)
SEI TS ≥ 95%ile	0.2* (CI: 0.1–0.4)	0.3* (CI: 0.1–0.8)	0.6* (CI: 0.4–0.9)	0.7* (CI: 0.6–0.9)
EBD or SLD	2.3* (CI: 1.9–2.8)	1.8* (CI: 1.2–1.6)	7.3* (CI: 6.3–8.5)	4.2* (CI: 3.7–4.7)

[a]only 9th–12th grade cohort examined
[b]only 6th–8th grade cohort examined
*statistically different at the .05 level of significance

Excess risk analyses. Shep's model of excess risk, as described by Fleiss et al. (2003), was used to investigate the relative difference in risk between students with very low scores on the SEI (i.e., at or below the 5th percentile) and students scoring above the 5th percentile.

Computed results indicated that out of 1,000 randomly selected ninth through twelfth grade students who self-reported engagement levels below the 5th percentile, 18 were withdrawn for transfer to an alternative setting and 32 dropped out. In contrast, out of 1,000 randomly selected students self-reporting levels above the 5th percentile, only 8 were withdrawn, and only 12 dropped out. A comparison of these rates suggested that the excess risk for dropout for high schoolers scoring at or below the 5th percentile on the SEI is 20 per 1,000 high schoolers (i.e., 32 minus 12. In other words, although the dropout rates are clearly low in this population, the risk of leaving school for unfavorable reasons was notably higher among high school students whose SEI scores were suggestive of normatively low levels of cognitive and affective engagement compared to students with high SEI scores.

Table 3.4
Excess risk analysis results: Transfer and dropout rates per 1,000 students

Outcome	SEI TS ≤ 5%ile	SEI TS > 5%ile	p_e (per 1,000)
Transferred to Alternative School[a]	18	8	10
Dropout[a]	32	12	20

[a]only 9th–12th grade cohort examined

Conditional probabilities analyses. The results of the conditional probabilities analyses, as summarized below in Table 3.5 and Figures 3.1 through 3.3, revealed several consistent trends that supported the findings observed in the relative risk ratio analysis. In each of the groups that were considered to be demonstrating signs of behavioral disengagement (i.e., twelfth graders with 3 or more absences, ninth graders with 2 or more disciplinary incidents, and eleventh

graders who dropped out), the conditional probability of a self-reported SEI score falling below the 5th and 10th percentiles was more than double the probability that would be expected to occur by chance alone. Furthermore, in each of the behaviorally disengaged groups in all examples of disengagement, the chances of self-reporting above the 90th and 95th percentiles were consistently lower that would be expected to occur by chance alone. In contrast, among students considered not to be evidencing indicators of behavioral disengagement, conditional probabilities tended to closely resemble chance alone probabilities, save for the group of 11th graders that did not drop out. Although the pattern was very slight, for these students, the conditional probability of scoring below the 5th and 10th percentiles was less than expected, while higher than expected for scoring above the 90th and 95th percentiles, suggesting an inverse pattern of conditional probabilities to that observed within 11th graders who did drop out.

Table 3.5

Conditional probabilities of SEI scores falling within given percentile ranks

Grouping Variable	Below 5th percentile	Below 10th percentile	Above 90th percentile	Above 95th percentile
Probability by chance alone:	.050	.10	.10	.05
≥3 absences[a] (N = 123)	.098 N = 12	.220 N = 27	.016 N = 2	.008 N = 1
<3 absences[a] (N = random 123 from 4,921)	.050 N = 6	.098 N = 12	.081 N = 10	.041 N = 5
≥2 incidents[b] (N = 137)	.190 N = 26	.270 N = 37	.036 N = 5	.022 N = 3
<2 incidents[b] (N = random 137 from 9,111)	.022 N = 3	.109 N = 15	.124 N = 17	.051 N = 7
Dropped out[c] (N = 88)	.125 N = 11	.216 N = 19	.023 N = 2	.011 N = 1
Did not drop out[c] (N = random 88 from 6,435)	.034 N = 3	.057 N = 5	.125 N = 11	.091 N = 8

[a] = among students in grade 12
[b] = among students in grade 9
[c] = among students in grade 11

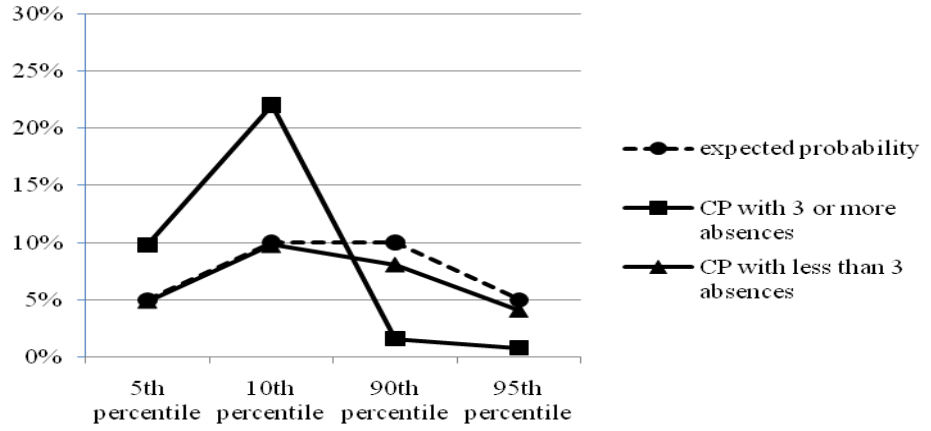

Figure 3.1. *Chance vs. conditional probability of SEI score distributions among twelfth graders by number of absences within the first 20 days of the fall 2007 semester*

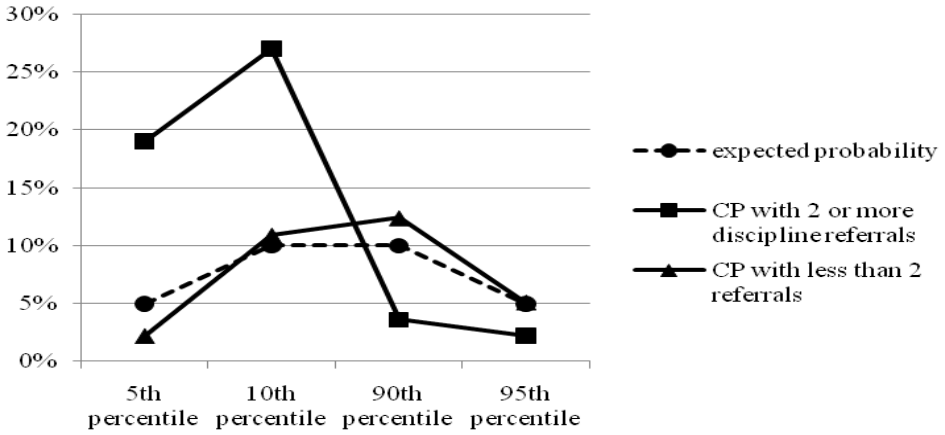

Figure 3.2. *Chance vs. conditional probability of SEI score distributions among ninth graders by number of disciplinary incidents during the fall semester 2007*

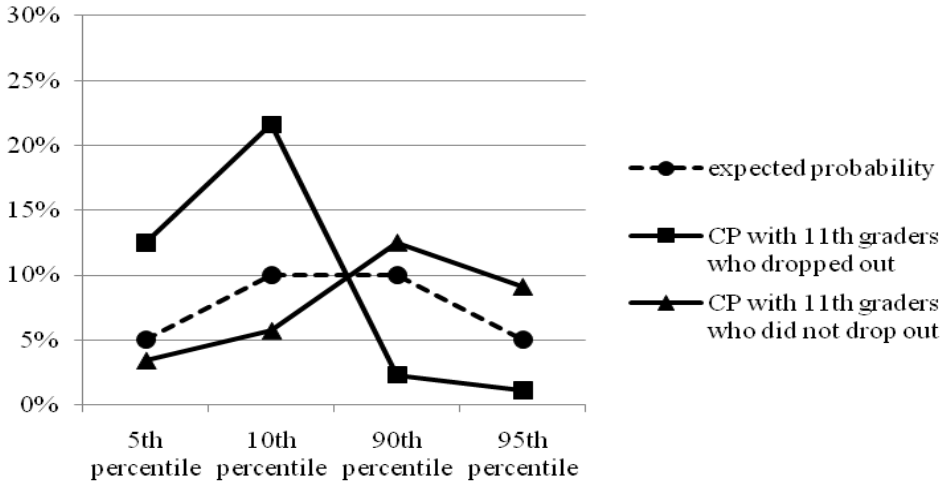

Figure 3.3. *Chance vs. conditional probability of SEI score distributions among eleventh graders by dropout status within the 2007–2008 school year*

CHAPTER 4: DISCUSSION

Dropout remains a problem in the United States, particularly for specific at-risk demographics and locales, and it has a substantial and detrimental impact on individuals and society. Still, research suggests dropout prevention is possible, and evidence points to using systematic, evidence-based programs that begin early and last through graduation (e.g., Check and Connect, see Sinclair et al., 1998). Early screening is a necessary component of such programs, but no single variable predicts dropout well on its own. Nevertheless, accuracy improves in dropout risk detection through the use of multiple risk/protective factor models. The factors used in these models can be organized into status or alterable variables, that is, according to their degree of susceptibility to change in the environment. Alterable risk/protective factors, which refer to those that are more amenable to change, are primarily the points of focus in effective dropout prevention programs.

Student engagement is an alterable variable with the potential to improve the accuracy of risk detection. Generally, student engagement is considered to be multifaceted; for instance, Fredricks et al. (2004) described it as consisting of behavioral, cognitive, and affective factors. Most studies and measures of engagement involve behavioral indicators, but although more covert and thus more difficult to measure, cognitive and affective indicators of student engagement may have a distinct or additive value if incorporated into multiple factor risk detection models. In order to investigate such possibilities, however, the construct validity of measures of cognitive and affective engagement must be sufficiently substantiated.

The purpose of the present study was to investigate the construct validity of the Student Engagement Instrument (SEI), a self-report questionnaire developed by Appleton et al. (2006) to measure cognitive and affective student engagement. Previous studies of the SEI have investigated – with promising results – its internal consistency, latent factor structure, the measurement invariance of its five-factor structure across grades 6 through 12, and the magnitude and pattern of its correlations with various educational variables (Appleton et al., 2006; Betts et al., in press). However, use of the SEI with more specific populations, such as students at risk of dropping out, has not been investigated. Furthermore, Appleton et al. reported low correlations between SEI factors and educational variables like grade point average and amount of disciplinary referrals, which threatens confidence in the construct validity of the SEI as a valid measure of cognitive and affective engagement. With these points in mind, the present study investigated, through confirmatory factor analysis (CFA), the use of the SEI with various populations considered to be at-risk for school dropout and failure. Furthermore, through statistical methods for rates and proportions (i.e., relative risk (RR) ratio, excess risk, and conditional probabilities), the degree, direction, and consistency of associations between SEI scores and behavioral indicators of disengagement were examined.

Results of CFAs suggested reasonable evidence of fit of SEI Five-Factor Model to the response data of all groups studied: (a) Sample 1, students in the general education population, (b) Sample 2, students with high incidence disabilities commonly associated with increased risk for dropout and academic failure, and (c) Sample 3, students who in fact subsequently transferred to an alternative school or dropped out at any point during the 2007-2008 academic year. The statistics of model fit were strongest for Samples 1 and 2, and were less robust yet demonstrated acceptable fit for Sample 3.

RR ratios of the cumulative incidence of various adverse outcomes (e.g., dropout, failure to pass statewide reading exam) were indicative of considerable, consistent, and statistically significant associations in expected directions between extreme scores on the SEI and indicators of behavioral disengagement. For instance, students in grades 9 through 12 self-reporting in the lower extremes (below the 5th percentile) on the SEI were 2.3 times more likely to drop out than the rest of the student population, while those scoring above the 95th percentile were 3.3 times less likely to drop out than the rest of the population. Furthermore, the degree of association between SEI scores and subsequent dropout appeared stronger than that of a status variable with national and local demographic associations to dropout, that is, students who were identified as having an SLD or EBD as a primary area of exceptionality. By the same token, an SLD or EBD status was found to be more strongly associated with failure of later statewide reading and math testing than were SEI scores.

An analysis of the excess risk further demonstrated that greater risk to high school students for leaving for unfavorable reasons and/or dropout was associated with extremely low SEI scores (below the 5th percentile). In contrast to the RR ratio analyses, however, the findings in the excess risk analyses showed more clearly that when comparing SEI scores below the 5th percentile to those above it, although excess risk was associated with the low percentile scores, the difference in risk was small, which unfortunately may be in large part an artifact of a very low dropout rate in demographics used in this study. For instance, since the risk of dropout associated with scoring below the 5th percentile was 32 in 1,000 students (3.2%) and the risk of dropout associated with scoring above the 5th percentile was 12 in 1,000 (1.2%), the excess risk of dropout was 20 in 1,000 students, a difference of only 2%.

Finally, in comparisons of various conditional probabilities, consistent trends were indicated that supported the findings observed in the RR ratio analyses. That is, in each group demonstrating signs of behavioral disengagement (e.g., students in grade 9 with 2 or more disciplinary incidents), the conditional probability of a self-reported SEI score falling below an extremely low percentile rank was consistently more than double what would be expected to occur by chance alone. Additionally, the reverse was true for higher percentiles. That is, for these same behaviorally disengaged groups, the probability of self-reported SEI scores falling above upper percentiles was consistently lower than expected. Whereas, for the group of students considered not to be showing signs of behavioral disengagement, in general, conditional probabilities of scoring at each studied percentile rank tended to resemble what would occur by chance alone. That is, except for the group of eleventh graders who were being compared to those who dropped out, for whom an inverse relationship was observed instead. That is, although slight, the probability of these "non-dropouts" having self-reported below the 5^{th} and 10^{th} percentiles was consistently less than what would occur by chance, while their probability of scoring above the 90^{th} and 95^{th} percentiles was consistently slightly higher than what would be expected by chance.

Implications

The results found in this study suggest that greater confidence may be placed in the interpretation of SEI scores, both for general populations and when used to assess the cognitive and affective engagement levels of students who are considered to be in the process of disengaging from school. That is, findings that the proposed SEI Five-Factor Model fits well with a general student population of sixth to twelfth graders were replicated. More importantly, the same model reasonably withstood the scrutiny of confirmatory factor analysis using the data

of two distinct at-risk groups. Furthermore, while the strength of associations between SEI scores and indicators of behavioral engagement/disengagement may not be considered strong, when focusing on the extreme poles of the engagement continuum, these associations were consistently found to be in expected directions and statistically significant. Such findings may suggest potential in including the SEI, or other reliable and substantiated measures of cognitive and/or affective engagement, in multifactor risk identification model efforts.

Limitations and Future Directions

The retrospective, correlational nature of the methods employed in this study precludes any conclusions regarding causal relationships among any of the variables studied (Campbell & Stanley, 1963). Furthermore, although attempts were made to expand generalizability by studying degrees of association using a variety of methods, variables, and demographic groups, further generalizations to non-representative populations may be unfounded.

Another primary limitation of this study was the low rate at which nearly all of the behavioral indicators of disengagement occurred in the population under study. For example, in the analysis of excess risk, the small difference in proportions of risk (i.e., 2%) found between comparison groups suggested limited practical value, for instance, of using the SEI to screen for dropout risk. Clearly, such evidence is inconclusive, however, due to the low dropout rate in the school district studied. That is, if the same RR ratios were found in a district with an extremely high dropout rate, the excess risk associated with self-reporting extremely low SEI scores could be found to be substantial. Future studies should attempt to incorporate data from districts with very high rates of behavioral disengagement (e.g., dropout rates approaching 30%) to allow for more conclusive evidence.

Another notable limitation involved assumptions not addressed by the CFA methods employed in this study. That is, the model fit indexes used to assess SEI Five-Factor Model fit on various group provided an indication of only the overall fit of the model, not of specific parts of the model. Therefore, it is possible that individual aspects of the Five-Factor Model, such as specific item loading pathways, were actually a poor fit to the data used, even though favorable results were demonstrated by all indexes included (Kline, 2005; Tomarken & Waller, 2003). Confidence in the construct validity of the SEI would be enhanced by supportive evidence in future studies investigating the measurement invariance of the SEI across various typical and at-risk student populations.

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APPENDICES

Appendix A

Mean, standard deviation, skew, and kurtosis for SEI items across samples

	Sample 1				Sample 2				Sample 3			
Item	$\bar{x}$	σ	Sk	Ku	$\bar{x}$	σ	Sk	Ku	$\bar{x}$	σ	Sk	Ku
1.	3.65	.558	-1.52	2.41	3.61	.595	-1.58	3.00	3.43	.692	-1.22	1.62
2.	2.64	.709	-.38	.01	2.67	.732	-.34	-.05	2.45	.799	-.28	-.54
3.	3.08	.664	-.58	.96	3.12	.716	-.72	.84	2.78	.806	-.68	.19
4.	3.23	.677	-.76	1.05	3.13	.777	-.82	.61	3.14	.774	-.79	.52
5.	2.84	.775	-.50	1.00	2.83	.830	-.49	-.17	2.46	.882	-.22	-.76
6.	3.04	.712	-.61	.64	2.87	.784	-.56	.16	2.86	.797	-.56	.10
7.	3.02	.731	-.55	.335	2.89	.792	-.49	-.03	2.83	.794	-.46	-.06
8.	3.68	.540	-1.68	3.08	3.56	.635	-1.47	2.29	3.47	.709	-1.36	1.80
9.	3.02	.766	-.50	-.01	3.13	.745	-.69	.42	2.80	.874	-.44	-.41
10.	2.51	.852	-.23	-.62	2.35	.938	.04	-.94	2.07	.887	.27	-.93
11.	3.67	.561	-1.65	2.70	3.51	.666	-1.29	1.44	3.26	.774	-.94	.60
12.	3.34	.724	-.93	.57	3.27	.766	-.90	.47	3.00	.840	-.60	-.15
13.	2.71	.770	-.30	-.19	2.79	.790	-.42	-.11	2.39	.855	-.01	-.68
14.	2.81	.708	-.54	.46	2.70	.792	-.44	-.14	2.72	.825	-.46	-.21
15.	3.18	.654	-.53	.64	3.13	.682	-.61	.75	2.93	.745	-.58	.42
16.	3.05	.711	-.59	.58	3.05	.797	-.67	.20	2.73	.836	-.50	-.21
17.	3.76	.505	-2.23	5.62	3.60	.631	-1.67	2.88	3.40	.750	-1.20	1.13
19.	3.65	.565	-1.57	2.64	3.57	.639	-1.54	2.55	3.43	.716	-1.20	1.21
20.	3.49	.660	-1.21	1.40	3.43	.709	-1.22	1.44	3.19	.814	-.93	.53
21.	2.80	.783	-.55	.12	2.76	.869	-.46	-.37	2.40	.883	-.22	-.85
22.	2.86	.708	-.53	.51	2.86	.773	-.57	.22	2.60	.832	-.41	-.39
23.	3.46	.630	-1.01	1.20	3.38	.689	-1.07	1.33	3.23	.739	-.90	.90
24.	3.68	.545	-1.75	3.72	3.60	.607	-1.65	3.35	3.51	.700	-1.57	2.61
25.	3.45	.647	-.98	.86	3.45	.644	-1.01	1.02	3.27	.754	-1.00	.99
26.	2.96	.758	-.54	.21	3.00	.763	-.59	.28	2.78	.833	-.51	-.16
27.	2.99	.770	-.68	.47	2.88	.883	-.56	-.30	2.61	.920	-.36	-.70
28.	2.78	.887	-.35	-.59	2.83	.910	-.41	-.62	2.70	.999	-.26	-.99
29.	3.63	.551	-1.36	2.02	3.57	.609	-1.46	2.58	3.39	.712	-1.16	1.46
30.	3.69	.532	-1.75	3.37	3.59	.595	-1.43	2.33	3.43	.687	-1.17	1.45
31.	3.00	.712	-.67	.84	3.01	.788	-.71	.40	2.61	.840	-.48	-.37
33.	2.91	.774	-.47	.01	3.00	.809	-.65	.13	2.84	.852	-.50	-.25
34.	3.29	.753	-.90	.44	3.36	.747	-1.09	.92	3.09	.834	-.71	-.02
35.	3.02	.802	-.60	.01	3.10	.787	-.73	.32	2.81	.869	-.49	-.33

$\bar{x}$ = item mean

σ = standard deviation

Sk = skew

Ku = kurtosis

Appendix B

*Standardized model parameter estimates in the SEI Five-Factor Model**

Items	Item Parameter Estimates				
	TSR	CRSW	PSL	FG	FSL
3. My teachers are there for me when I need them.	.70				
5. Adults at my school listen to the students.	.71				
10. The school rules are fair.	.60				
13. Most teachers at my school are interested in me as a person, not just a student.	.69				
16. Overall, my teachers are open and honest with me.	.74				
21. Overall, adults at my school treat students fairly.	.72				
22. I enjoy talking to the teachers here.	.68				
27. I feel safe at school.	.59				
31. At my school teachers care about students.	.77				
2. After finishing my schoolwork I check it over to see if it's correct.		.58			
9. Most of what is important to know you learn in school.		.61			
15. When I do schoolwork I check to see whether I understand what I'm doing.		.64			
25. When I do well in school it's because I work hard.		.62			
26. The tests in my classes do a good job of measuring what I'm able to do.		.60			
28. I feel like I have a say about what happens to me at school.		.50			
33. Learning is fun because I get better at something.		.66			
34. What I'm learning in my classes will be important in my future.		.43			
35. The grades in my classes do a good job of measuring what I'm able to do.		.64			
4. Other students here like me the way I am.			.71		
6. Other students at school care about me.			.81		
7. Students at my school are there for me when I need them.			.79		
14. Students here respect what I have to say.			.67		
23. I enjoy talking to the students here.			.65		
24. I have some friends at school.			.45		
8. My education will create many future opportunities for me.				.70	
11. Going to school after high school is important.				.68	
17. I plan to continue my education following high school.				.72	
19. School is important for achieving my future goals.				.78	
30. I am hopeful about my future.				.65	
1. My family/guardian(s) are there for me when I need them.					.64
12. When something good happens at school, my family/guardian(s) want to know about it.					.73
20. When I have problems at school my family/guardian(s) are willing to help me.					.75
29. My family/guardian(s) want me to keep trying when things are tough at school.					.66

*As reported by Betts et al. (in press)

TSR = Teacher-Student Relationships

CRSW = Control and Relevance of School Work

PSL = Peer Support for Learning

FG = Future Goals and Aspirations

FSL = Family Support for Learning