AN EXAMINATION OF THE PSYCHOMETRIC PROPERTIES OF THE STUDENT ENGAGEMENT INSTRUMENT – COLLEGE VERSION

by

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(Under the Direction of Amy L. Reschly)

ABSTRACT

This study evaluated the psychometric properties of the Student Engagement Instrument – College Version (SEI-C) with college students in the Southeastern United States. Participants self-selected paper-and-pencil or online administration. Confirmatory factor analysis revealed a modified five-factor structure. Measurement invariance of the modified five-factor structure of the SEI-C was assessed across the paper-and-pencil and online samples. Full configural, full metric, partial scalar, and full residual variance invariance were established. The paper-and-pencil and online data were aggregated, and correlational analyses between the five SEI-C factors and the four higher-order factors of the Motivation and Engagement Scale – University/College (MES-UC) provided evidence of convergent and divergent validity. All but one of the 20 correlations were statistically significant, and all correlations were in the expected direction. Overall, there is evidence to suggest the appropriateness of extending the SEI upward for use with college students and for collecting data via online or paper-and-pencil administration.

INDEX WORDS: student engagement, motivation, college dropout, confirmatory factor analysis, measurement invariance

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DEDICATION

I would like to dedicate this thesis to my parents, both of whom have loved me unconditionally since I first came into their lives nearly 25 years ago. You have provided me with great opportunity and have supported me throughout all of my endeavors. You have allowed me the freedom to question, to explore, to disagree with you, and to choose for myself. You have allowed me to set my own goals and to live by my own standards, and I have never felt pressured by either of you to follow the paths laid forth by you or anyone else. I cannot thank the two of you enough for teaching me the value of treating others with unconditional kindness and respect. For these reasons, I know that you have been perfect parents. I am blessed to have had you play such significant roles in my life. I love you both.

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CHAPTER ONE

INTRODUCTION

Benefits of a College Degree for the Degree Holder

The attainment of a college degree is beneficial to both the degree-holder and to society. For the individual, benefits of a college degree include increased likelihood of employment (Organisation for Economic Co-operation and Development, 2012; Taylor et al., 2011), higher salaries, and increased opportunities for career advancement (U.S. Department of Education, 2010). U.S. Census data demonstrate that employment levels rise as educational attainment increases ("Education Pays…," 2012). For example, the unemployment rate in 2011 for those without a high school degree was 14.1%. In contrast, the unemployment rate for those with just a high school degree was 9.4%, while the unemployment rate for those with at least a Bachelor's degree was even lower at 4.3% (U.S. Department of Labor, 2012a). This relationship between educational attainment and employment can be observed globally, as citizens with advanced degrees are more immune to unemployment caused by the recent global economic downturn than their less educated counterparts (OECD, 2012).

In addition to increased likelihood of employment, U.S. Census data from 2009 revealed that, on average, an American worker with a Bachelor's degree earned nearly twice as much annually as an American worker with only a high school diploma ($56,665 versus $30,627). Those with advanced degrees earned even more ($73,738, $103,054, and $127,803, respectively, for those with Master's, Doctorate, and Professional degrees; U.S. Census Bureau, 2010). Over the course of an individual's career, these earnings differences add up: a college graduate will

earn roughly 66% more than a worker with only a high school diploma (Baum, Ma, & Payea, 2010). In dollars, this means that workers holding only a Bachelor's degree will earn roughly $550,000 more than the high school graduate over the span of a 40-year work career (roughly $14,000 more per work year), even when accounting for costs associated with attending college and potential wages lost while enrolled in school (Taylor et al., 2011). Globally, this earnings gap between college degree holders and non-holders grew wider during the global recession: In 2008, men and women with college degrees earned 58% and 54% more than their respective counterparts who possessed only an upper secondary education; in 2010, those numbers jumped to 67% and 59%, respectively (OECD, 2012).

Although monetary wealth alone does not necessarily lead to long-term happiness, there is evidence to suggest that increases in income are linked to increases in long-term life satisfaction as well as to increases in short-term emotional well-being (e.g., day-to-day levels of happiness, anxiety, sadness, anger; Kahneman & Deaton, 2010). Pew survey results support Kahneman and Deaton's findings, as college graduates report higher rates of happiness, job satisfaction, and monetary earnings than non-graduates (Taylor et al., 2011). Additionally, college graduates are at a decreased risk to experience the well-documented effects related to poverty, including poor nutrition, chronic health issues, substandard housing, and stress ("Effects of Poverty," 2012). It seems that, on average, the accrual of wealth is necessary but not sufficient for moderate to high levels of individual happiness.

Aside from greater likelihoods of being employed, higher average wages, and increased opportunities for career advancement, there exist additional benefits to the college graduate: specifically, better overall health (Cutler & Lleras-Muney, 2007) as well as more positive perceptions of personal health (Baum & Payea, 2004). Across all age groups, college graduates

perceived their health more favorably than did those with less formal education (Baum & Payea, 2004). Further, college graduates are less likely to engage in behaviors hazardous to one's health, such as smoking. In 2000, 14% of college graduates reported smoking regularly while twice as many (28%) high school graduates reported doing so (Baum & Payea, 2004). College graduates are also less likely to engage in binge drinking (i.e., 5 or more alcoholic drinks in a day) and are less likely to be overweight or obese (Cutler & Lleras-Muney, 2007). The latter finding is particularly salient given that recent statistics indicate that slightly more than 1 in 3 U.S. adults is obese (Ogden, Carroll, Kit, & Flegal, 2012) and that—should current rates hold steady—more than 44% of all U.S. adults will be considered obese by current standards by the year 2030 (Levi, Segal, St. Laurent, Lang, & Rayburn, 2012). Not surprisingly, as educational attainment increases, life expectancy also increases (OECD, 2012). Increases in education, across several different income brackets, are typically linked to better overall health outcomes (Crabtree, 2010).

Overall, those who attain college degrees experience higher rates of employment and higher salaries than their less educated counterparts. There also appears to be substantial evidence that individuals who hold a college degree typically will experience greater emotional well-being and long-term life satisfaction than individuals who do not, at least in part due to their higher annual earnings and decreased risk for experiencing poor outcomes associated with poverty. Further, college graduates perceive their health more favorably than their counterparts and demonstrate lower likelihoods of engaging in behaviors harmful to their own health. Even when accounting for the costs of attending college as well as the potential wages lost during that time, the benefits of college are numerous for the individual.

Benefits of an Educated Society

In addition to benefits conferred upon the individual, it is advantageous for any country to have an educated populace; these societal benefits are numerous and wide-ranging. First, an educated and productive workforce is less reliant upon social safety net programs (U.S. Department of Education, 2010). For example, among U.S. adult citizens who received welfare through the Temporary Assistance for Needy Families (TANF) program in 2008, 45% had not completed high school while less than 5% had received at least some postsecondary education (National Skills Coalition, 2011). Further, an educated workforce is more likely to contribute to state and federal taxes (U.S. Department of Education, 2010). As educational attainment increases, estimates of total taxes paid increases: Workers with only a high school diploma pay roughly $6,695 in taxes annually while workers with a Bachelor's, Master's, Doctorate, or professional degree pay between $11,940 and $26,235 in taxes annually (Baum & Payea, 2004). Obviously, a broadened national tax base can lead to the funding of government projects which benefit all citizens. Some notable examples within recent U.S. history include the creation of the interstate highway system and the creation of the internet, two innovations which have led to increased commerce and to greater national prosperity.

An additional benefit of an educated society pertains to crime: as education levels increase, crime and incarceration rates decrease (Baum & Payea, 2004; Harlow, 2003; Lochner & Moretti, 2003). Among the incarcerated population, those who have acquired very little formal education are represented at disproportionately higher rates than those with greater educational attainment (Harlow, 2003). To best demonstrate this disproportionate representation, it is useful to compare the percentage of the U.S. population that does not hold a high school degree against the percentage of the prison population that does not hold a high

school degree. In 1997, 41% of inmates in federal or state prisons or local jails failed to complete high school, while 18% of adults in the general population had not (Harlow, 2003). This well-established relationship between incarceration rates and educational attainment has led to the availability of educational programs in the overwhelming majority of prisons and jails (Harlow, 2003)[1] as well as to aggressive early intervention programs for at-risk students (e.g., Head Start; see Schweinhart, 2007). Regarding the role of education as a point of intervention for decreasing crime, Lochner and Moretti argued that "a significant part of the measured effect of education on crime can be attributed to the increase in wages associated with schooling" (2003, p. 27). Tying crime and incarceration rates to dollar values, they argued that a 1% increase in high school completion rate among males ages 20-60 would save the United States 1.4 billion dollars annually (Lochner & Moretti, 2003). Given that the U.S. incarcerates more of its citizens than any other country in the world,[2] it seems to be of increasing importance to emphasize educational attainment as a means of reducing greater societal problems caused by crime and high rates of institutionalization. Not only does increasing the educational attainment of a country's populace aid in reducing societal problems associated with crime, increases in educational attainment are also associated with increased participation in civic duties, such as voting, volunteering, and donating blood (Baum & Payea, 2004; Hill, Hoffman, & Rex, 2005). Compared to high school graduates, college graduates vote at higher frequencies (72% versus 49%), an important and occasionally overlooked responsibility related to citizenship in a representative democracy (Baum & Payea, 2004; OECD, 2012).[3] College graduates are also

[1] In 2000, 91.2% of state prisons, 100.0% of federal prisons, and 87.6% of private prisons offered at least one education program for its inmates (Harlow, 2003).
[2] The U.S. incarcerates 760 citizens per 100,000 people. The second and third highest incarceration rates belong to Russia (624 per 100,000) and South Africa (329 per 100,000; OECD, 2010a).
[3] The U.S. has had paltry voter turnout rates which are decreasing over time, as recent voter turnout data show that 48% of Americans voted in the 2006 mid-term elections, a drop of 29 percentage points since 1980 (OECD, 2010c).

more likely to volunteer in their communities and donate blood than high school graduates (Baum & Payea, 2004). Overall, high levels of educational attainment tend to lead to or are associated with several desirable outcomes for any nation.

Not surprisingly, the children of parents who are college educated are more likely to be read to and also demonstrate higher cognitive and attentive skills than do the children of less educated parents (Baum & Payea, 2004). Further, reading and interacting with children at an early age sets them along a trajectory of higher educational attainment (Hart & Risley, 1995). It appears that a college education sets one along a trajectory which is self-perpetuating from one familial generation to the next. That is, college educated parents tend to experience individual benefits which in turn benefit their own children. Thus, it may not be surprising to discover that—as discovered by Hart & Risley's research—three year-old children of the most educated parents possessed vocabularies that were larger than the vocabularies of the least educated parents. Further, U.S. children who hail from families of high academic achievement participate in postsecondary education at disproportionately higher rates than do children who hail from families of low academic achievement (see OECD, 2012, charts A6.1 & A6.2). Perhaps the age-old adage, "The apple doesn't fall far from the tree," has some merit regarding educational attainment, given the connection between parent and child achievement levels.

Although oft-cited benefits of a college degree may typically revolve around individual benefits (e.g., improved wages, employability, health), it is clear that there are numerous additional benefits awarded to society. These societal benefits include an increasingly educated populace that is more likely to contribute to tax revenues, less likely to require government resources, less likely to engage in costly criminal behavior, and more inclined to participate in civic duties, such as voting, volunteering, or donating blood. Overall, college education is an

investment with numerous returns to the individual, those with whom the individual has consistent close contact, and to society as a whole.

Increasing Necessity of a College Degree

Over the past 50 years, the U.S. workforce has become increasingly more educated. In 2003, 33% of civilian workers age 25 and over earned at least a Bachelor's degree, a drastic increase over the 10% of workers with Bachelor's degrees in the 1950's and 1960's (U.S. Census Bureau, 2004). This increase over time in postsecondary degree attainment is also observed among young Americans, as 33% of all 25- to 29-year-olds now hold Bachelor's degrees, an unprecedented and historic high in America (Fry & Parker, 2012). This increase in the number of college educated citizens has been linked, at least in part, to the changing nature of the U.S. economy (i.e., a shift from an industrial economy to an information-based economy), as low-skill jobs are no longer as readily available as they were in decades past (Kirsch, Braun, Yamamoto, & Sum, 2007), and the earnings gap between college graduates and high school graduates widened over the span of 25 years from the 1970's through the mid-1990's (Taylor et al., 2011). Despite national growth in the attainment of college degrees, however, the U.S. is falling behind other industrialized countries in terms of academic attainment. In his 2011 State of the Union address, President Barack Obama stated,

> Over the next 10 years, nearly half of all new jobs will require education that goes beyond a high school education. And yet, as many as a quarter of our students aren't even finishing high school. The quality of our math and science education lags behind many other nations. America has fallen to ninth in the proportion of young people with a college degree.

With the U.S. economy embroiled in the late-2000's global Great Recession and in light of a changing national economy that now places an emphasis on advanced education (OECD, 2012), it is imperative for the U.S. workforce to acquire education beyond the high school diploma. Today, roughly 60% of American jobs require at least some postsecondary education and/or training (Lotkowski, Robbins, & Noeth, 2004). A 2012 report from the Bureau of Labor Statistics indicated that roughly 3.7 million of those jobs are unfilled (U.S. Department of Labor, 2012). While it would be a sweeping generalization to state that increases in education alone could fill these currently vacant positions, it is reasonable to assume that some portion of these 3.7 million jobs went unfilled due to a lack of adequately qualified applicants. Indeed, employment data lend some credibility to this idea. While unemployed citizens outnumber job postings by a ratio of 3.6 to 1, the science, technology, engineering, and math (STEM) job postings-to-unemployed ratio is 1.9 to 1 (Change the Equation, 2012). That is, the U.S. lacks qualified workers to fill domestic, high-skill jobs in STEM fields due, at least in part, to a lack of relevant education. Given this knowledge, it is not surprising that the president has pushed for increased math and science achievement through his public addresses and his 2009 "Educate to Innovate" campaign (see The White House, 2009).

Not only has the job market itself and the prerequisite qualifications for contributing in the job market changed, societal attitudes toward postsecondary education have also changed. In 1978, 36% of Americans viewed obtaining a college education as "very important," whereas 73% of American adults in 2009 agreed that a college education is necessary in order to get ahead in life (Fry & Parker, 2012). Further, in 2011, 94% of U.S. parents expected their child or children to attend college; these expectations were roughly equivalent between parents who did attend college and those who did not attend college: 97% versus 93% (Taylor et al., 2011). In

today's workforce, high school and college diplomas are no longer considered luxuries. Over the span of a few decades, the high school diploma has become a minimal requirement for job attainment: in 2003, 90% of employed civilians had completed high school (U.S. Census, 2004). During that same time span, the college degree has become the lower rung standard for middle-class job attainment.

Present College Graduation Rates

Given the benefits of a college degree for both the individual and for society, present-day national college graduation rates are alarming. Among a 2003 national cohort of full-time undergraduate students enrolled in 4-year institutions, only 57% completed bachelor's degrees within 6 years from the same institution (Knapp, Kelly-Reid, & Ginder, 2011). Four-year graduation rates were worse at 36%. Of the 34 countries which comprise the Organisation for Economic Co-operation and Development (OECD), postsecondary degree attainment data are available for 22 countries. Of those 22 countries, the U.S. ranked 13th in on-time tertiary graduation rates in 2007, behind countries like Iceland, Poland, Finland, Japan, and the U.K., indicating a middle-of-the-road ratio of college graduates to the population at the typical age of graduation (OECD, 2010b). While U.S. postsecondary, as well as secondary, graduation rates have steadily increased over the past 50 years, U.S. graduation rates relative to other countries has fallen (Baum & Payea, 2004; OECD, 2012). In colloquial terms, it appears that the rest of the world has "caught up" to the U.S. Given the increasing globalization of the national economy (Kirsch et al, 2007) and the educational and economic "rise of the rest," it is imperative for the U.S. workforce to become increasingly educated and qualified relative to the international workforce. Higher postsecondary graduation rates will benefit the country as a whole, as high-skilled employment opportunities will be filled more ably by high-skilled American workers.

As high school dropout reform has received increasing national attention over recent years (Appleton, Christenson, Kim, & Reschly, 2006), so too has postsecondary dropout reform. Specifically, legislators in several states (e.g., Georgia, South Carolina) have focused efforts on postsecondary education funding reform and are considering using formulas which include institutional postsecondary graduation rates, as opposed to total enrolled numbers, to determine the allocation of state funding for postsecondary institutions (Diamond, 2011). This emphasis placed upon institutional graduation rates is likely the result of a widely disparate range of graduation rates between flagship public universities and regional universities (Diamond, 2011)[4] as well as the overwhelming historical trend of lower graduation rates among two-year versus four-year institutions (Tinto, 1975).

In theory, these alternative formulas for determining the allocation of funds would spur colleges to educate students more efficiently, moving students toward timely degree completion and boosting institutional graduation rates. With a more efficient system, the long-term effect would be to increase each state's ratio of postsecondary degree holders to non-holders and to produce a better prepared workforce that can sustain state-level economies through job productivity and tax revenues. While the implementation of these formulas is novel in some states, this performance-based funding (PBF) is a "decades old higher education finance strategy" that has been enacted across 26 states with "a mixed history of success and instability" over the past 30 years (Harnisch, 2011, p. 2). Nonetheless, PBF has re-emerged in recent years due to improvements in policy and data management systems and, further, has been promoted as a viable option by the Bill and Melinda Gates Foundation, the Lumina Foundation, College Board, National Conference of State Legislators, National Governors Association, Education

[4] Georgia Tech and the University of Georgia both boast 80% six-year graduation rates while regional universities produce significantly lower six-year graduation rates (e.g., 45% at Georgia Southern, 41% at Kennesaw State, 25% at Augusta State).

Commission of the States, and President Obama (Harnisch, 2011). Given the importance of postsecondary graduation rates and the increased attention which is being placed upon those rates, it is essential for researchers, policy wonks, and legislators to understand why, exactly, college students are not graduating.

Postsecondary Dropout Literature

A review of the postsecondary dropout literature indicated a number of reasons for which college students fail to graduate from their chosen institutions. Summarizing the literature, Kuh, Cruce, Shoup, Kinzie, and Gonyea (2008) concluded that oft cited reasons for college dropout include, but are not limited to, "change of major, lack of money, family demands, and poor psycho-social fit" (p. 541). Parallel with high school dropout, postsecondary dropout is typically viewed as a longitudinal process (i.e., dropout from college is not typically a singular event; Tinto, 1975). In general, dropout is viewed as a gradual disengagement from one's postsecondary institution (e.g., Levitz, Noel, & Richter, 1999; Tinto, 1975, 1982), though the reasons for this gradual disengagement may vary from student to student.

Tinto (1975) developed an influential institutional model to describe postsecondary dropout. In Tinto's model, students drop out either due to a lack of social integration or due to a lack of academic integration. Within Tinto's model, social and academic integration are inversely related, as time dedicated to academic integration necessarily detracts from time dedicated to social integration and vice-versa. A lack of integration in either domain can initiate the gradual process of dropout. In this model, Tinto acknowledged the roles of status variables (e.g., SES, gender, race, ability) and alterable variables (e.g., educational expectations, institutional commitment) in the dropout process. Tinto also referenced Sewell and Shah who concluded that, even when controlling for intelligence, socioeconomic status (SES) was still

"positively, monotonically, and significantly related to planning on college, college attendance, and college graduation for both sexes" (Sewell & Shah, 1967, p.22). Regarding status variables, Tinto (1975) summarized the state of postsecondary dropout literature and concluded that students who persist throughout college typically hailed from better educated families, had parents who were more urbane, and had parents who were more affluent. Further, Tinto noted, "College persisters tend to come from families whose parents tend to enjoy more open, democratic, supportive, and less conflicting relationships with their children," and that these students often have parents with "greater expectations for their children's further education" (Tinto, 1975, p.100).

In contrast with the aforementioned status variables, Tinto (1975) noted that extra-curricular activities and connections between students and faculty were linked to increased persistence to finish college. These ideas (i.e., the importance of extra-curricular activities and student-faculty interactions) are related to current ideas regarding behavioral and affective engagement, respectively (e.g., Appleton et al., 2006). With regard to social integration, Tinto explained that it is more frequently the case that a lack of social integration leads to dropout, as opposed to an excess of social integration. This idea may be best reflected by comparing recent (spring 2012) University of Georgia grade point averages among students associated with Greek life (mean GPA of 3.35) versus all other undergraduates (mean GPA of 3.24; University of Georgia, 2012). This is but a crude metric of social integration as well as of dropout; however, given that poorer GPA is linked with higher rates of dropout, data comparing the grade point averages of students involved with Greek life (necessarily integrated socially) versus all students (not necessarily integrated socially) seem to provide initial evidence in support of Tinto's assertion. (It is worth noting, though, that a potentially relevant counter-example involves

comparing the spring 2012 grade point averages of all UGA student-athletes against all undergraduates: With a mean GPA of 3.05, the 533 NCAA student-athletes performed worse; "Georgia Student-Athletes," 2012). Within his original dropout model, Tinto made a very important distinction that academic dismissal due to poor academic ability is different from voluntary withdrawal (likely due to poor social integration). Further, from a cost-benefit perspective, Tinto concluded that as one nears degree completion, the individual's goal and institutional commitment increases.

Tinto has since revised his original model and noted that his initial model included several shortcomings, particularly not placing enough emphasis on the role of finances in degree completion, not distinguishing fully between behaviors leading to permanent dropout versus institutional transfer, not distinguishing between differential educational experiences based upon status variables (e.g., gender, race, SES), and not accounting for disengagement within 2-year institutions (Tinto, 1982). Regarding finances, Tinto was astute in commenting that while financial concerns are often cited as the primary reason for departure, these concerns "often reflect the end product rather than the origin of the decision to drop out" (Tinto, 1982, p. 690). Specifically, although finances can become a legitimate concern for the degree-seeking student (and collective U.S. student loan debt indicates that finances are a legitimate concern,[5] particularly given the fact that the cost of a college education has increased three-fold in inflation-adjusted dollars since 1980; Taylor et al., 2011), often the perceived benefit of acquiring the necessary finances for continuing one's college education decreases as the student wanes in individual goal and/or institutional commitment. This idea is also reflected in more recent research, such as that conducted by Levitz and colleagues (1999) who stated,

[5] As of June 30, 2012, outstanding U.S. student loan debt has reached $914 billion (Federal Reserve Bank of New York, 2012).

"Withdrawing-student surveys always list money, time, and personal reasons to the question of why they are leaving. Yet our experience indicates that these are but the surface reasons" (p. 39). Regarding institutional transfer versus permanent dropout, Tinto (1982) recognized the necessity of a theoretical model to explain the interaction of institutional and system variables upon a student's persistence or lack of persistence at any given institution. Drawing from both migration and labor models, Tinto suggested thinking of institutional migration in terms of either "push" versus "pull" factors (i.e., factors which push a student out, such as student-institution mismatch, or factors which pull a student away, such as home and family difficulties) or "wage" and work opportunity, where "wage" is representative of finances within the postsecondary setting (Tinto, 1982). Further, Tinto suggested that differential rates of dropout among various demographic groupings (e.g., race, SES, gender) should be examined.

More current research is sensitive to differential rates of dropout (e.g., Aud et al., 2012; Baum & Payea, 2004). In fact, many universities sponsor programs which promote the degree completion of students representing minority groups (e.g., the Graduate School of the University of Georgia actively recruits students from historically underrepresented groups through its Outreach and Diversity program). At the time of Tinto's revised theory (1982), white males were graduating from postsecondary institutions at rates higher than any other group; now female students and Asian/Pacific Islanders graduate at higher rates (Aud et al., 2012). As noted by Tinto, the potential necessity of different models for different groups (e.g., ethnic groups), based on what he assumed to be likely different patterns of dropout, are necessary. We now know this to be the case, as African American, Hispanic, and Native American students graduate at far lower rates than their Caucasian and Asian American peers (Aud et al., 2012).

The implications of Tinto's research suggest that postsecondary student attrition should be addressed at an institutional and systems level. In light of a century's worth of consistently stable 4-year postsecondary graduation rates (i.e., the percentage of students who graduated among those who enrolled four years prior) from 1880-1980 (Tinto, 1982), despite an investment of "literally billions of dollars in educational programs designed to enhance the likelihood that individuals would enter and persist within the higher educational system," (p. 695), Tinto argued that sweeping changes were necessary to improve current rates of attrition. Specifically, Tinto (1982) advocated retention programs which (a) focus on the longitudinal process of dropout, (b) are involved as early as the initial point of entry (i.e., admission), and (c) involve several university staff.

Around the same time that Tinto (1982) was revising his own theories of postsecondary attrition, Levitz and Noel established a national database containing information on postsecondary retention and graduation rates (Levitz et al., 1999). The work conducted by Levitz and Noel at ACT has provided several insights into patterns of postsecondary dropout. Consistent with Tinto (1982) and his idea that institutional variables likely affect the process of dropout, national rates of postsecondary attrition indicate that dropout rates are lower for more selective institutions and at private institutions (Levitz et al., 1999). Levitz and colleagues (1999) are quick to note that these relationships are not necessarily causal and that grouping institutions by varying levels selectivity or by public versus private status does not mean that these university groupings are homogenous. Indeed, they cite significant amounts of variation even among similarly grouped institutions:

> There is a reason for such wide variation within these groups of similar institutions. Institutions can control their dropout rates to a great extent based on the energy and effort

> that is put into getting students started right on the path into and through the first year of college. Institutions that provide adequate personal and programmatic support through orientation, advising, and careful attention to introductory course experiences realize lower dropout rates. This was first noted by Aubrey Forrest (1982); we too have made hundreds of similar observations on the college and university campuses we have visited (Levitz et al., 1999, p. 36).

Taken collectively, these findings suggest that changes need to be made at institutional and systems levels. The focus of Levitz and colleagues' work is on first-year attrition rates. This is due to their observation that institutional student attrition rates tend to halve with each successive year of schooling, meaning that the highest rates of attrition occur between the first and second years at a postsecondary institution (Levitz et al., 1999). Knowing this, Levitz and colleagues (1999) suggested that "intrusive" and "proactive" prevention programs are necessary for entering freshmen. It is their hope that, with proper prevention, freshmen students in particular will not experience feelings of inadequacy, confusion, or frustration as manifested in affect (e.g., not knowing how to make friends, not knowing how to communicate with professors/advisers) and/or academic ability (e.g., not knowing how to study, not knowing how to ask for help; Levitz et al., 1999).

Levitz and colleagues (1999) categorized the reasons for which students withdraw from postsecondary education into five categories: personal (e.g., unrealistic expectations, student-institution mismatch), social (e.g., alienation, lack of social integration), academic (e.g., poor feedback, lack of educational or vocational goals), life issues (e.g., health problems, family problems, financial concerns), and institutional issues (e.g., negative attitudes from those serving in university positions). Further, Levitz and colleagues recognized that among these varied

reasons for which students withdraw, perhaps the most prevalent (according to "hundreds of anecdotal supports") is a lack of academic preparedness (1999, p. 40). That is, professors assume that first-year students are self-directed learners who already possess the ability to learn independently; however, often times these entering freshmen are not ready for this type of learning.

A recent meta-analysis conducted by Robbins, Lauver, Le, Davis, Langley, and Carlstrom (2004) and since published as part of an ACT policy report by Lotkowski, Robbins, and Noeth (2004) shed considerable light upon the best predictors of postsecondary dropout. Starting with over 400 postsecondary retention studies, 109 studies met inclusion criteria for the meta-analysis (i.e., included studies addressed both academic and non-academic factors, focused on full-time students at four-year U.S. institutions, utilized standardized measures). Robbins and colleagues (2004) examined nine non-academic factors (academic goals, achievement motivation, academic self-confidence, academic-related skills, contextual influences, general self-concept, institutional commitment, social support, and social involvement), two academic factors (ACT score, high school grade point average) and one status variable (SES). The non-academic factor of contextual influences was further disaggregated into categories, such as institutional selectivity, financial support, and institutional size.

The results of this meta-analysis support many of the aforementioned ideas related to postsecondary dropout. First, all but one of the factors identified by Robbins and colleagues (2004) were positively correlated with postsecondary retention. The strength of these correlations varied, with the weakest individual predictor of postsecondary retention being general self-concept ($\rho = .050$) and the strongest individual predictor being academic-related skills ($\rho = .366$; Robbins et al., 2004). Among the contextual influences, institutional size had no

relationship with postsecondary retention, a surprising finding since high school size appears to be linked with secondary graduation rates (Lee & Smith, 1997). The strongest predictor of postsecondary retention was a combination of SES, high school grade point average, ACT score, institutional commitment, academic goals, social support, academic self-confidence, and social involvement, as this particular combination of factors accounted for 17% of the variance among postsecondary retention rates (Lotwkowski et al., 2004). In contrast, the combination of ACT score, high school grade point average, SES, academic self-confidence, and achievement motivation was the strongest predictor of college grade point average, as this particular combination of factors accounted for 26% of the variance among college student grade point averages (Lotkowski et al., 2004).

Given the results of the meta-analysis conducted by Robbins and colleagues (2004), Lotkowski and colleagues concluded that postsecondary retention and academic performance (as measured by college grade point average) are "two very different college outcome processes," due to the varying strength and combination of factors relating to those two outcomes (2004, p.10). Like several postsecondary researchers before them (e.g., Tinto), Lotkowski and colleagues (2004) acknowledged the role of non-academic factors in postsecondary dropout. Lotkowski and colleagues (2004) did, however, maintain the primary role of academic skills in postsecondary success and retention and cited several other postsecondary researchers who echo this sentiment (e.g., Adelman, 1999; Ishitani & DesJardins, 2002; Tinto, 1975, 1997).

Overall, a review of postsecondary dropout literature suggests that the reasons for which college students fail to persist at the postsecondary level are numerous. The reasons most often cited by students include a lack of money, time, interest, and/or the presence of pull factors (e.g., personal reasons). The work of several dropout researchers indicates that these reasons are

generally nothing more than surface level reasons for dropout and further suggest that a lack of academic preparedness (Levitz et al., 1999), a lack of social integration (Lotkowski et al., 2004; Tinto, 1975; Tinto, 1982), and experiencing difficulty transitioning during the first year of postsecondary study (Levitz et al., 1999; Lotkowski et al., 2004) are more accurate causes for dropout. Several strategies have been suggested to prevent postsecondary dropout, including supplemental academic instruction and/or remedial instruction, increasing the strength and number of relationships students have within the university environment, and even pre-screening students for problems through the use of survey measures. One particularly promising approach toward addressing college dropout, though, first developed in the high school dropout literature.

Student Engagement: Theoretical Construct

Within high school dropout literature, student engagement has emerged as a useful theoretical construct (Appleton et al., 2006) and has become one of the focal points for high school dropout reform efforts. The latest What Works Clearinghouse dropout prevention practice guide illustrates this focus on improving student engagement as a necessary and important form of high school dropout prevention (Dynarski, Clarke, Finn, Rumberger, & Smink, 2008). Student engagement "involves active participation in learning and schoolwork as well as in the social life of school" (Dynarski et al., 2008, p. 4). Unlike generally stable or completely unalterable student factors (e.g., socioeconomic status, parents' level of education, student race/ethnicity), student engagement is viewed as potentially dynamic over time, alterable, and affected by a student's current academic skill as well as future postsecondary goals. Several studies have identified levels of student engagement as differing significantly amongst successful and non-successful students, even when controlling for factors such as socioeconomic status (Reschly & Christenson, 2012).

Student engagement, in its current form, can be defined in a number of different ways, according to a number of different theories. Fredricks, Blumenfeld, and Paris (2004) conducted a literature review of student engagement in upper elementary through high school and identified three common components among various theories of student engagement. These three common components include behavioral engagement (i.e., participating in academic, social and/or extracurricular activities), emotional engagement (i.e., focusing on emotional reactions to teachers, peers, academics, school), and cognitive engagement (i.e., exerting effort to understand challenging ideas and master challenging tasks). Further, Reschly and Christenson (2012) suggest that even among competing 2-, 3-, and 4-factor models of student engagement there exists "agreement that at a minimum, engagement is comprised of participatory behavior and some affective component" (p. 11). That is, theories of student engagement usually consist of observable behavior as well attitudes and feelings toward school, teachers, and peers, which are less readily observed. This is reflected in the definition of student engagement provided by the What Works Clearinghouse practice guide:

> Engagement includes both behavioral and psychological components. Attendance, class participation, effort in doing schoolwork, and avoidance of disciplinary actions (notably suspensions) are behavioral indicators of engagement, while interest and enthusiasm, a sense of belonging, and identification with the school constitutes psychological engagement. Both aspects of engagement have been associated with dropping out of school. Attendance in school activities and feeling a sense of belonging in the school community are both critical components of school engagement and should be addressed as part of dropout prevention or intervention strategies (Dynarski et al., 2008, pp. 4-5).

So while the exact definition of student engagement may vary from one researcher to the next, the same basic elements seem to appear across conceptualizations of student engagement.

Postsecondary Student Engagement

To date, there are two major self-report measures of postsecondary student engagement. One is the National Survey of Student Engagement (NSSE, alternatively referred to as the College Student Report), designed in 1998 by researchers at the National Center for Higher Education Management Systems ("NSSE Timeline," n.d.). Since 2000, the NSSE has been highly influential in the measurement of postsecondary student engagement at American universities and colleges ("About NSSE," n.d.).[6] The other major instrument is the Motivation and Engagement Scale – University/College Version (MES-UC), an upward extension of an elementary and secondary student engagement and motivation scale developed by Andrew Martin and validated for use with Australian students (Martin, 2009a).

The conceptualizations of student engagement vary between the NSSE and MES-UC. For example, the MES-UC is based upon the idea that there exist specific behaviors and cognitions that are adaptive and maladaptive for school success. The adaptive term is "booster" and the maladaptive terms are "mufflers" (i.e., maladaptive thoughts) and "guzzlers" (i.e., maladaptive behaviors; Martin, 2009b). In this framework, "booster thoughts" (e.g., self-belief, learning focus, valuing) may be viewed as adaptive motivation, adaptive cognitions, and/or engagement thoughts/cognitions. Conversely, "guzzlers" (e.g., self-sabotage, disengagement) may be viewed as maladaptive engagement and/or maladaptive behaviors (Martin, 2009b). With regard to the definition of engagement, Martin does not distinguish clearly between student engagement and student motivation, as he uses the two terms interchangeably. Further, because Martin's instrument is an extension of an instrument designed for use at the secondary education

[6] Since 2000, the total number of universities and colleges that have administered the NSSE has reached 1,523.

level, the college version of the instrument does not necessarily account fully for findings from the postsecondary dropout literature. In contrast with Martin's conceptualization of student engagement, the developers of the NSSE have defined engagement as having two properties: (1) the time and effort put forth by the student to engage in meaningful academic activities and (2) the manner in which the postsecondary institution utilizes its resources to promote student participation in educationally salient activities ("About NSSE," n.d.). While one function of the NSSE results is to aid students at the individual level, another function of the instrument is to measure institutional competency regarding sound educational practices. In this manner, the NSSE survey differs from the MES-UC instrument. Additionally, the definition of student engagement promoted by the NSSE developers also differs from those typically observed in the high school literature, as the NSSE places institutional characteristics into its conceptualization.

Similarities across Secondary and Postsecondary Dropout and Student Engagement

Across the secondary and postsecondary dropout and student engagement literatures, there exist several commonalities. First, the idea that dropout is a longitudinal process of disengagement from school seems to be supported across levels of education (e.g., Appleton et al., 2006; Finn, 1989; Levitz et al., 1999; Tinto, 1975). That is, dropout is not a singular event; it is considered a gradual process of not participating, lacking identification with teachers and peers, lacking educational goals, etc. Additionally, the distinction between types of risk factors occurs in both literatures. For example, Christenson and colleagues (2008) distinguished between demographic risk (i.e., risk associated with one's demographic statuses, such as ethnicity or socioeconomic status) and functional risk (i.e., risk associated with one's individual risk factors, such as attendance or behavior) when discussing high school dropout. Pertaining to postsecondary dropout, Lotkowski and colleagues (2004) emphasized focusing intervention on

broad student risk factors, such as the courses in which students are enrolled (e.g., implementing Supplemental Instruction to all students enrolled in traditionally difficult first- and second-year courses), as well as targeting intervention for students who demonstrate individual functional risk (e.g., utilizing student test and attendance data to intervene early in a student's college career). Another distinction made between risk factors includes the idea of "push" versus "pull" factors. Tinto (1975) referred to these ideas in describing postsecondary dropout, an idea also prevalent in the work of high school dropout researchers (e.g., Jordan, McPartland, & Lara, 1999).

With regard to conceptualizations of student engagement at the secondary and postsecondary level, there exists considerable overlap. For example, the behavioral/participatory component of student engagement is present throughout, as researchers appear to have reached a consensus that a student's participation in class activities, attendance, and even involvement with extracurricular activities reflect how engaged that student is (e.g., Appleton et al., 2006; Finn, 1989; Kuh et al., 2008; Tinto, 1975) and how successful that student will be (Levitz et al., 1999). Certainly, one would expect students who are highly engaged in school to attend class, participate, and be involved in school activities. Using Finn's (1989) participation-identification model, behavioral engagement is essentially the product of a positive feedback loop in which a student (a) participates, (b) performs successfully, (c) identifies with school,[7] and (d) is more likely to participate in the future. This cycle of high-achieving students "getting richer" while low-achieving students "getting poorer" may also be referred to as "Matthew effects" (e.g., Stanovich, 1986) or "reciprocal determinism" (e.g., Bandura, 1978) and is an idea seen in both

[7] It should be noted that Finn's (1989) idea of the student identifying with the school would be classified as affective engagement in most models of student engagement (e.g., Appleton et al., 2006).

the secondary and postsecondary literatures (e.g., Credé, Roch, & Kieszcynka, 2010, Kuh et al., 2008; Reschly, 2010).

In addition to the presence of behavioral engagement across both secondary and postsecondary student engagement literatures, emotional engagement (i.e., interpersonal relationships, feelings toward school) too is present across both literatures. For example, Tinto (1975) emphasized the importance of social integration to postsecondary academic success and noted that college persisters tend to perceive themselves as socially integrated into the postsecondary environment. Levitz and colleagues (1999) suggested that universities implement programs that emphasize establishing relationships between students and faculty. Kuh and colleagues (2008) measure postsecondary student-instructor relationships through their NSSE instrument. Similarly, Appleton and colleagues (2006) emphasized the importance of students' perceptions of relationships with teachers and peers for long-term student success at the secondary level. For students to be successful, they need to experience a positive interpersonal climate (Wentzel & Watkins, 2002). At all levels of education, the student-teacher relationship is an integral component of educational attainment.

Further, elements of cognitive engagement can be observed across literatures. Wehlage and colleagues (1989) identified the importance of "psychological investment required to comprehend and master knowledge and skills explicitly taught in school" (p. 177, as cited in Rumberger & Rotermund, 2012). Though Wehlage and colleagues identified this as "educational engagement," this concept appears consistent with Fredricks and colleagues' definition of cognitive engagement (i.e., exerting effort to understand challenging ideas and master challenging tasks). These ideas are also present in the work of Appleton and colleagues (2006) who have identified student self-regulatory and goal-setting skills as well as student-

perceived value and relevance of school work as components of cognitive engagement. Similar ideas have been found in postsecondary research. For example, Sewell and Shah (1967) concluded that—when accounting for student ability and family SES—the strongest independent predictor of goal attainment was the individual's plans to attend college (as cited in Tinto, 1975).

Fredricks and colleagues (2004) observed that—across theoretical orientations—conceptualizations of student engagement at the secondary level generally consist of three parts: behavioral, affective, and cognitive. Parts of all three components are present in the work of postsecondary dropout and student engagement researchers. If one views maximizing student engagement as sound teaching practice (and the developers of the NSSE would suggest that institutional practices, including teaching, are part of student engagement), it is not surprising to find that many of the components of a highly engaged student are also present in Chickering and Gamson's oft cited article, "Seven Principles for Good Practice in Undergraduate Education" (1987). To improve student outcomes, Chickering and Gamson (1987) emphasized the importance of student-faculty contact and cooperation among students (emotional/affective engagement) as well as active learning and time on task (behavioral engagement). A more contemporary guide for undergraduate education, *McKeachie's Teaching Tips* (Svinicki & McKeachie, 2010), reiterates indirectly many of these ideas regarding maximizing student engagement as sound teaching practice.

Differences between Secondary and Postsecondary Dropout and Student Engagement

While there exist several commonalities amongst secondary and postsecondary student engagement and dropout, there also exist a number of features unique to either the secondary or postsecondary level of education. For example, the role of parental monitoring at the secondary level (Reschly & Christenson, 2012) does not appear to be an important component of student

engagement at the postsecondary level. Relationships still matter for achievement at the postsecondary level; however, those relationships appear to be oriented more toward instructors and other students than with parents (e.g., Levitz et al., 1999; Tinto, 1975). Further, the conceptualization of student engagement at the postsecondary level is not as well defined as it presently is at the secondary level. (This is likely due to the relative novelty of the student engagement construct and its first emergence in secondary, as opposed to postsecondary, education dropout literature; Appleton, Christenson, & Furlong, 2008.) The developers of two major postsecondary measures of student engagement, the MES-UC and the NSSE, both define student engagement in manners that are inconsistent with the broader Fredricks and colleagues (2004) conceptualization (i.e., behavioral, affective, cognitive components). For example, Martin (2009b) fails to distinguish between student engagement and motivation on his MES-UC instrument and uses the two terms interchangeably. As noted by Reschly and Christenson (2012), this lack of a distinction between motivation and student engagement may not be considered problematic in applied intervention work; however, for researchers, the determination of whether these two constructs are distinct or related is a critical question. Thus, it is not surprising to find that—in contrast with the definition of student engagement put forth by Martin (2009b)—Fredricks and colleagues (2004) consider student engagement to be a meta-construct which ultimately subsumes motivation (as cited in Reschly & Christenson, 2012). Further, the Fredericks and colleagues (2004) conceptualization differs from the conceptualization put forth by developers of the NSSE. For example, Kuh (2003) extends the importance of the relationship between the student and instructor (i.e., affective engagement) to include the types of experiences provided by the instructor as well as the institution. The developers of the NSSE view the presence or absence of specific educational practices as part of its definition of student

engagement. As a tool designed to guide institutional practices, this makes sense; however, this definition of student engagement differs from the definitions that are most prominent in the secondary literature.

Measuring Student Engagement

Fredricks and colleagues (2011) reviewed 21 instruments purported to measure various aspects of student engagement at the elementary and secondary levels. As cited by Fredricks and colleagues (2011), student engagement has varied in its definition over time, with researchers first identifying behavioral aspects (Brophy, 1983; Natriello, 1984), then affective aspects (Connell, 1990; Finn, 1989), and eventually cognitive aspects (Fredricks et al., 2004). Fredricks and colleagues (2011) further noted that measures of student engagement have been correlated positively with school achievement and negatively with school dropout, suggesting that student engagement possesses utility as a point of intervention. In fact, several programs are currently being implemented within the U.S. with a specific focus on improving student engagement (e.g., *Check & Connect*; U.S. Department of Education, 2006).

Given the utility of the student engagement construct as a point of dropout prevention and a general lack of instruments that measure this construct longitudinally across elementary, secondary, and postsecondary education, it is clear that researchers and educators alike would benefit from an instrument designed to measure student engagement from the earliest stages of formal education all the way through postsecondary work. In fact, this idea has already been proposed by Reschly and Christenson (2012, p.16): "Currently there are few longitudinal studies that utilize a comprehensive, theory-based measure of student engagement. This type of research is needed to investigate developmental changes in the engagement construct." A better understanding of student engagement across the typical student career could be invaluable for

educators. Further, a comprehensive and psychometrically valid measure of student engagement across the student lifespan would be a particularly salient progress-monitoring tool. Being able to progress-monitor students frequently with the intent to identify those demonstrating the lowest levels of engagement would allow for targeted intervention to occur prior to complete disengagement. When conducted properly, frequent progress-monitoring and targeted intervention has the potential to completely alter the educational trajectories of students, whereby "Matthew effects" are diminished and the "poor" can also become "richer." Further, should an instrument of student engagement become validated for use across one's educational history and then administered to a large normative sample, educators could determine whether a specific student's fluctuation in levels of student engagement represent typical development or whether the student differs significantly from the normative sample. As identified by Fredricks and colleagues (2011), one promising measure of student engagement is the Student Engagement Instrument (SEI), initially developed by Appleton, Christenson, Kim, and Reschly (2006). This instrument has been used for research purposes as well as for identification of disengaged students in Gwinnett County Public Schools (Fredricks et al., 2011).

Student Engagement Instrument

Appleton and colleagues (2006) have defined engagement as a multi-dimensional construct comprised of the following four subtypes: academic, behavioral, cognitive, and psychological/affective. Within this conceptualization of engagement, academic engagement (e.g., time on task, homework completion) and behavioral engagement (e.g., attendance, suspensions) are more easily observable, whereas cognitive engagement (e.g., perceived value of learning, personal goals) and psychological/affective engagement (e.g., relationships with teachers) are less easily observed. The SEI is a 33- or 35- item Likert-like scale designed to

measure the cognitive and psychological components of student engagement.[8] The structure of the SEI is represented in Figure 1.1. The SEI was originally validated on ninth grade students in a large, diverse, urban school district in the upper Midwest (Appleton et al., 2006). Recent research has since validated the structure of the SEI with students from 1st grade through 12th grade (Betts, Appleton, Reschly, Christenson, & Huebner, 2010; Carter, Reschly, Lovelace, Appleton, & Thompson, 2012). Presently, the SEI is being used in several school districts, and has been translated into other languages for use around the world. Given the validation of the SEI for use with students ranging from elementary education to secondary education, a logical next step would be to validate the SEI for use at the postsecondary level. The aim of the present study is to determine the appropriateness of extending the SEI to the postsecondary level.

Purpose of the Study

The purpose of the present study is to examine the college version of the SEI, appropriately named the Student Engagement Instrument – College Version (SEI-C), at the postsecondary level. In this study, the following research questions are posed:

1. What is the factor structure of the SEI-C with college students?
    a. Does the five-factor structure of the SEI replicate perfectly when used with college students?
    b. If not a perfect replication, is the resulting factor structure similar to the structure of the SEI as determined in initial validation studies?
2. Given the model with the best fit, is there evidence to suggest establishing the SEI-C as a valid measure of college students' cognitive and affective engagement with school?

[8] The original version of the SEI (Appleton et al., 2006) contained 35 items which loaded onto 6 factors; however, the 6th factor (which consisted of 2 items) was removed from subsequent research (Betts et al., 2010).

3. Is there evidence to suggest that SEI-C data collected via paper-pencil survey administration is equivalent to data collected via online survey administration?

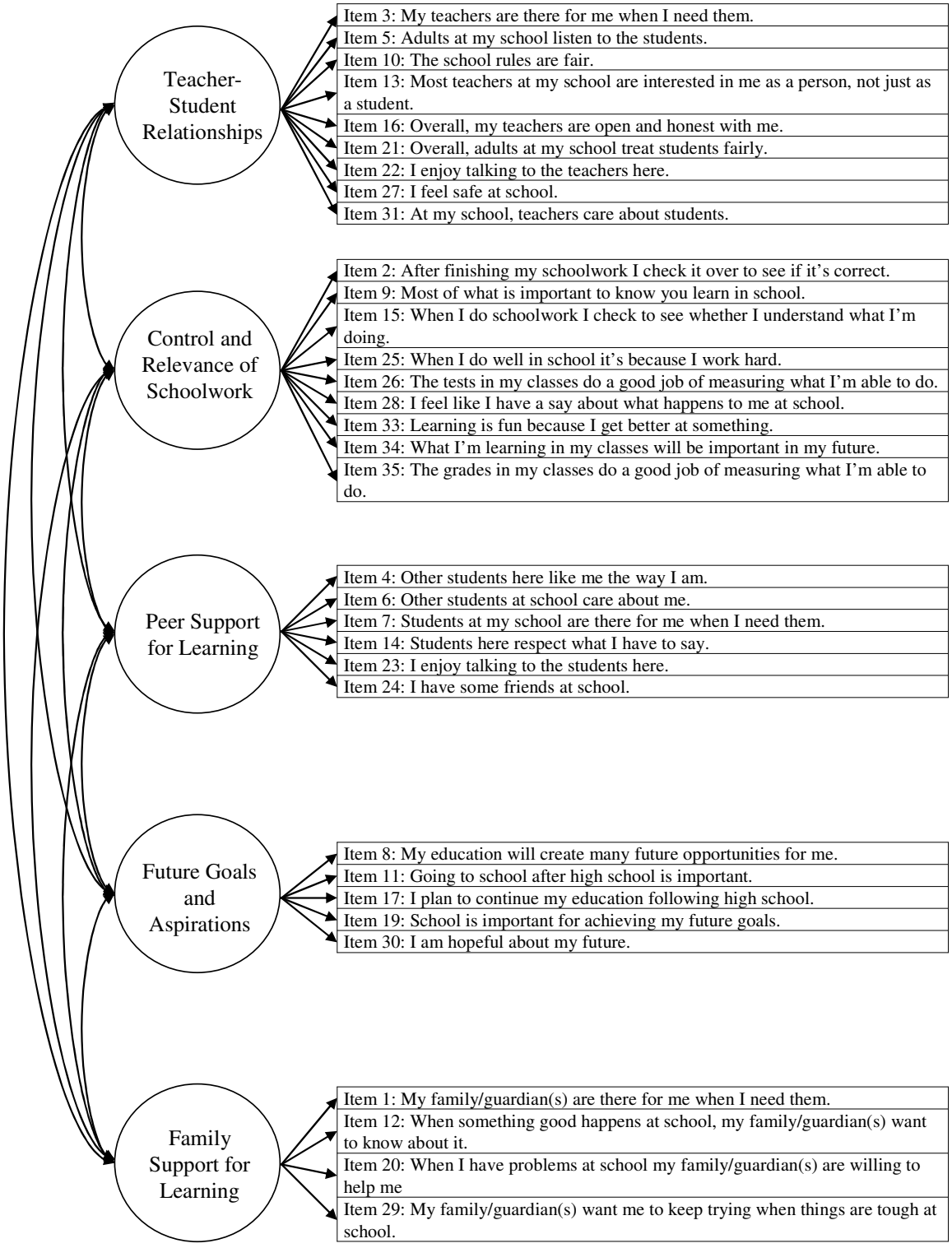

Figure 1.1. The SEI five-factor model. *Note*. Error terms are omitted for improved visual clarity.

CHAPTER TWO

METHOD

Participants

Data from this study were drawn from a larger study of college students' motivation and engagement. All data were collected between April 2010 and October 2010 at a large public university in the southeastern United States. Participants consisted of college students enrolled in various undergraduate psychology courses. As per course requirements (i.e., participating in a minimal number of psychology experiments), students volunteered to participate in the study in return for one hour of experiment credit. The total sample size in the original dataset was 622 students. The total number of participants included in the final dataset was reduced by 3.9% to 598 students, as twenty-four cases were removed due either to incomplete responding or duplicate submission. (The latter problem was unique to the online survey method.)

Demographic data were collected directly from participants. Freshmen comprised 47.2% of the total sample (n = 282), sophomores 25.9% (n = 155), juniors 16.7% (n = 100), seniors 10.0% (n = 60), and graduate students 0.2% (n = 1). Participants were ethnically diverse, as students identified themselves as Caucasian (82.8%), Asian American (7.0%), African American (5.4%), Hispanic (2.0%), or Other (5.4%). Females were represented at a greater rate than males (69.9% versus 30.1%), though this is consistent with university demographics where 58% of enrolled undergraduates in 2010 were female (University of Georgia, 2011). The median age of participants was 19 years of age. Overall, the sample was representative of university

undergraduate demographics. Complete demographic data of the participants may be found in Table 2.2.

Measures

Student Engagement Instrument

The SEI, a 33-item self-report measure of student engagement, was originally validated on ninth grade students (N = 1, 931) in a diverse, urban school district in the upper Midwest (Appleton et al., 2006). The SEI was developed for use through exploratory and confirmatory factor analyses (Appleton et al., 2006). SEI survey item response choices are based upon a 4-point Likert-like scale (i.e., "1" indicates "strongly disagree," "2" indicates "agree," "3" indicates "disagree," "4" indicates "strongly agree"). The SEI is designed to measure three subtypes of affective engagement (i.e., Teacher-Student Relationships, Peer Support for Learning, Family Support for Learning) and two subtypes of cognitive engagement (i.e., Control and Relevance of School Work, Future Goals and Aspirations). Coefficient alphas provided evidence of internal consistency across all five factors: Teacher-Student Relationships ($r_\alpha = .88$), Control and Relevance of School Work ($r_\alpha = .80$), Peer Support for Learning ($r_\alpha = .82$), Future Aspirations and Goals ($r_\alpha = .78$), Family Support for Learning ($r_\alpha = .76$; Appleton et al., 2006). Further, correlations between SEI factors and other outcomes (e.g., GPA, suspension, reading achievement, math achievement) were generally in the expected direction (see Table 2.1).

Recent research has since validated the use of the SEI with students ranging from 1st grade through 12th grade (Betts et al., 2010; Carter et al., 2012).[9] Less well researched is whether the SEI can be utilized at the postsecondary level. It is worth noting that there exist a few minor differences between the elementary/secondary version of the SEI and the college

[9] Please refer to Appleton et al. (2006) or Betts et al. (2010) for more detailed information about the development and psychometric properties of the SEI.

version (SEI-C). Among the 33 SEI-C items, 12 items were modified from the original SEI in wording only (e.g., "teacher" changed to "professor," "school" changed to "college/university"). One item was changed in content ("I plan to continue my education after high school" changed to "I plan to graduate from college/university").[10] A recent study found the Peer Support for Learning factor of the SEI-C to be predictive of college student GPA (Grier-Reed, Appleton, Rodriguez, Ganuza, & Reschly, 2012). To date, however, no research has examined the factor structure of the SEI-C at the item level.

Motivation and Engagement Scale – University/College

The Motivation and Engagement Scale – University/College (MES-UC) is a 44-item self-report measure designed to measure student engagement and motivation at the college level (Martin, 2009b). As discussed in the Introduction, the MES-UC fails to distinguish between engagement and motivation, using the two terms interchangeably. MES-UC items are based on a 7-point Likert scale, where "1" indicates strong disagreement, "7" indicates strong agreement, and "4" indicates a neutral response. The MES-UC purports to measure four higher-order factors: Adaptive Motivation, Adaptive Engagement, Maladaptive Motivation, and Maladaptive Engagement.[11] Three first-order factors comprise the adaptive motivation factor (Learning Focus, Valuing, and Self-Belief), while three first-order factors comprise the maladaptive motivation factor (Uncertain Control, Failure Avoidance, Anxiety). Similarly, three first-order factors comprise the adaptive engagement factor (Planning, Task Management, Persistence), while two first-order factors comprise maladaptive engagement (Disengagement, Self-Sabotage). Each of the eleven first-order factors consists of exactly four survey items. A validation study

[10] Please refer to Appendix A for more information about the items comprising the SEI-C.
[11] Martin uses other terms interchangeably with the ones mentioned here. For example, the Adaptive Motivation factor is alternately referred to as "Booster Thoughts," "Engagement Thoughts/Cognitions," and "Adaptive Cognitions."

conducted with 420 Australian undergraduate students suggested that the model containing eleven first-order factors fit the data well (χ^2 = 1,697.75, *df* = 847, CFI = .96, RMSEA = .05), as did the model containing four higher-order factors (χ^2 = 1,968.82, *df* = 886, CFI = .95, RMSEA = .05; Martin, 2009b). Cronbach's alpha values for the eleven first-order factors ranged from .70 (Valuing) to .87 (Self-Sabotage), suggesting adequate internal consistency (Martin, 2009b).

Procedure

Participants self-selected the manner in which they completed the surveys, either through online administration or through paper-and-pencil administration. Permission to participate in the study was granted on a rolling admissions basis. Once an adequate number of responses was reached for one method of data collection (i.e., roughly 300 responses via online administration), researchers limited participants to registering only for the other method of data collection (i.e., paper-and-pencil administration). Participants were not allowed to participate in both online and paper-and-pencil administrations.

To control for undesired effects due to the order of survey administration (e.g., practice effects, fatigue) researchers counterbalanced the order in which participants completed their surveys by utilizing a balanced Latin Square approach, as suggested by Shuttleworth (2009). As opposed to true counterbalancing (which would have resulted in twenty-four unique survey orders), the Latin Square approach resulted in four unique orders of survey administration in which each measure preceded every other measure exactly 50% of the time. Further, each measure was presented first and last exactly once. Participants in both the online and paper-and-pencil administrations were randomly assigned to complete their surveys in one of the four orders that resulted from the balanced Latin Square.

Paper-and-pencil survey data were entered manually into a spreadsheet by a trained research assistant, and a 20% data check was performed to ensure accuracy of data entry. Paper-and-pencil and online survey data were inspected for values outside of the expected ranges, and online survey data were visually inspected for duplicate submission errors. Any surveys with missing SEI-C or MES-UC data were removed from analysis. Descriptive statistics (i.e., item mean, standard deviation, skewness, and kurtosis) were calculated using SPSS Statistics v.17.0 and can be found in Appendix B.

Data Analyses

Prior research has established an expected factor structure for the SEI with students ranging from kindergarten through 12th grade (Appleton et al., 2006; Betts et al., 2010; Carter et al., 2012). As this study is an extension of that research, we expected to find a factor structure similar to that found by Betts and colleagues (2010) and Carter and colleagues (2012). To evaluate the factor structure, two separate confirmatory factor analyses (CFA) were conducted on the paper-and-pencil and online samples using M-Plus v.6.1 software. Because items of the SEI-C contain four scale points and because response frequencies for all 33 items suggested non-normal distributions, the data were treated as ordered categorical rather than continuous. Thus, the chosen estimator for use in the analysis was robust weighted least squares (WLSMV), as opposed to the more frequently used maximum likelihood (ML) estimator, as suggested by Millsap (2011) and Brown (2006). Using WLSMV as the estimator, the M-Plus software estimated polychoric correlation matrices for use in the CFAs, and several model fit statistics were computed, specifically the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). (While change in chi-square values is typically used to determine model fit, this method could not be used in the same way

when using WLSMV as the estimator, as indicated by the M-Plus software.) Brown and Cudeck (1993) argued that RMSEA values ranging from .06 to .08 suggest acceptable fit, while values above .10 suggest poor fit (as cited in Milfont & Fischer, 2010). Further, MacCallum and colleagues (1999) suggested reporting 90% confidence intervals when reporting RMSEA (as cited in Milfont & Fischer, 2010). Hu and Bentler (1999) suggested using the following cutoff criteria when assessing model fit: RMSEA < .06, TLI > .95, and CFI > .95 (as cited in Schreiber, Nora, Stage, Barlow, and King, 2006), though these criteria are more stringent than typically used rules of thumb (i.e., CFI > .90, TLI > .90). Yu (2002) argued that the aforementioned cutoff criteria proposed by Hu and Bentler for RMSEA, TLI, and CFI are appropriate for categorical data as well as continuous data (as cited in Schreiber et al., 2006). The RMSEA, CFI, and TLI were examined to determine goodness of fit of the five factor model upon the data. Using these fit indices as well as modification indices, the five-factor model was altered to provide for improved fit of both the online and paper-and-pencil samples.

Next, measurement invariance was assessed. A series of tests were conducted to assess invariance across the paper-and-pencil and online samples; the framework for this invariance analysis was based upon steps delineated by Betts and colleagues (2010) and also by Milfont and Fischer (2010). First, configural invariance (i.e., the factorial structure is equal across groups) was tested by running a multi-group CFA (MGCFA) while constraining the factorial structure to be the same across both groups. Fit indices (i.e., CFI, TLI, RMSEA) were examined to determine if configural invariance held. Following the establishment of the configural model, metric invariance (i.e., determination of whether the two groups responded to items in the same way) was assessed by constraining all factor loadings to be equal across the two groups. Model fit indices were examined, and the fit of the metric model was compared against the configural

model using chi-square difference testing. Following the establishment of the metric model, scalar invariance was assessed. This was tested by constraining the intercepts to be the same across groups. Because comparison between the full scalar model and the metric model suggested that full scalar invariance could not be established, an iterative process of freeing item thresholds was utilized to determine if partial scalar invariance could be established. After each iterative step, results of the chi-square difference test were used to determine goodness of fit. This iterative process continued until a non-significant chi-square difference test value was obtained, indicated that at least partial scalar invariance held. Once partial scalar invariance was established, residual variance invariance (also known as error variance invariance) was examined by constraining error/residual variances to be equal across groups. Model comparison was again conducted using the chi-square difference testing. Following the establishment of at least partial measurement invariance, the data from both the paper-and-pencil and online samples were combined (N = 598) for subsequent analysis. Standardized parameter estimates of the revised five-factor model using an aggregation of paper-and-pencil and online data can be found in Appendix C.

Finally, to investigate evidence of convergent and divergent validity, correlations between the five revised SEI-C factors and the four higher-order MES-UC factors (i.e., adaptive motivation, maladaptive motivation, adaptive engagement, maladaptive engagement) were calculated using SPSS software.

Table 2.1
Correlations between SEI factors and outcomes

	TSR	CRSW	PSL	FG	FSL
GPA	.239	.001	.086	.253	.058
Suspension (Y/N)	-.201	.032	-.062	-.131	-.009
NALT Reading Normal Curve Equivalent Score	.171	-.287	.075	.135	.032
NALT Math Normal Curve Equivalent Score	.162	-.249	.079	.141	.009

Note. TSR = Teacher-Student Relationships; CRSW = Control and Relevance of School Work; PSL = Peer Support for Learning; FG = Future Aspirations and Goals; FSL = Family Support for Learning; NALT = Northwest Achievement Levels Test. Adapted from "Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument," by JJ. Appleton, S.L. Christenson, D. Kim, and A.L. Reschly, 2006, *Journal of School Psychology, 44*, p. 439. Copyright 2006 by the Society for the Study of School Psychology.

Table 2.2
Description of participants – sample sizes and percentages

	Total Sample Size/Percentage	Paper-Pencil Size/Percentage	Online Size/Percentage
Sample Size	598	286	312
Male	180 / 30.1	49 / 17.1	131 / 42.0
Female	418 / 69.9	237 / 82.9	181 / 58.0
Race			
African American	32 / 5.4	18 / 6.3	14 / 4.5
Asian American	42 / 7.0	29 / 10.1	13 / 4.2
Caucasian	495 / 82.8	228 / 79.7	267 / 85.6
Hispanic	12 / 2.0	4 / 1.4	8 / 2.6
Other	17 / 2.8	7 / 2.4	10 / 3.2
Primary Language			
English	566 / 94.6	263 / 92.0	303 / 97.1
Other	32 / 5.4	23 / 8.0	9 / 2.9
Classification			
Freshman	282 / 47.2	151 / 52.8	131 / 42.0
Sophomore	155 / 25.9	58 / 20.3	97 / 31.1
Junior	100 / 16.7	43 / 15.0	57 / 18.3
Senior	60 / 10.0	33 / 11.5	27 / 8.7
Graduate	1 / 0.2	1 / 0.3	0 / 0.0

CHAPTER THREE

RESULTS

SEI Five-Factor Model Goodness of Fit

Two separate confirmatory factor analyses were conducted to determine whether the five-factor model of the SEI fit the data from the paper-and-pencil and online samples, respectively. Initial fit indices suggested poor fit of the five-factor model upon the paper-and-pencil sample and acceptable fit upon the online sample (see Table 3.1). Using modification indices to identify problematic items, items were removed to improve model fit. From the paper-and-pencil sample, items 14, 26, and 35 were removed from the model. From the online sample, items 6, 7, 26, 27, and 35 were removed from the model. Model fit improved across both samples (see Table 3.1). While fit indices did not meet cutoff criteria set forth by Hu and Bentler (1999), model fit did meet standards set forth by typically used rules of thumb (i.e., CFI and TLI values greater than .90). Prior to examination of measurement invariance, items 6, 7, 14, 26, 27, and 35 were removed from both models to allow for greater consistency across the two models, and fit indices again suggested improved fit for both models (see Table 3.1). The structure of the revised five-factor model is represented in Figure 3.1.

Measurement Invariance

To assess measurement invariance across the paper-and-pencil and online groups, configural invariance was first examined by constraining the factor structure to be the same across the two groups. Fit indices suggested that configural invariance held (see Table 3.2). Metric invariance was then examined by constraining the factor loadings to be equal across the

two groups. Fit indices and chi-square difference testing between the metric model and the configural model suggested that full metric invariance held across groups (see Table 3.2). Scalar invariance was assessed by constraining the intercepts (i.e., item thresholds) to be the same across groups. Again, chi-square difference testing was utilized to determine if differences between the metric and scalar models were statistically significant or not. Indeed, the differences were significant, so item thresholds were relaxed in an iterative manner until a non-significant *p* value was obtained. After freeing four item thresholds, a non-significant *p* value was obtained (see Table 3.2); thus, partial scalar invariance held across groups. The final step in assessing measurement invariance was to examine whether residual variance invariance held by constraining the residual variances to be equal across groups. Chi-square difference testing suggested that full residual variance invariance held across groups.

Due to the establishment of measurement invariance across groups, data from the paper-and-pencil and online samples were combined. These data were then used to determine correlations within the SEI-C instrument. All five factors were correlated with one another; this finding is consistent with prior research (e.g., Appleton et al., 2006; Betts et al., 2010). Correlations are presented in Table 3.3.

Evidence of Convergent and Divergent Validity

Using SPSS software, correlations between the five revised SEI-C factors and the four higher-order MES-UC factors were calculated. Results are shown in Table 3.4. All but one of the 16 correlations were statistically significant at the .05 level: There was nearly no relationship between the SEI-C Control and Relevance of Schoolwork factor and the MES-UC Maladaptive Engagement factor ($r = .01$). Of the 20 correlations, all were in the expected direction (i.e., positive correlations between SEI-C factors and the two adaptive MES-UC factors, negative

correlations between the SEI-C factors and the two maladaptive MES-UC factors). The strongest relationship was between the SEI-C Future Goals and Aspirations factor and the MES-UC Adaptive Motivation factor (r = .63), as 40% of the variance in one factor was accounted for by change in the other. The second strongest relationship was between the SEI-C Control and Relevance of Schoolwork factor and the MES-UC Adaptive Engagement factor: 30% of the variance in one factor was accounted for by the other.

Table 3.1
SEI-C five-factor model fit indices

Sample	Removed Items	*n*	χ^2	*df*	RMSEA (90% CI)	CFI	TLI
Paper-Pencil	None	286	1094.194	485	.066 (.061-.071)	.89	.88
	14, 26, 27	286	814.599	395	.061 (.055-.067)	.91	.90
	6, 7, 14, 26, 27, 35	**286**	**675.030**	**314**	**.063 (.057-.070)**	**.91**	**.90**
Online	None	312	1388.431	485	.077 (.073-.082)	.92	.91
	6, 7, 26, 27, 35	312	700.101	340	.058 (.052-.064)	.96	.96
	6, 7, 14, 26, 27, 35	**312**	**613.613**	**314**	**.055 (.049-.062)**	**.96**	**.96**
Recommended values:					<.08[1]	>.95[2]	>.95[2]

Note. RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; (1) Browne & Cudeck, 1993; (2) Hu & Bentler, 1999, though typical rules of thumb are >.90

Table 3.2
Fit indices for measurement invariance

Model	Alteration	RMSEA (90% CI)	CFI	TLI	*p*	Comparison	Decision
Model 1: Full configural invariance	---	.058 (.054-.063)	.95	.94	---	---	Accept
Model 2: Full metric invariance	---	.054 (.049-.058)	.96	.95	.198	Model 1 vs. Model 2	Accept
Model 3: Full scalar invariance	---	.052 (.048-.057)	.95	.96	.000	Model 2 vs. Model 3	Reject
	Free item 25, threshold 2	.052 (.047-.056)	.96	.96	.001	Model 2 vs. Model 3	Reject
	Free item 34, threshold 3	.051 (.047-.056)	.96	.96	.006	Model 2 vs. Model 3	Reject
	Free item 15, threshold 2	.051 (.047-.056)	.96	.96	.035	Model 2 vs. Model 3	Reject
	Free item 29, threshold 3	.051 (.046-.056)	.96	.96	.094	Model 2 vs. Model 3	Accept
Model 4: Full error variance invariance	---	.051 (.046-.056)	.96	.96	.098	Model 3 vs. Model 4	Accept

Table 3.3
Correlations between factors in the revised five-factor SEI-C

	TSR	CRSW	PSL	FG	FSL
TSR	--	.56**	.36**	.29**	.25**
CRSW		--	.42**	.48**	.36**
PSL			--	.45**	.41**
FG				--	.58**
FSL					--

Note. TSR = Teacher-Student Relationships; CRSW = Control and Relevance of School Work; PSL = Peer Support for Learning; FG = Future Aspirations and Goals; FSL = Family Support for Learning; ** = Correlation is significant at the 0.01 level (2-tailed); * = Correlation is significant at the 0.05 level (2-tailed)

Table 3.4
Correlations between the revised SEI-C and the MES-UC

	Adaptive Motivation	Adaptive Engagement	Maladaptive Motivation	Maladaptive Engagement
Teacher-Student Relationships	.32**	.31**	-.11**	-.16**
Control and Relevance of School Work	.50**	.55**	-.01	-.29**
Peer Support for Learning	.30**	.26**	-.09*	-.27**
Future Aspirations and Goals	.63**	.41**	-.10*	-.43**
Family Support for Learning	.41**	.32**	-.09*	-.31**

Note. ** = Correlation is significant at the 0.01 level (2-tailed); * = Correlation is significant at the 0.05 level (2-tailed)

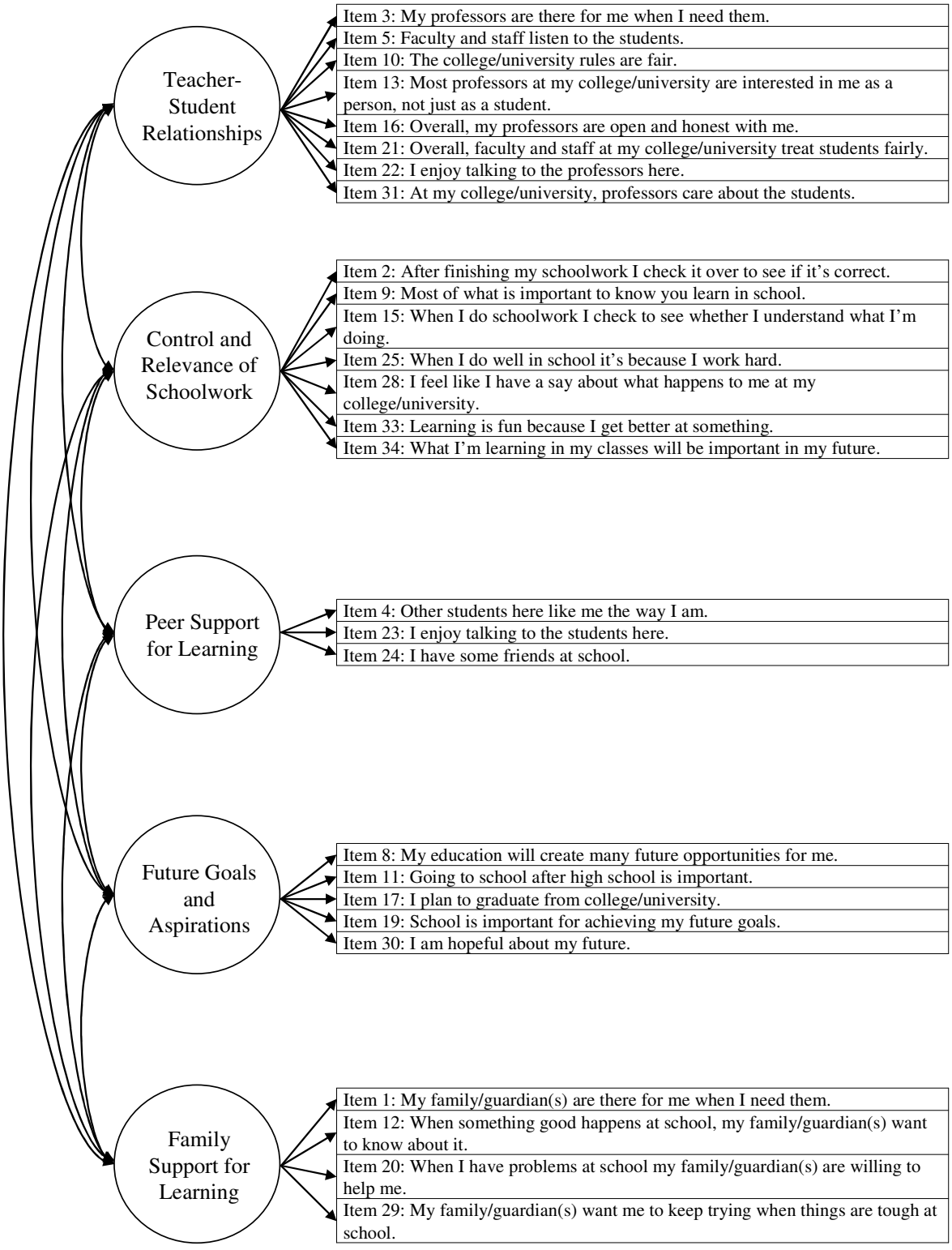

Figure 3.1. The SEI-C five-factor model – revised. *Note*. Error terms are omitted for improved visual clarity.

CHAPTER FOUR

DISCUSSION

Over a relatively short period of time, attitudes and expectations concerning educational attainment have changed drastically in the U.S. as well as internationally. Today, 94% of U.S. parents expect for their child or children to attend college (Taylor et al., 2011). This finding is not surprising, given the numerous benefits afforded to both the individual and to society through increasingly higher levels of educational attainment. Given increased expectations—and even economic necessity—of college participation and completion, current trends in U.S. graduation rates are alarming. Specifically, U.S. postsecondary graduation attainment has increased over time but is increasing at rates that—should they continue—will not keep U.S. citizens competitive with the rest of the world in a global job market. Thus, it is not surprising that both high school and college dropout have gained increasing national attention in recent years. Reforms aimed at curbing current secondary and postsecondary dropout rates are underway. Among those reform efforts, student engagement (i.e., behavior, attitudes, and feelings toward school) has emerged in the high school dropout literature (e.g., Appleton et al., 2006) as well as in the postsecondary literature (e.g., Kuh et al., 2008). Unlike status variables (e.g., SES, parents' level of education) associated with school completion, student engagement is believed to be alterable and is the focus of several intervention programs at the secondary level (e.g., *Check & Connect*). Of course, any good intervention program requires frequent measurement and progress-monitoring. At the elementary and secondary levels, several instruments purport to

measure student engagement (see Fredricks et al., 2011), of which one of the more promising instruments is the Student Engagement Instrument (SEI; Appleton et al., 2006).

While there exists some consensus among the high school literature as to what, specifically, constitutes student engagement (see Fredricks et al., 2004), the state of the concept at the postsecondary level is messy and less well defined. Two major instruments of student engagement exist at the postsecondary level: The Motivation and Engagement Scale – University/College (MES-UC) and the National Survey of Student Engagement (NSSE). The designers of each instrument define student engagement differently. The MES-UC is an upward extension of an instrument designed for use at the elementary and secondary levels. Further, validation studies of the MES-UC have focused on Australian student populations, while the NSSE instrument has been designed by U.S. researchers and validated upon U.S. student populations. In contrast, the NSSE instrument is not designed specifically for individual student progress-monitoring purposes but rather to assess broader universities policies, activities, and climate.

Given the relative dearth of student engagement instruments at the postsecondary level, as well as the lack of consensus toward a unified conceptualization of postsecondary student engagement, assessing the feasibility of extending a secondary measure of student engagement upward seems logical. The purpose of the present study was to determine whether an upward extension of the SEI, a self-report questionnaire developed by Appleton and colleagues (2006) for use with high school students, is appropriate. Recently published research has validated the SEI for use with students ranging from 1st through 12th grade (Betts et al., 2010; Carter et al., 2012) and has also established some initial evidence of convergent validity at the college level when using GPA as a correlate (Grier-Reed et al., 2012). However, research conducted at the

college level is presently limited to one study which suffers from limitations related to a small sample size (N = 122). Further, no research—to date—has examined the factor structure of the SEI – College Version (SEI-C) at the item level. The present study sought to examine whether the five-factor structure of the SEI would be found within a large, ethnically diverse sample of college students. Given the model with the best fit, evidence of convergent and divergent validity was examined. Further, measurement invariance analysis was conducted to determine if the construct of student engagement was measured differently by modality of survey administration (i.e., paper-and-pencil administration versus online administration).

Having collected data via paper-and-pencil administration (n = 286) and online administration (n = 312), results of two separate confirmatory factor analyses (CFAs) suggested poor fit of the five-factor model upon the paper-and-pencil data and acceptable fit of the five-factor model upon the online data. The five-factor model was modified, ultimately removing six of the 33 items, and fit of the model improved to acceptable levels across both groups. Results of a measurement invariance analysis suggested that—broadly—student engagement data collected via paper-and-pencil administration did not differ systematically from data collected via online administration. Specifically, full configural invariance, full metric invariance, partial scalar invariance, and full residual variance invariance held across the paper-and-pencil and online groups. Because measurement invariance held, the paper-and-pencil and online data were combined to assess the relationship between the modified SEI-C factors and the four higher-order factors of the MES-UC. The correlations between these factors were all in the expected direction, and only one of 20 correlations was not statistically significant. These findings provide evidence of convergent and divergent validity of the SEI-C.

Implications

The findings from this study suggest that a modified version of the SEI-C may be useful as a measure of student engagement at the postsecondary level. The five-factor model proposed by earlier research (i.e., Betts et al., 2010) did not fit the data perfectly, but a slightly modified model fit well with an ethnically diverse sample of college students in the Southeast, and correlations with another measure of student engagement and motivation provide initial evidence that the SEI-C is indeed measuring student engagement. Further, measurement invariance held across modality of survey administration, suggesting that future research with the SEI-C may be undertaken with either paper-and-pencil or online survey administration. Given the convenience and expediency with which online survey data may be collected, this particular finding should not be understated. These findings, when taken in conjunction with one prior study conducted at the college level (i.e., Grier-Reed et al., 2012), suggest that evidence in support of using the SEI-C as a measure of student engagement at the college level is emerging. One particularly salient use of this instrument may involve frequent progress-monitoring of college students throughout their college careers. Given the findings that postsecondary attrition rates tend to halve with each successive year in school (Levitz et al., 1999), assessment of student engagement starting at the point of entry could be an enormous first step in curbing postsecondary dropout rates. Using student engagement data to target college students for specific interventions or instruction (see Levitz et al., 1999; Lotkowski et al., 2004; Ramirez, 1997) could potentially alter the educational trajectories of at-risk students and aid efforts at improving current postsecondary graduation rates.

Limitations and Future Directions

While this study establishes initial evidence supporting the use of the SEI-C at the college level, it is obvious that future research is necessary to establish fully the validity and utility of the SEI-C for use with college students. One limitation of this study is that the sample may be considered a sample of convenience, as participants were able to volunteer to participate and were recruited through an undergraduate psychology research pool. Future researchers may want to target students across the academic landscape as well as students hailing from traditional at-risk populations (e.g., non-traditional students, non-native English speakers, students from low SES backgrounds, students with disabilities). Further, participants were allowed to choose their preferred modality of survey administration until one form of administration (i.e., the online administration) was capped. Future researchers hoping to conduct invariance analyses across administration modalities may wish to randomly assign students to either the paper-and-pencil or online groups.

Another limitation of this study is that structural invariance (i.e., the variance of factor means, variances, and covariances) across the paper-and-pencil and online groups was not assessed. This portion of an invariance analysis has been described as "optional" by Milfont and Fischer, as researchers need to determined whether such differences are theoretically meaningful (2010, p.113). Regardless, it would be useful to determine whether structural invariance holds across paper-and-pencil and online groups. This would enhance confidence in the administration of online forms of the SEI-C.

An additional limitation of this study is that correlations with another measure of student engagement and motivation (the MES-UC) were the only evidence provided of convergent and divergent validity. Correlations with other established postsecondary measures (e.g., the

National Survey of Student Engagement) could provide additional evidence of convergent validity. Additionally, proxies of behavioral engagement (e.g., class attendance, college GPA, hours outside of class dedicated to academically meaningful activities) could be useful in future studies. Overall, greater confidence in the utilization of the SEI-C as a postsecondary measure of student engagement would result in the emergence of additional research with findings consistent with the ones found in this study.

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APPENDICES

Appendix A
Description of SEI-C items

SEI-C Item Text
1. My family/guardian(s) are there for me when I need them.
2. After finishing my schoolwork I check it over to see if it's correct.
3. My professors are there for me when I need them.
4. Other students here like me the way I am.
5. Faculty and staff listen to the students.
6. Other students at the college/university care about me.
7. Students at my college/university are there for me when I need them.
8. My education will create many future opportunities for me.
9. Most of what is important to know you learn in school.
10. The college/university rules are fair.
11. Going to school after high school is important.
12. When something good happens at school, my family/guardian(s) want to know about it.
13. Most professors at my college/university are interested in me as a person, not just as a student.
14. Students here respect what I have to say.
15. When I do schoolwork I check to see whether I understand what I'm doing.
16. Overall, my professors are open and honest with me.
17. I plan to graduate from college/university.
18. I'll learn, but only if the professor gives me a reward.*
19. School is important for achieving my future goals.
20. When I have problems at school my family/guardian(s) are willing to help me.
21. Overall, faculty and staff at my college/university treat students fairly.
22. I enjoy talking to the professors here.
23. I enjoy talking to the students here.
24. I have some friends at school.
25. When I do well in school it's because I work hard.
26. The tests in my classes do a good job of measuring what I'm able to do.
27. I feel safe at my college/university.
28. I feel like I have a say about what happens to me at my college/university.
29. My family/guardian(s) want me to keep trying when things are tough at school.
30. I am hopeful about my future.
31. At my college/university, professors care about students.
32. I'll learn, but only if my family/guardian(s) give me a reward.*
33. Learning is fun because I get better at something.
34. What I'm learning in my classes will be important in my future.
35. The grades in my classes do a good job of measuring what I'm able to do.

Note. In accordance with research conducted on the SEI by Betts and colleagues (2010), items 18 and 32 were removed from analysis.

Appendix B

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

	Total Participants				Paper-Pencil Sample				Online Sample			
Item	$\bar{x}$	σ	Sk	Ku	$\bar{x}$	σ	Sk	Ku	$\bar{x}$	σ	Sk	Ku
1.	3.75	.515	-2.20	5.19	3.81	.407	-1.94	2.66	3.69	.598	-2.02	4.08
2.	3.04	.694	-.43	.26	3.08	.671	-.44	.45	3.00	.708	-.38	.10
3.	2.95	.572	-.43	1.39	2.98	.519	-.19	1.31	2.95	.614	-.56	1.40
4.	3.31	.586	-.43	.74	3.38	.578	-.50	.63	3.24	.575	-.27	.66
5.	3.00	.568	-.38	1.44	3.01	.562	-.24	1.08	2.98	.570	-.53	1.92
6.	3.18	.645	-.45	.42	3.20	.657	-.45	.23	3.16	.631	-.45	.75
7.	3.21	.632	-.47	.61	3.26	.619	-.51	.73	3.15	.646	-.44	.53
8.	3.71	.504	-1.51	1.81	3.82	.413	-2.10	3.60	3.59	.559	-1.09	.84
9.	2.59	.797	-.05	-.46	2.59	.793	.07	-.49	2.59	.812	-.14	-.45
10.	3.04	.596	-.29	.84	3.09	.589	-.23	.70	3.00	.608	-.35	.89
11.	3.66	.571	-1.73	3.32	3.71	.544	-2.03	4.56	3.61	.591	-1.50	2.62
12.	3.65	.590	-1.73	3.04	3.71	.566	-2.15	5.24	3.59	.615	-1.38	1.59
13.	2.55	.727	-.05	-.27	2.53	.679	-.05	-.20	2.58	.752	-.05	-.32
14.	3.08	.514	-.17	2.00	3.09	.511	-.17	2.19	3.07	.512	-.18	2.06
15.	3.21	.578	-.20	.43	3.28	.559	-.02	-.49	3.14	.587	-.32	1.06
16.	3.10	.528	-.16	1.65	3.16	.502	.11	1.34	3.06	.546	-.32	1.83
17.	3.84	.395	-2.30	4.56	3.91	.295	-3.34	10.84	3.76	.462	-1.72	2.05
19.	3.71	.484	-1.32	.61	3.79	.427	-1.68	1.57	3.63	.528	-1.00	-.10
20.	3.64	.595	-1.64	2.47	3.67	.564	-1.55	1.42	3.60	.629	-1.62	2.75
21.	3.18	.526	-.10	1.52	3.21	.533	-.13	1.44	3.15	.515	-.08	1.81
22.	2.96	.645	-.36	.54	2.97	.672	-.31	.22	2.95	.624	-.44	.97
23.	3.38	.592	-.55	.44	3.48	.554	-.56	.01	3.29	.599	-.48	.86
24.	3.59	.569	-1.23	1.67	3.68	.511	-1.24	.47	3.51	.595	-1.05	1.53
25.	3.47	.624	-.80	-.17	3.62	.554	-1.23	1.25	3.34	.601	-.47	-.70
26.	2.85	.767	-.37	-.10	2.84	.754	-.33	-.10	2.84	.780	-.41	-.07
27.	3.34	.553	-.06	-.73	3.35	.570	-.17	-.70	3.32	.561	.12	-.73
28.	2.81	.789	-.37	-.17	2.83	.758	-.41	.09	2.81	.827	-.35	-.35
29.	3.70	.498	-1.52	2.38	3.80	.442	-2.35	6.70	3.61	.533	-1.02	.75
30.	3.70	.499	-1.34	.76	3.80	.431	-2.06	3.47	3.60	.540	-.91	-.26
31.	2.97	.542	-.45	1.91	2.97	.502	-.56	2.93	2.97	.575	-.41	1.41
33.	3.09	.563	-.20	1.02	3.06	.578	-.22	.86	3.11	.556	-.19	1.12
34.	3.30	.619	-.38	-.22	3.36	.643	-.58	-.24	3.24	.591	-.21	.02
35.	2.77	.770	-.36	-.11	2.79	.727	-.38	.12	2.75	.810	-.33	-.30

Note. $\bar{x}$ = item mean; σ = standard deviation; Sk = skew; Ku = kurtosis

Appendix C

Standardized model parameter estimates in the modified five-factor SEI-C model

Item	Item parameter estimate				
	PSL	TSR	FG	FSL	CRSW
4. Other students here like me the way I am.	.75				
23. I enjoy talking to the students here.	.89				
24. I have some friends at school	.79				
3. My professors are there for me when I need them.		.74			
5. Faculty and staff listen to the students.		.74			
10. The college/university rules are fair.		.64			
13. Most professors at my college/university are interested in me as a person, not just as a student.		.66			
16. Overall, my professors are open and honest with me.		.83			
21. Overall, faculty and staff at my college/university treat students fairly.		.84			
22. I enjoy talking to the professors here.		.72			
31. At my college/university, professors care about students.		.86			
8. My education will create many future opportunities for me.			.86		
11. Going to school after high school is important.			.64		
17. I plan to graduate from college/university.			.92		
19. School is important for achieving my future goals.			.84		
30. I am hopeful about my future.			.80		
1. My family/guardian(s) are there for me when I need them.				.83	
12. When something good happens at school, my family/guardian(s) want to know about it.				.81	
20. When I have problems at school, my family/guardian(s) are willing to help me.				.83	
29. My family/guardian(s) want me to keep trying when things are tough at school.				.88	
2. After finishing my schoolwork I check to see if it's correct.					.54
9. Most of what is important to know you learn in school.					.47
15. When I do schoolwork, I check to see whether I understand what I'm doing.					.68
25. When I do well in school it's because I work hard.					.66
28. I feel like I have a say about what happens to me at my college/university.					.53
33. Learning is fun because I get better at something.					.57
34. What I'm learning in my classes will be important in my future.					.60

Note. PSL = Peer Support for Learning; TSR = Teacher-Student Relationships; FGA = Future Goals and Aspirations; FSL = Family Support for Learning; CRSW = Control and Relevance of School Work