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The Relationship between Adolescents' Life Satisfaction and Academic Achievement: A Longitudinal Analysis

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by

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Abstract

The current study aimed to replicate and extend recent research by Ng, Huebner, and Hills (2015) by investigating the longitudinal, bidirectional relationship between life satisfaction and academic achievement among adolescents. Specifically, students' baseline (Time 1) life satisfaction was examined as a predictor of academic achievement (as measured by GPA, FCAT-reading DSS scores, attitudes toward school, and goal valuation) one year later (Time 2). The same four academic achievement variables at Time 1 were also examined as a predictor of life satisfaction one year later at Time 2. Positive affect and negative affect were examined as moderators of those relationships. An archival data set that included data from 425 high school students was analyzed. In contrast to findings from prior research, results of four regression analyses indicated that life satisfaction was not a significant predictor of later academic skills (i.e., GPA, FCAT-reading DSS) or academic engagement (i.e., goal valuation, attitude towards school), although there was bivariate support for a link between Time 1 life satisfaction and later academic engagement. When academic variables were considered as predictors of later life satisfaction, there was bivariate support for the relationship between Time 1 GPA and Time 2 life satisfaction. In contrast to hypotheses, regression analyses failed to support a significant relationship between initial academic skills and later life satisfaction. However, moderated regression analyses indicated that academic skills (i.e., GPA, FCAT-reading DSS) predict later life satisfaction for students with greater initial emotional well-being (i.e., low negative affect, high positive affect). In regard to academic engagement, there was bivariate support for a small relationship between initial academic engagement and later life satisfaction, but regression

analyses and moderated regression analyses failed to support that relationship. Analyses indicate that initial positive affect was a significant predictor of later life satisfaction and later goal valuation, which supports Frederickson's (2009) broaden and build theory of positive emotions. Findings of the current study highlight the importance of promoting positive emotions among students, in part as a means to improve life satisfaction and cognitive engagement in school. The current study also provides support for offering mental health services to students with relatively high GPAs and standardized test scores who also experience symptoms of internalizing disorders (i.e., low positive affect, high negative affect). Finally, findings from the current study taken in conjunction with findings reported by Ng et al. (2015) suggest that middle school may be the optimal time for interventions aimed at improving students' subjective well-being.

Chapter One:

Introduction

Statement of the Problem

Since World War II, psychological practice has been based on a disease model of human functioning, with a focus on treating psychopathology and dysfunction (Seligman & Csikszentmihalyi, 2000). Because of this, mental health has traditionally been defined as an absence of psychopathology (Seligman & Csikszentmihalyi, 2000; Suldo & Shaffer, 2008). However, the relatively recent movement known as positive psychology has begun to shift the focus of psychology toward cultivating individual strengths and other positive qualities. According to Snyder, Lopez, and Pedrotti (2011), positive psychology is defined as "the scientific and applied approach to uncovering people's strengths and promoting their positive functioning" (p. 3). Positive psychology is also defined as the study of human strength and virtue that focuses on building competency and nurturing what is best in people in order to prevent pathology from developing (Marques, Pais-Ribeiro, & Lopez, 2011; McCabe, Bray, Kehle, Theodore, & Gelbar, 2011) and promote fulfilled individuals and thriving communities (Seligman & Csikszentmihalyi, 2000).

In response to the call for definitions of mental health to include more than just an absence of psychopathology (e.g., Seligman & Csikszentmihalyi), Greenspoon and Saklofske (2001) explored the validity of a dual-factor model of mental health among children. The dual-factor model of mental health conceptualizes mental health and mental illness as two separate but related constructs, rather than opposite ends of a spectrum (Greenspoon & Saklofske, 2001;

Suldo & Shaffer, 2008). It is important for research to focus on mental wellness in addition to mental illness among children because good health acts as a resource children can draw upon to buffer them from potentially harmful stressors (Forrest, Bevans, Riley, Crespo, & Louis, 2013; Huebner, Suldo, Smith, & McKnight, 2004). Additionally, Seligman and Csikszentmihalyi (2000) note that by valuing subjective experiences and positive individual traits, a focus on mental wellness can build positive qualities in both individuals and communities to improve quality of life. Furthermore, McCabe et al. (2011) noted that adolescence specifically is an important time to promote mental wellness because the cognitive, emotional and social development that occurs during this time makes it the optimal time period to promote change and build a foundation for mental well-being throughout the lifespan. Other rationales for promoting well-being come from studies that demonstrate positive outcomes linked to high well-being, such as superior functioning in the domains of social relationships, physical health, and academic success (Suldo & Shaffer, 2008).

Building upon the current emphasis on well-being among positive psychologists, this study examined the relationship between high school students' life satisfaction and their academic achievement. Previous research on the relationship between academic success and life satisfaction has been inconsistent and tends to differ across age, culture, and other demographic variables (Crede, Wirthwein, McElvany, & Steinmayr, 2015). Specifically, this study investigated the potential bidirectional relationship between life satisfaction and achievement because past research (McCabe et al., 2011; Ng, Huebner, & Hills, 2015) has suggested that such a relationship may best explain how academic achievement and life satisfaction are related among students. The current study also investigated the potentially moderating effects of positive affect and negative affect on the relationship between life satisfaction and academic achievement

in order to revisit ideas advanced by Ng et al. (2015) that negative and/or positive affect moderate the relationship between academic achievement and life satisfaction. Although Ng and colleagues' analyses did not support this moderation role, they only examined affect in the school context as opposed to more typical examinations of affect in all daily activities.

Definition of Key Terms

Subjective well-being. Subjective well-being (SWB) is the scientific term for happiness (Diener, 1984) and is defined as a positive, summary evaluation of one's life as a whole (Andrews & Withey, 1976). SWB is made up of three separate, yet related factors: a cognitive component known as life satisfaction and two affective components known as positive affect and negative affect (Andrews & Withey, 1976). All three elements of SWB, including positive and negative affect, are independent of one another, meaning that high levels of one factor does not necessarily indicate high (or low) levels of another factor (Andrews & Withey, 1976; Diener, 1984). Overall, SWB is a broad term that includes emotional responses, satisfaction in specific life domains (e.g., family, school, work, self) and a global evaluation of life satisfaction (Diener, Suh, Lucas, & Smith, 1999).

Life satisfaction. Life satisfaction is defined by Diener (1984) as a positive global evaluation of one's life. Life satisfaction is based on the standards of each individual that determines what makes up a good life (Diener, 1984). As reported by Suldo, Riley and Shaffer (2006), life satisfaction is the most stable component of SWB. Because of this, life satisfaction is the indicator of SWB that is most frequently used to study youth's perceived quality of life (Suldo et al., 2006).

Positive and negative affect. Positive affect and negative affect are two emotional components of SWB. Positive affect is defined as the frequency with which one experiences

positive emotions such as happiness, joy, or surprise (Andrews & Withey, 1976). Negative affect is defined as the frequency with which one experiences negative emotions such as sadness, anger or fear (Andrews & Withey, 1976). Positive affect and negative affect are independent constructs, meaning that high levels of one do not necessarily indicate low levels of the other (Andrews & Withey, 1976).

Academic achievement. For the purposes of this study, academic achievement is defined as students' grade point average (GPA) and standardized test scores. Specifically, developmental scaled scores (DSS; range 772-3008) from the Florida Comprehensive Assessment Test in reading (FCAT-reading) were used. FCAT DSS scores are used to track student progress across two years and is considered a more sensitive measure of student growth. The FCAT was the primary statewide test used to assess students' progress in their curriculum and make high stakes educational decisions pertinent to promotion and graduation in Florida between 1998 and 2014 (Florida Department of Education, 2016). Reading scores specifically were used because such scores are the most utilized among high school students in this state. Both GPA and standardized test scores are considered objective, distal measures of academic achievement that measure the global performance of specific skills or behaviors over a long period of time (Suldo, Gormley, DuPaul, & Anderson-Butcher, 2014). Suldo et al. (2014) described distal measures as being more relevant for older students than for younger students, which is why these indicators were utilized in the current study of life satisfaction and academic achievement among high school students.

Academic engagement. Academic engagement is defined as the psychological process related to learning that consists of the attention, interest, investment and effort a student puts into learning (Marks, 2000). According to Appleton, Christenson, Kim, and Reschly (2006), there are

three subtypes of student engagement: affective engagement (e.g., interest, positive attitudes about learning, feelings toward one's school), behavioral engagement (e.g., attention, effort, participation), and cognitive engagement (e.g., motivation, setting learning goals). Of the three subtypes of engagement, cognitive engagement and affective engagement are typically assessed via indirect methods because both subtypes involve internal states (Appleton et al., 2006; Finn & Zimmer, 2012).

Purpose of the Study

The purpose of the current study was to replicate and extend research by Ng et al. (2015) by investigating the potential bidirectional relationship between students' life satisfaction and academic achievement using longitudinal data. The findings from that study have important implications because school-based mental health services tend to focus on resolving behavioral or academic problems rather than promoting well-being. Ng et al.'s (2015) findings, however, indicate that life satisfaction serves as an antecedent for academic achievement. That study was restricted to a sample of early adolescents. Thus, it is unknown if the same trends exist for high school age students.

The current study involved a secondary analysis of a dataset with longitudinal data on mental health and achievement from a large sample of high school students. The two waves of data collection occurred one year apart. By replicating and extending Ng and colleagues' line of inquiry, the current study aimed to strengthen the argument in favor of school-based mental health services that address subjective well-being in addition to mental health problems. Additionally, the potentially moderating effects of positive affect and negative affect on the relationship between academic achievement and life satisfaction were investigated. The current study addressed gaps in the existing literature by examining both school-reported GPA and

school-reported standardized test scores (FCAT-reading) as indicators of academic achievement. Furthermore, attitudes about school, an affective measure of academic engagement, and goal valuation, an indicator of the cognitive component of academic engagement, were examined as additional indicators of academic achievement. Several researchers (e.g., Ng et al., 2015; Suldo, Thalji, & Ferron, 2011) have noted that achievement data tend to be relatively stable over time; by examining indicators of academic achievement that allow for the detection of more variability (i.e., FCAT DSS scores), the current study aimed to replicate and clarify the bidirectional relationship identified by Ng et al. (2015).

Research Questions

The specific research questions answered in this study are as follows:

1) What is the relationship between high school students' life satisfaction at Time 1 and academic achievement one year later at Time 2 (controlling for achievement at Time 1), using the following indicators of achievement: GPA, FCAT-reading DSS score, attitudes about school, and goal valuation?
    a. Does positive affect and/or negative affect moderate these relationships?
2) What is the relationship between high school students' academic achievement (as measured by GPA, FCAT-reading DSS score, attitudes about school, and goal valuation) at Time 1 and life satisfaction one year later at Time 2 (controlling for life satisfaction at Time 1)?
    a. Does positive affect and/or negative affect moderate these relationships?

It was hypothesized that a statistically significant, bidirectional longitudinal relationship between life satisfaction and academic achievement would be supported. Previous research (i.e., Ng et al., 2015) suggests that life satisfaction is associated with later academic achievement and

that academic achievement is associated with later life satisfaction. Suldo et al. (2011) also reported that life satisfaction significantly predicts GPA one year later (after controlling for GPA at Time 1), which further supports the hypothesis that a significant relationship between life satisfaction and academic achievement would be identified in the current study. Based on ideas advanced by Ng et al. (2015), it was also hypothesized that negative or positive affect may moderate the bidirectional relationship between life satisfaction and academic achievement. Finally, in regard to positive affect specifically, it was hypothesized that initial positive affect would exert a main effect on students' later life satisfaction and academic achievement. Fredrickson's (2009) "Broaden and Build" theory of positive emotions suggests that the experience of positive affect leads to both positive experiences and further increases in positive emotions. Thus, students with high levels of positive affect at Time 1 are hypothesized to experience higher life satisfaction and higher academic achievement at Time 2 compared to students with low levels of positive affect at Time 1.

Contributions to the Literature

The current study makes several important contributions to the literature. First, only one study to date (Ng et al., 2015) has examined the potential bidirectional relationship between academic achievement and life satisfaction using longitudinal data. The current study extended Ng et al.'s (2015) research by analyzing data collected one year apart. In comparison, previous longitudinal research on this topic has used data collected five months (Ng et al., 2015) to nine months (Suldo et al., 2011) apart, time periods the authors noted were relatively stable in terms of youths' life satisfaction and achievement. By using data collected one year apart, the current study was likely better able to detect the possibly lasting bidirectional relationship between the two variables of interest, as the greater interval may have permitted for more changes over time.

Additionally, the current study analyzed data on student GPA obtained from school records, which is considered more reliable that GPA data collected from students' self-report (Kuncel, Crede & Thomas, 2005). The current study also included standardized test scores (FCAT-reading) as an indicator of academic achievement, while most previous research has relied solely on GPA as an indicator of achievement. The inclusion of standardized test scores enhances understanding of academic achievement in relation to students' life satisfaction by providing an additional source of information regarding student performance. Finally, the current study included a measure of cognitive academic engagement and a measure of affective academic engagement as additional indicators of academic achievement. To date, academic engagement has not been included in any previous research investigating the bidirectional relationship between life satisfaction and academic achievement.

Chapter Two:

Review of the Literature

This chapter summarizes the relevant psychological and educational literature that provides the foundation for the current study. First, an overview of traditional, psychopathology-focused approaches to mental health will be provided, followed by a summary of the more recent approach to mental health called positive psychology. Next, information on the various forms and measures of academic success for high school-aged students will be discussed. Then, research on the relationship between life satisfaction and academic success will be delineated. Research exploring concurrent relationships will be described first, followed by cross-sectional and longitudinal research exploring predictive relationships between the two variables. Finally, the relationship between positive and negative affect and both life satisfaction and academic success will be described.

Defining Mental Health

Historically, mental health has been almost exclusively defined as an absence of psychopathology (Snyder et al., 2011). Since at least World War II, psychological practice has been based on a disease model of human functioning (Seligman & Csikszentmihalyi, 2000). Because the focus of psychological practice has been on pathology and repairing damage, there has been a significant increase in understanding regarding therapy and treatment for mental illness (Seligman & Csikszentmihalyi, 2000). In comparison, relatively little is known about how to help people live good lives. Seligman and Csikszentmihalyi (2000), however, have suggested that the positive psychology movement has begun to shift the field toward a focus on cultivating

strengths and other positive qualities. Positive psychology is defined as a study of strength and virtue that aims to nurture what is best in people in order to build competency and prevent mental health problems (Seligman & Csikszentmihalyi, 2000). According to Seligman (2002), there are three pillars of positive psychology: positive emotions, positive traits (e.g., strengths, virtues, abilities), and positive institutions (e.g., families, countries). Seligman (2002) also noted that positive institutions are theorized to support positive traits which in turn support positive emotions, and all three pillars are important for promoting the best in people not only during challenging times but also during good times.

Seligman and Csikszentmihalyi (2000) called for a definition of mental health that includes more than just an absence of psychopathology, which has led to a focus on positive indicators of mental health, including subjective well-being (SWB). Andrews and Withey (1976) defined subjective well-being as a positive, summary evaluation about one's life as a whole based on the privately known and evaluated aspects of life. Using factor analysis, Andrews and Withey (1976) determined that there are three separate but related components of SWB. Positive affect and negative affect are the two affective components of SWB. Negative affect is defined as the presence of negative emotions such as sadness, anger or guilt (Diener, 2000). Similarly, positive affect is defined as the presence of positive emotions such as joy, happiness, or enthusiasm (Diener, 2000). Barbara Fredrickson (2009) has further emphasized the importance of positive affect through the "broaden and build" theory. This theory posits that positivity and positive emotions broadens one's openness to experiences, and that openness in turn builds one's resources to draw upon in times of trouble. Additionally, the resources gained from these experiences promote thriving and further positive emotions, which acts as an "upward spiral" of positive functioning.

In addition to these two affective components, Andrews and Withey (1976) also identified a cognitive component of SWB, which they described as a positive cognitive evaluation of life. This component is now termed life satisfaction (Diener, 1984). All three elements of SWB are related but independent of one another. For example, Diener (1984) noted that a person who experiences high levels of positive affect does not necessarily experience low levels of negative affect, and a person who experiences low levels of negative affect does not necessarily experience high levels of positive affect. Diener, Suh, Lucas, and Smith (1999) similarly describe SWB as a broad term that includes affective responses, global life satisfaction, and satisfaction in specific life domains such as family, school, work, and self.

The conceptualization of SWB developed by Andrews and Withey (1976) is a hedonic model of well-being due to the focus on the internal experience of "feeling good." In comparison, several other conceptualizations of well-being utilize a eudaimonic model of well-being that includes the presence of positive life functioning and thriving in addition to feeling good. For example, Keyes (2009) has conceptualized wellness as the combination of social well-being and psychological well-being. According to Keyes (2009), social well-being is defined as the presence of strong interpersonal relationships and integration into one's community, and psychological well-being is defined as the presence of self-acceptance and a purpose, or meaning, in life. Seligman (2011) has also suggested a model of well-being that includes five indicators of positive functioning rather than life satisfaction alone. This model, known as the PERMA model, includes the following indicators of well-being: 1) positive emotions, 2) engagement or immersion in activities, 3) strong relationships with others, 4) meaning or purpose in life, and 5) accomplishment solely for the sake of achievement (Seligman, 2011). Measurement and testing of this model is in the early stages, especially with youth samples.

Life satisfaction is considered to be the most stable component of subjective well-being (Diener et al., 1999), so it is the indicator of SWB most frequently used to study youth's perceived quality of life (Suldo et al., 2006). Diener (1984) defined life satisfaction as a positive global evaluation of one's life that is based on the standards of each individual in order to determine what makes up a good life. Benefits of high life satisfaction in youth include higher levels of social support from adults and peers, fewer externalizing and internalizing behavior problems, and higher levels of emotional, social, and academic self-efficacy (Suldo & Huebner, 2006). Furthermore, Huebner, Suldo, Smith and McKnight (2004) noted that life satisfaction specifically is an important component of youth's well-being because it may buffer against negative experiences and the development of psychopathology.

Stemming from the research on SWB by positive psychologists, there has been an increased emphasis on the relevance of a dual-factor model of mental health (cf. Greenspoon & Saklofske, 2001). Greenspoon and Saklofske (2001) were the first to examine the utility of a dual-factor model of mental health for children. This model conceptualizes mental health and mental illness as two separate but related constructs rather than opposite ends of a spectrum. There are a total of four separate mental health status groups possible in the dual-factor model of mental health: a high-pathology, high-SWB group; a low-pathology, high-SWB group; a high-pathology, low-SWB group; and a low-pathology, low-SWB group. Greenspoon and Saklofske (2001) identified differences between the four mental health status groups in regard to interpersonal relationships, perceived scholastic competence, locus of control, emotionality, and behavioral conduct. Thus, the researchers concluded that information about an individual's pathology and SWB is more informative in regard to risk and functioning than information about pathology alone.

Suldo and Shaffer (2008) further validated the use of a dual-factor model of mental health for early adolescents. Again suggesting that psychopathology and well-being are separable constructs that make unique contributions to understanding of youth functioning, the authors identified the same four mental health status groups described by Greenspoon and Saklofske (2001). Suldo and Shaffer (2008) described these groups as vulnerable (low pathology, low SWB); troubled (high pathology, low SWB); symptomatic but content (high pathology, high SWB); and complete mental health (low pathology, high SWB). Findings from studies of the dual-factor model in youth align with the definition of mental health proposed by Seligman and Csikszentmihalyi (2000) that includes both positive and negative indicators, specifically of psychopathology and subjective well-being. The current study focuses on the positive factor of mental health—subjective well-being.

Defining Academic Success for High School Students

Research has identified several methods for determining academic success at the student level. Suldo, Gormley, DuPaul, and Anderson-Butcher (2014) described both proximal and distal measures of success for individual students. Proximal measures of individual success reflect student attitudes related to school or the performance of specific skills or behaviors over a short time period (e.g., days or weeks). In comparison, distal measures of individual success reflect the global performance of specific skills or behaviors over longer periods of time. For example, student grade-point average (GPA) is a distal measure of academic skills because it reflects student performance over an entire semester, school year, or high school career. Suldo et al. (2014) noted that student-level distal measures may be more relevant for older students, while proximal measures may be more relevant for younger students.

Another distinction between various measures of student-level success identified by Suldo et al. (2014) is that of objective compared to subjective indicators. Objective indicators of academic success do not require interpretation, while subjective measures such as attitudes toward school and learning require some subjective judgement. Based on the classification of academic success indicators provided by Suldo et al. (2014), the current study utilized the following objective, distal indicators of academic skills that measure student knowledge over time: student GPA and standardized test scores (i.e. FCAT-reading).

In regard to using student GPA as an indicator of academic achievement, a meta-analysis by Kuncel, Crede and Thomas (2005) has identified an important distinction between student-reported GPA and GPA obtained from school records. This purpose of this meta-analysis was to determine the validity and reliability of self-reported GPA compared to true GPA, as provided by school records. The authors reported that, on average, students tended to over-report their GPAs, with correlations ranging from $r = .45$ to $r = .98$. The average correlation between self-reported GPA and true GPA for high school students was $r = .82$, with an effect size of $d = .32$. However, Kuncel et al. (2005) identified specific subsets of students that were more likely to misrepresent their GPAs. Students with lower grades, students with lower ability, and high school students were all more likely to incorrectly report their GPA. Due to the presence of such systematic variance, the authors recommended that if GPA is to be used for research purposes, student GPAs should be obtained from school records rather than from self-report measures. Based on this research, the present study utilized GPA data obtained from official school records.

Another measure of academic achievement identified by Suldo et al. (2014) is academic engagement, which is often considered a proximal indicator of academic success. Academic engagement includes beliefs and behaviors that can pose barriers to learning or increase access to

instruction, which are both necessary for later success. Specifically, academic engagement is typically defined in the literature as a psychological process that is related to learning and consists of the attention, interest, investment and effort a student puts into learning (Marks, 2000). According to Appleton et al. (2006), there are three subtypes of academic engagement: affective engagement, behavioral engagement, and cognitive engagement. Engagement is considered a meaningful indicator of academic success because it leads to achievement, as indicated by academic skills (e.g. GPA or standardized test scores) and other important outcomes, such as high school graduation and the pursuit of higher education (Marks, 2000). Further, engagement is thought to be the key factor in dropout and school completion (Reschly, Huebner, Appleton, & Antaramian, 2008).

In regard to the relationship between academic engagement and academic achievement, Marks (2000) noted that while there is a strong positive relationship between student engagement and objective measures of academic performance, the two concepts are independent of one another. Research by Wang and Holcombe (2010) found that all three components of academic engagement were related to later GPA after controlling for previous school performance. Specifically, longitudinal data collected one year apart indicated that school participation (a behavioral measure of engagement; $\beta = .13$), identification with one's school (an affective measure of engagement; $\beta = .32$), and use of self-regulation strategies (a cognitive measure of engagement; $\beta = .17$) were all associated with later GPA.

While most previous research on academic engagement has focused solely on behavioral indicators of engagement, research is emerging regarding the cognitive and affective components of engagement (Appleton, Christenson, Kim & Reschly, 2006). Specifically, Appleton and colleagues (2006) note that indicators of affective engagement include attitudes about learning

and feelings toward one's school, while indicators of cognitive engagement include motivation and goal-setting. Appleton et al. (2006) recommends researchers use self-report measures to gain insight into the two less observable components of engagement. This recommendation aligns with Linnenbrink and Pintrich's (2002) position that researchers should include multiple components of engagement in order to gain a more complete understanding of student engagement compared to information gained when evaluating only one component of engagement.

In regard to academic success, the current study examined multiple measures of academic success in order to gain a more complete understanding of student functioning. Two distal measures of academic skills were utilized: student GPAs obtained from school records and standardized test scores (i.e., FCAT-reading scores). Additionally, the current study examined an indicator of affective engagement (i.e., attitudes toward school) and an indicator of cognitive engagement (i.e., goal valuation), which are often considered more proximal measures of academic success. By including two indicators of academic engagement, the current study aimed to contribute to the limited existing knowledge regarding the link between students' mental health and academic engagement specifically.

Links between Mental Health and Academic Engagement

To date, there has been limited research regarding the links between students' mental health and academic engagement. There has been even less research evaluating multiple components of academic engagement, as most research has focused exclusively on indicators of behavioral engagement. For example, Li and Lerner (2011) focused on a negative indicator of overall mental health in relation to academic engagement. The sample of 1977 adolescents in grades 5-8 came from a larger longitudinal study, and was 43% female, 63% European

American, 24% Latino/a, 8% African American, 3% Asian, 3% Native American, and 4% other ethnicity. Students' depression was measured using the Center of Epidemiologic Studies Depression Scale, emotional engagement was measured with three items targeting caring about school, behavioral engagement was measured with four items targeting academic functioning (e.g., attendance, homework completion), and academic skills were measured using student-reported grades on an eight-point scale. Statistical analyses were conducted using ANOVAs, and results indicated that depression was negatively associated with behavioral engagement (F[3,1967]=19.71, p<.01), emotional engagement (F[3,1967]=27.79, p<.01), and grades (F[3,1967]=52.52, p<.01). It is unclear whether the relationship identified by Li and Lerner (2011) is also present when positive indicators of mental health, such as life satisfaction, are considered. For example, research by Ladd, Buhs, and Seid (2000) investigated the longitudinal relationship between kindergarten students' behavioral engagement and their satisfaction with school, which is one component of life satisfaction, according to Huebner (1991c). Data were collected during the fall semester and spring semester of 202 students' kindergarten year. The School Liking and Avoidance Questionnaire was used to assess school satisfaction, and the Teacher Rating Scale of School Adjustment was used to measure students' independent and cooperative class participation, which was considered an indicator of behavioral engagement. Results indicated that school satisfaction significantly and positively predicted independent class participation (β = .19) and cooperative class participation (β = .23) one semester later. Furthermore, students' later school satisfaction was significantly predicted by both cooperative class participation (β = .23) and independent class participation (β = .19). Thus, this study provided initial support for the existence of a reciprocal relationship between student

engagement and school satisfaction, although the extent to which these findings may generalize to older students is not clear.

Research by Elmore and Huebner (2010) addressed this gap by studying the relationship between school satisfaction and academic engagement among middle school students. Using the Multidimensional Student's Life Satisfaction Scale (MSLSS) school satisfaction subscale and the Assessment of Behavioral Disaffection Scale withdrawal and aggression/resistance subscales, data were collected from 565 7th and 8th grade students one year apart. Regression analyses were used to determine the relationship between behavioral engagement and school satisfaction, with relevant demographic variables controlled for by being entered first into the regression equations. Results indicated that students' later resistance and aggression (i.e., low behavioral engagement) was significantly and negatively predicted by school satisfaction ($\beta = -.15$), and students' later withdrawal (i.e., low behavioral engagement) was also significantly and negatively predicted by school satisfaction ($\beta = -.27$). Thus, the authors concluded that high levels of these two negative indicators of behavioral engagement can be predicted by lower levels of students' satisfaction with school.

The first research investigating the link between engagement and a more traditional indicator of subjective well-being was conducted by Oberle, Schonert-Reichl, and Zumbo (2011). Participants included 1402 Canadian students in 4th through 7th grades. The sample was 47% female and was stratified by "vulnerability," which included socio-economic status (SES). Life satisfaction was measured using the Satisfaction with Life Scale (SWLS) and affective engagement was measured through school connectedness, as assessed with the Sense of School as a Community Scale. The zero-order correlation between life satisfaction and school connectedness was significant ($r = .42$) and multi-level modeling was used to further analyze the

data. Results indicated that school connectedness was significantly related to life satisfaction at both the student level (γ_{40} = .18, t[1,339.33]=6.11, p<.001) and at the school level (γ_{01} = .43, t[18.59]=2.76, p=.01). However, it is important to note that this study did not investigate the potentially bidirectional nature of the relationship between affective engagement and life satisfaction, as affective engagement was examined as a predictor variable only.

Lewis, Huebner, Malone, and Valois (2011) examined the bi-directional relationship between students' global life satisfaction and three indicators of student engagement. Participants were 779 students in 7th and 8th grades at one middle school (mean age = 12.6 years old). The sample was 53% female, 62% Caucasian, 31% African American, and 7% Asian, Hispanic, or other racial group. Approximately 21% of students in the sample were of low socioeconomic status, as measured by free or reduced price lunch. Time 1 data were collected from students during Fall 2008 and Time 2 data were collected during Spring 2009. Life satisfaction scores were obtained using the Student's Life Satisfaction Scale (SLSS); emotional engagement was calculated from the School Satisfaction subscale of the MSLSS; cognitive engagement was measured using the Future Aspirations and Goals subscale of the Student Engagement Instrument (SEI); and behavioral engagement was assessed with the behavioral engagement subscale of the School Engagement Scale (SES-B). Correlational analyses indicated moderate significant correlations between Time 1 life satisfaction and Time 2 emotional engagement (r = .30, p<.01), Time 2 cognitive engagement (r = .33, p<.01), and Time 2 behavioral engagement (r = .39, p<.01). There were also moderate significant correlations between Time 2 life satisfaction and Time 1 emotional engagement (r = .27, p<.01), Time 1 cognitive engagement (r = .38, p<.01), and Time 1 behavioral engagement (r = .39, p<.01). Structural equation modeling was used to determine whether Time 1 life satisfaction predicted later engagement at Time 2 and

whether Time 1 engagement predicted later life satisfaction at Time 2, after controlling for demographic variables and baseline levels of the given outcome variable. Results indicated that Time 1 life satisfaction significantly predicted Time 2 cognitive engagement (β = .09, p<.05) but not emotional or behavioral engagement at Time 2. Additionally, cognitive engagement at Time 1 was found to be a significant predictor of Time 2 life satisfaction (β = .12, p<.05). Neither emotional nor behavioral engagement at Time 1 significantly predicted later life satisfaction scores. Lewis and colleagues (2011) noted that the study was impacted by attrition, due to the fact that students who did not participate in data collection at Time 2 were more likely to have lower life satisfaction, lower behavioral engagement, and lower GPAs. Additionally, there was a relatively short period of time between Time 1 and Time 2 data collection, which may have led to greater stability for variables.

In sum, previous research has investigated the relationship between mental health and all three subtypes of academic engagement: affective engagement (Lewis et al., 2011; Li & Lerner, 2011; Oberle et al., 2011), cognitive engagement (Lewis et al., 2011; Li & Lerner, 2011), and behavioral engagement (Elmore & Huebner, 2010; Ladd et al., 2000; Lewis et al., 2011). Measures of mental health used in such research includes indicators of school satisfaction (Elmore & Huebner, 2010; Ladd et al., 2000), negative indicators of mental health (i.e., depression; Li & Lerner, 2011), and positive indicators of overall mental health (i.e., life satisfaction; Lewis et al., 2011; Oberle et al., 2011). The above-described research included primary-aged students (Ladd et al., 2000; Oberle et al., 2011) and early adolescents (Elmore & Huebner, 2010; Lewis et al., 2011; Oberle et al., 2011); older adolescents have not been included in extant research on the relationship between academic engagement and mental health. Thus,

future research should further investigate if and how the three subtypes of academic engagement are related to mental health among high school students.

Links between Life Satisfaction and Measures of Academic Skills

In comparison to research regarding academic engagement, there has been substantial research regarding the relationship between students' life satisfaction and indicators of academic achievement or skills. Initially, researcher's exploration of the potential links between life satisfaction and academic success were guided by the happy-productive worker hypothesis. Wright, Cropanzano, Denney, and Moline (2002) conducted a longitudinal study investigating the validity of the happy-productive worker hypothesis, which posits that happier workers will be more productive and have higher performance compared to workers who are unhappy. Although the authors noted that previous research on the topic has been mixed, results from Wright et al.'s (2002) study supported this hypothesis because happy workers in their sample demonstrated higher job performance compared to unhappy workers. Suldo and colleagues (2006) extended the application of the happy-productive worker hypothesis to education by suggesting that happy students would be more productive (i.e. have higher achievement) than unhappy students. Crede, Wirthwein, McElvany, and Steinmayr (2015) also noted that the happy-productive worker hypothesis can be applied to educational situations, and these researchers hypothesized that just as happier workers are more productive, students with higher life satisfaction will have higher academic achievement. This hypothesis has helped to guide empirical investigations of the relationship between achievement and life satisfaction. Such studies are described next, beginning with research that does not support a relationship between academic success and life satisfaction, and continuing with research that has supported such a relationship.

Lack of support for concurrent relationships. Research investigating the relationship between measures of academic skills (e.g. standardized test scores, GPA) and life satisfaction has been inconsistent, with some studies supporting the relationship while others have failed to support such a relationship (Crede, Wirthwein, McElvany, & Steinmayr, 2015). For example, Huebner (1991a) investigated the correlates of global life satisfaction among children. Participants included 79 Caucasian students in 5th, 6th, and 7th grades (ages 10-13). The SLSS was used to measure life satisfaction, and academic achievement was assessed by calculating the average of all grades on each student's last report card. Findings from this study indicated that school grades were not significantly correlated with SLSS scores (r =.14, p =.11). The participants in this study were as young as ten years old, and it may be that a more proximal measure of academic success would have led to different findings. The small sample size also contributed to reduced power to identify an effect if and when one was present.

Another study that did not support a link between life satisfaction and academic achievement was conducted by Huebner and Alderman (1993). Two groups of students were included as participants in this study. One group was identified as being at-risk for academic failure due to learning and/or emotional problems, and the other group was a matched control group that was not experiencing academic problems. Twenty-eight students were included in each group for a total of 56 participants. Participants were 54% male, 75% Caucasian, 21% African-American, 4% Hispanic, and in 3rd through 6th grade (mean age = 10.2 years old). The SLSS was used to measure students' life satisfaction, and academic functioning was determined based on teacher referral that the student was at-risk for academic failure. Results of this study found no significant difference between the two groups regarding scores on the SLSS, leading the authors to conclude that there was no relationship between academic performance and global

life satisfaction. The mean SLSS score for the at-risk group was 20.71 and the mean for the control group was 23.14 (t[54] = 2.19, p = ns). One key limitation of this study is the method of measuring academic achievement. Academic functioning was based on a subjective referral from teachers rather than an objective indicator of success, which may have influenced findings, given that most schools define academic success in objective terms (e.g. grades, test scores). Also, the relatively small sample size utilized limited statistical power to detect differences between groups.

Research by Chow (2008) also failed to support the relationship between life satisfaction and academic achievement. The purpose of this study was to investigate correlates of life satisfaction among high school students in Canada. Participants included 262 students (aged 14-19) who attended 14 high schools in Canada. Participants were 49% male, 87% Caucasian, 53% Catholic, and 51% middle-class. Life satisfaction was measured using a single item with a five-point Likert-type scale, and student GPA was self-reported. Multiple ordinary least squares (OLS) regression analyses were conducted for 13 predictor variables simultaneously, including academic performance (i.e. GPA). Results from these analyses indicated that academic performance was not a significant predictor of life satisfaction at an alpha level of .05 (β =.012; p >.05). Given that this study consisted only of Canadian participants, used self-reported GPA, and measured life satisfaction using a single item, confidence in the results of this research is limited. Additionally, because the OLS regression analyses were conducted simultaneously, it is possible that another predictor variable (e.g., SES) suppressed a significant relationship between life satisfaction and GPA. The bivariate association between life satisfaction and GPA was not reported in the article.

Cheng and Furnham (2002) examined if and how self-confidence and school performance correlated with self-rated happiness among adolescents in the United Kingdom (UK). Participants included 90 adolescents (54% male) in the UK between the ages of 16 and 18. In this study, happiness was measured using the Oxford Happiness Inventory (OHI) and academic achievement was measured using student-reported grades. The Personal Evaluation Inventory was used to assess students' self-confidence in regard to their academic ability. Initial analyses found that school grades were significantly correlated with happiness ($r = .25$, $p < .05$) after controlling for age and sex. However, hierarchical regression analyses indicated that school grades were not a significant predictor of happiness after self-confidence regarding academic ability was included in the model. Limitations of this study include the use of self-reported grades rather than school-reported grades, and the potentially misleading conclusion that academic skills are not crucial to subjective well-being just because a related variable (i.e., academic self-efficacy) is a stronger predictor.

In addition to the above studies that reported a lack of significant findings, one study has reported a negative relationship between academic achievement and life satisfaction. This study by Marks, Shah, and Westall (2004) investigated the link between life satisfaction and school factors, including school-level academic achievement, among students in the UK. A total of 1,080 primary and secondary students between the ages of nine and fifteen who lived in Nottingham, UK participated in this study. Students' life satisfaction was measured using the MSLSS and school-level academic achievement for four schools was determined based on national test results in math, English, and science. Students attending School A, which had the highest aggregate academic achievement of all four schools included in the study, reported the lowest levels of overall life satisfaction and school satisfaction compared to students attending

other schools. However, it is important to note that correlational analyses and regression analyses were not conducted as part of the analysis, so no statistical information regarding the relationship between well-being and academic success for individual students is available from this study. Additionally, the researchers used school-level measures of achievement rather than individual student-level measures, which may have influenced the results given that life satisfaction was measured at the student level. Another school-level variable, such as stress or parental pressure, could have caused the lower life satisfaction amongst students attending the school with the highest achievement.

In summary, researchers have reported a lack of significant findings or negative findings among primary students (Huebner & Alderman, 1993; Marks et al., 2004), middle school students (Huebner, 1991; Marks et al., 2004), and secondary students (Cheng & Furnham, 2002; Chow, 2008). However, these findings may be explained by issues with the conceptualization of constructs and/or with the design of the studies. For example, several of the above studies failed to clearly and appropriately define the construct of academic success. Specifically, academic success was not verified by Huebner and Alderman (1993), and instead teachers' subjective reports were used to indicate academic success. Furthermore, Huebner (1991) used GPA as an indicator of academic success for younger students, which other researchers (Suldo et al., 2014) have described as being less relevant than other measures of academic success among this age group. Additionally, Marks et al. (2004) used a school-level indicator of achievement and an individual-level indicator of life satisfaction and did not consider extraneous variables, which may have influenced the negative findings reported by the researchers. Several studies that reported a lack of significant findings also used problematic methods to assess life satisfaction. For example, Chow (2008) used a single-item measure of life satisfaction, which may not

provide a complete picture of students' life satisfaction. Finally, both Huebner (1991a) and Huebner and Alderman (1993) utilized relatively small sample sizes in their research, which reduced power to identify an effect if and when one was present. Finally, the use of multivariate analyses by both Chow (2008) and Cheng and Furman (2002) may have masked a significant relationship between subjective well-being and academic achievement. Thus, further research is needed to determine whether the lack of findings or negative findings reported above can be explained by the indicators used to measure life satisfaction and/or academic success.

Support for concurrent relationships. Compared to the research described above that failed to find a significant positive relationship between students' life satisfaction and academic achievement, much research has supported a concurrent relationship between these two variables. For example, research by Kirkcaldy, Furnham and Siefen (2004) examined archival data from 30 countries to specifically determine the correlates of happiness. Specifically, the researchers were interested in determining whether national educational attainment was related to a nation's happiness. Data on national happiness were obtained from Veenhoven's World Database of Happiness, and average national academic achievement was obtained from the Programme for International Students Assessment (PISA) survey, which included data from 250,000 15-year-olds from 30 countries. Correlational analyses found that the average level of happiness in a country was positively correlated with three educational literacy variables: science literacy (r = .57), math literacy (r = .59), and reading literacy (r = .63). Furthermore, happiness explained up to 40% of the variance in a nation's educational literacy. However, it is important to note that the data used in this study were collected at a national level, and national-level associations between variables do not necessary indicate similar associations at an individual level. Additionally, Kirkcaldy et al. (2004) did not account for any economic or social factors

(e.g., family size, income) that differ between countries, and it is possible that the correlations described reflect some other, cofounding variable that was not controlled for by the researchers.

In order to learn more about the presence of life satisfaction among college students in the Canadian city of Regina, Chow (2005) examined 318 undergraduates (mean age = 20.6 years old). The sample was 36% male and 86% white. The SWLS was used to assess life satisfaction in conjunction with a 21-item survey measuring specific aspects of life satisfaction, such as relationships and leisure activities. The author did not provide information regarding how school performance was measured. Using multiple OLS regression analyses that did not include statistical controls, Chow (2005) reported that GPA was a significant predictor of life satisfaction (β =.13). However, due to the limited geographic location of the college students in this study, as well as the lack of information on how GPA were obtained, the results of this study may not generalize to adolescents in the United States. Research conducted in Hungary by Piko and Hamvai (2010) sought to determine the social correlates of life satisfaction among adolescents in that country. Eight hundred and eighty-one high school students in Hungary between the ages of 14 and 20 participated in the study. The sample was 45% female; no information was provided regarding the ethnicity of the sample. Students' life satisfaction was measured using the SWLS and academic achievement was measured using a seven point self-report Likert-type scale from 1 (*mostly D's and F's)* to 7 *(mostly A's)*. Multiple regression analyses that did not include statistical controls revealed that students' self-reported ratings of good academic achievement significantly predicted life satisfaction for both boys (β =.12) and girls (β =.10). Due to the use of an unvalidated self-report scale to measure academic achievement, it is not clear whether objective measures of academic achievement would produce similar results. The authors did not note whether a translated version of the SWLS was used or whether the SWLS has been

previously validated for use with Hungarian students, which may limit the validity of these findings. Additionally, because the study included only Hungarian students, it is possible that cultural factors influenced these findings and it is not clear whether these results could be generalized to students from other cultural backgrounds.

Gilman and Huebner (2006) also found support for a positive relationship between academic success and life satisfaction. The purpose of this study was to investigate the characteristics of adolescents who reported high levels of global life satisfaction. Participants included 190 students in grades 6-12, with the sample being 54% male, 87% Caucasian, 3% Hispanic, 2% Asian, 2% African-American, and 6% other ethnic group. Only 4% were of low SES (as measured by free or reduced lunch status). Academic achievement was assessed using self-reported GPA and life satisfaction was measured with the SLSS. Correlational analyses found that the correlation between students' global life satisfaction and GPA (r = .32) was significant at an alpha level of .01. When participants were then separated into high life satisfaction, average life satisfaction and low life satisfaction groups, there was a significant difference between the low life satisfaction group and the other two groups in regard to GPA (F[2, 410] =19.44, p <.01). Limitations regarding the generalizability of this study include the lack of ethnic/racial and economic diversity in the sample and the use of self-reported GPA rather than GPA from school records.

Within the framework of the dual-factor model of mental health, Suldo and Shaffer (2008) conducted research exploring how SWB and academic functioning were related. Participants included 349 6^{th}-8^{th} students aged 10-16 years old. The sample was 60% female, 55% Caucasian, 14% African-American, 12% Hispanic, and 26% low SES (as measured by free or reduced-price lunch status). GPA and standardized test scores were obtained from school

records, the SLSS was used to assess life satisfaction, and the Child Behavior Check List (CBCL) was used to determine the presence of psychopathology. Results from this study indicated that, in regard to academic functioning, students who had both high SWB and low psychopathology (known as the complete mental health group) had the highest standardized test scores in reading and math compared to students in other mental health status groups. However, such a relationship was not found when GPA was used as an indicator of academic success and demographic factors associated with grades were accounted for in analyses. Because this study of between group differences did not support such a relationship, more research is needed to determine the presence of linear relationships between academic outcomes and subjective well-being.

Expanding upon the findings from Suldo and Shaffer (2008), Renshaw and Cohen (2014) explored the relationship between life satisfaction and student functioning among college students within the dual-factor model of mental health. Participants were 1,356 undergraduate college students between the ages of 17 and 52 (mean age = 19.2 years old). In regard to demographic variables, the sample was 65% female, 82% Caucasian, 8% African-American, 3% Hispanic, and 3% Asian. Life satisfaction was measured using the six-item General Life Satisfaction Scale from the Quality of Life Interview, Brief Version, which was created specifically for the purposes of the study. Student functioning was assessed through self-reported GPA. The zero-order correlation between life satisfaction and student GPA (r = .10) was statistically significant at the .01 alpha level. Due to violation of assumptions, Welch's tests were used to analyze the data. Similar to findings by Suldo and Shaffer (2008) specific to test scores, the findings reported by Renshaw and Cohen (2014) indicated that when combined with indicators of psychological distress, life satisfaction had additive value in predicting academic

achievement. For the purposes of these analyses, the authors chose to collapse life satisfaction scores into two groups, low/mixed life satisfaction and moderate/high life satisfaction. This may have influenced the findings of this study, and it is possible that there is a more nuanced relationship between life satisfaction and academic achievement that was suppressed by the grouping of life satisfaction into two categories. An additional limitation of this study is the use of student-reported GPA rather than GPA from school records.

In summary, many studies exploring the concurrent relationship between students' academic achievement and their life satisfaction have supported such a relationship among adolescents (Gilman & Huebner, 2006; Kirkcaldy et al., 2004; Piko & Hamvai, 2010; Suldo & Shaffer, 2008) and college students (Chow, 2005; Renshaw & Cohen, 2014). While several validated measures of life satisfaction were utilized in these studies, including the SLSS (Gilman & Huebner, 2006; Suldo & Shaffer, 2008), the Quality of Life interview (Renshaw & Cohen, 2014), the SWLS (Piko & Hamvai, 2010) and the World Database of Happiness (Kirkcaldy, 2004), only one study (Suldo & Shaffer, 2008) used a measure of academic achievement other than GPA. Thus, future research using multiple indicators of academic achievement is needed to further clarify the relationship between achievement and life satisfaction.

Overall, research on this topic has produced inconsistent results, with some studies reporting a significant relationship and other studies reporting non-significant relationships. On the other hand, studies that analyzed bivariate associations between individual students' life satisfaction and grades have consistently found small (e.g., Renshaw & Cohen, 2014) to large correlations (e.g., Kirkcaldy et al., 2004). Research utilizing predictive analyses of these variables has shed further light on the association between these two constructs.

Support for cross-sectional predictive relationships. One of the first studies investigating the predictive relationship between life satisfaction and academic achievement was conducted by Chang, McBride-Chang, Stewart, and Au (2003). The purpose of their study was to investigate the predictors of life satisfaction among children and adolescents living in Hong Kong. Participants were 115 children in 2nd grade and 74 adolescents in 8th grade. The samples were 56% female and 53% female, respectively. All participants were students attending schools in the highest-achieving school track in Hong Kong. The MSLSS was used to measure students' life satisfaction. The authors noted that the MSLSS had been translated into Chinese and had been checked by an independent evaluator to ensure meaning was preserved during translation and to check for appropriate language use. Students' academic achievement was measured through a composite score that was created from test scores in three subjects: math, Chinese, and English. One test score per subject was used, and tests were not standardized. Multiple regression analyses were used to determine significant predictors of life satisfaction among each group of students. In each analysis, statistical controls were used to account for the influence of other predictors (e.g., parental warmth, self-concept). Results indicated that academic achievement was a significant predictor of life satisfaction among 2nd grade students, but not among 8th grade students. Chang et al. (2003) suggested that this could be due to the greater emphasis on tests in Hong Kong primary schools that declines when students move to middle school. The authors hypothesized that test scores may also be more salient to children compared to adolescents because children have fewer aspects of life outside of school, while adolescents typically have more aspects of life that contribute to life satisfaction, such as relationships with friends or significant others. It is not clear whether the results can be generalized to other populations due to the strong cultural emphasis on academic achievement in Hong Kong and the

inclusion of students who all attended highly rigorous schools. Additionally, unstandardized test scores were used to measure academic achievement, which could create issues with comparability of scores across subjects. Finally, test scores were collected at a single time point, which does not reflect student performance across subjects and across time in the same way that GPA reflects student performance.

Crede, Wirthwein, McElvany, and Steinmayr (2015) examined if the relationship between academic achievement and life satisfaction among German adolescents was moderated by parents' educational attainment. A total of 411 11^{th} grade students in Germany participated in the study, with the sample being 49% female, predominantly Caucasian, and predominantly middle or high SES. All participants attended schools in the most academically rigorous and prestigious secondary school track available in Germany. Students' life satisfaction was measured using the seven-item General Life Satisfaction Scale and GPA was obtained from school records. Bivariate analysis indicated that the correlation between life satisfaction and GPA (r = .14) was statistically significant at a .01 alpha level. Using multiple regression analyses, Crede et al. (2015) found that life satisfaction significantly predicted students' academic achievement (β =.40) after controlling for demographic variables. Furthermore, results indicated that mothers' education attainment moderated the relationship between life satisfaction and academic achievement (academic achievement x mothers' education, β =.47), while fathers' education attainment had no moderating effect. When mother's education level was high, there was a stronger link between academic achievement and life satisfaction. However, because this study consisted only of German participants, it is not clear whether these results are generalizable to students from other cultures. Suldo and colleagues (2006) have suggested that culture may moderate the link between academic achievement and life satisfaction. Specifically,

students' life satisfaction may be more affected by school performance in cultures that place a heavy emphasis on academic success. Additionally, all participants in this study attended highly rigorous secondary schools, which may similarly moderate the relationship between life satisfaction and academic achievement. It is possible that academic achievement has a stronger influence on life satisfaction among students attending academically prestigious schools because academic success is more strongly emphasized in such a context. Finally, the authors did not note if or how the General Life Satisfaction Scale was translated into German, which may limit the validity of students' life satisfaction scores.

Testing a theoretical model of students' life satisfaction, Suldo, Shaffer, and Riley (2008) investigated how school-related factors predicted life satisfaction among American high school students. Participants were 321 high school students between the ages of 14 and 19. The sample was 68% female and 20% low SES (as measured by free or reduced-price lunch status). In regard to ethnicity, the sample was 70% Caucasian, 10% African-American, 8% Hispanic, and 9% other ethnic groups. Students' cumulative GPAs were obtained from school records and life satisfaction was measured using the SLSS. Correlational analyses indicated that academic achievement was significantly correlated with global life satisfaction (r = .21). Path analyses were conducted and the researchers statistically controlled for the variance in the outcome variable accounted for by other predictor variables (e.g., school climate, behavior problems). Additionally, path analysis revealed that the relationship between life satisfaction and academic achievement was mediated by students' personal academic beliefs, with high-achieving students reporting stronger academic beliefs, which in turn predicted greater life satisfaction.

Forrest, Bevans, Riley, Crespo and Louis (2013) also investigated the relationship between health measures, including life satisfaction and well-being, and school outcomes. Cross-

sectional data from a larger, three-year longitudinal study were analyzed in this study. A total of 1,479 students from three U.S. school districts were included in the study. Students were in 4th through 8th grades, and the sample was 52% female and 21% non-white. Life satisfaction was measured using a five-item self-report scale, although the specific measure was not identified by the authors. Academic achievement was determined from student GPAs and achievement test scores, which were obtained from school records. After controlling for all demographic variables, high life satisfaction was found to be a significant predictor of high GPA (β =.08), but not a significant predictor of standardized test scores. Although Forrest et al. (2013) mentioned the possibility of a bidirectional relationship between life satisfaction and academic achievement, the analyses used in this study did not consider life satisfaction as an outcome variable in addition to a predictor variable. Additionally, the authors failed to provide specific information on the life satisfaction measure used, and they also did not describe the specific standardized test scores included as a measure of academic achievement. Nevertheless, the authors concluded that good health, including high life satisfaction, may act as a resource children can draw upon to protect them from potentially harmful life stressors.

In order to determine the incremental validity of life satisfaction relative to positive affect and negative affect as predictors of student engagement and achievement, Heffner and Antaramian (2016) examined archival data obtained from middle school students in 7th and 8th grades. Participants were 814 students (mean age = 12.7 years old) attending the same middle school. The sample was 54% female, 62% Caucasian, 31% African-American, and 7% Asian, Hispanic, or other racial group. Approximately 22% of the sample received free or reduced price lunch, an indicator of low SES. Life satisfaction was assessed with the SLSS; the PANAS-C was used to measure positive and negative affect; cognitive engagement was measured with the

Future Aspirations and Goals subscale of the SEI; affective engagement was assessed with the Teacher-Student Relationship scale of the SEI; behavioral engagement was measured using the behavioral engagement subscale of the SES-B; and GPAs and standardized test scores were obtained from school records. Results indicated that students' life satisfaction was significantly correlated with cognitive engagement (r = .26, p<.01), affective engagement (r = .38, p<.01), behavioral engagement (r = .38, p<.01), standardized math test scores (r = .12, p<.01), and GPA (r = .21, p<.01). Regression analyses revealed that although positive affect did not significantly predict GPA, negative affect was a significant predictor of students' GPA (β = -.12, p<.01). Positive affect was found to be the only significant predictor of standardized language test scores (β = -.113, p<.01). Additionally, life satisfaction significantly predicted academic outcomes above and beyond the influence of positive and negative affect. Specifically, life satisfaction predicted affective engagement (F[1,788]=38.09, p<.01), cognitive engagement (F[1,791]=44.39, p<.01), behavioral engagement (F[1,801]=55.55, p<.01), GPA (F[1,804]=16.05, p<.01), and standardized math test scores (F[1,755]=8.70, p<.01). Limitations of the study include that the study utilized cross-sectional data only and thus may not accurately portray how life satisfaction and academic achievement variables are related across-time.

In order to determine whether global life satisfaction predicts college students' academic performance, Rode et al. (2005) collected data from 673 college students in the United States. The mean age of students was 20.7 years old, and the sample was 57% male and 79% white. Students' cumulative GPAs were obtained through self-report, and a subsample of 100 student GPAs were checked against university records. The correlation between self-report and actual GPA was r = .93. Life satisfaction was measured with the SLSS, and control variables included gender, country of citizenship (a proxy for language), and IQ (measured using the Wonderlic

Personnel Test). Structural equation modeling (SEM) indicated that students' life satisfaction was significantly related to GPA (path coefficient = .15) after controlling for demographic variables. Furthermore, the authors reported that after controlling for leisure satisfaction, which was a predicted suppressor variable, the path coefficient between GPA and life satisfaction increased (path coefficient = .20). Limitations of this study include the use of self-reported GPA, and the use of only university students with the same undergraduate major (business) throughout both parts of the study. Additionally, at Time 1 students were asked to report their GPA on the same questionnaire that contained the life satisfaction measure, and it is possible that students' perceptions of their life satisfaction could have been influenced by thinking about their GPA beforehand. However, this study significantly contributed to the literature on the relationship between academic achievement and life satisfaction as it was the first to consider life satisfaction as a predictor variable rather than an outcome variable.

In sum, researchers have reported that academic achievement significant predicts students' life satisfaction in collectivist nations (Chang et al., 2003) and individualistic nations (Suldo et al., 2008). Additionally, life satisfaction has been found to significantly predict various indicators of academic achievement in research in individualistic nations (Crede et al., 2015; Forrest et al., 2013; Rode et al., 2005). Significant findings have been reported among a wide age range of age levels, including primary students (Chang et al., 2003), adolescents (Crede et al., 2015; Forrest et al., 2013; Suldo et al., 2008), and college students (Rode et al., 2005). However, none of the above-described studies have considered a bidirectional relationship between academic achievement and life satisfaction, although initial support for a longitudinal relationship between the two variables was reported by Rode et al. (2005). Finally, the only study to include standardized test scores as an indicator of academic achievement (Forrest et al., 2013)

reported a lack of significant findings, which is inconsistent with between-group analyses reported by Suldo and Shaffer (2008). Thus, further research using multiple indicators of academic achievement is needed to better understand the predictive, bidirectional relationship between life satisfaction and academic success.

Longitudinal studies. While the above studies investigated the predictive relationship between achievement and life satisfaction using cross-sectional data, Leung, McBride-Chang, and Lai (2004) were the first to do so using longitudinal data. The purpose of this study was to determine whether students' perceived academic competence predicted life satisfaction. Participants were 346 7th grade students in China, all of whom attended schools that were highly-ranked in terms of student discipline and academic performance. Students were between the ages of 11 and 14, and the sample was 36% male. The MSLSS was used to assess global life satisfaction, and the measure was translated into Chinese and back-translated by research assistants to ensure the meaning of items was preserved. Students were asked to report their academic achievement as a comparison of their performance to other students in the class on a five-point scale ranging from 1 (*much worse than other students*) to 5 (*much better than other students*). Data were collected in October and November, 1999 (Time 1) and again seven months later in June and July, 2000 (Time 2). A conceptual model using repeated measures analyses found that students' perceived academic achievement at Time 1 was a significant predictor of global life satisfaction at both Time 1 (path coefficient = .54) and Time 2 (path coefficient = .26). Because this study included only students from China, it is possible that cultural factors moderated the relationship between life satisfaction and academic achievement. Also, the participants in this study all attended highly-ranked schools, which likely resulted in a restricted range that may have also influenced the relative impact of academic achievement on students'

life satisfaction. Additionally, because academic achievement was assessed using student perceptions of how they were performing in comparison to other students in their class, it is possible that this method may not be an accurate representation of how the student is performing objectively. Similar to issues identified by Kuncel et al. (2005) regarding self-report GPA, it may be that students who have low achievement report that compared to their peers, they have average or above-average achievement.

Similarly, a two-year longitudinal study in Portugal by Marques, Pais-Ribeiro, and Lopez (2011) investigated the relationship between various positive psychology constructs—including life satisfaction and hope—and academic achievement among Portuguese students. Data were collected at three time points over the course of two years, and the final sample was 53% female and consisted of 202 students between the ages of 12 and 16. Students were in 6th and 8th grades at Time 1, 7th and 9th grades at Time 2, and 8th and 10th grades at Time 3. Life satisfaction was measured using the previously validated Portuguese version of the SLSS and academic achievement was obtained from school records. Students' average academic achievement was calculated using numerical scores (range 1-5) from each school subject. Academic achievement was found to be moderately correlated with life satisfaction at Time 1 (r = .25), Time 2 (r = .24), and Time 3 (r = .28). However, hierarchical regression analyses found that Time 2 life satisfaction did not predict academic achievement at any time points over and above what was predicted by students' Time 1 hope scores. The authors did not conduct any regression analyses that did not include hope. It is not clear from these analyses if or how hope influences the relationship between students' academic achievement and life satisfaction. Furthermore, as with several other studies described above, it is also possible that cultural factors influenced the findings of this research.

Further longitudinal research by Finnish researchers Salmela-Aro and Tuominen-Soini (2010) investigated factors associated with changes in adolescent life satisfaction. Specifically, the researchers were interested in determining how academic achievement was related to life satisfaction among adolescents living in Finland. The final sample included 642 adolescents in the 9th grade, with 49% of the sample being female. Life satisfaction was measured using the SWLS at Time 1, and again five months later at Time 2. Cumulative GPA was obtained through self-report at Time 2 only. Correlational analyses indicated that academic achievement was significantly correlated with life satisfaction at Time 1 (r = .33) and Time 2 (r = .30). Furthermore, latent growth modeling found that academic achievement was predictive of life satisfaction for both boys (*Estimate* = 0.188, SE = 0.083, p <0.05) and girls (*Estimate* = 0.343, SE = 0.115, p <0.01). Specifically, students with higher levels of academic achievement also experienced higher levels of life satisfaction across time. Limitations of this study include the use of self-report GPA and the inclusion of only Finnish students, because culture may impact the generalizability of these findings to students from different cultural or national backgrounds. Additionally, the authors did not discuss whether or how the SWLS was translated to Finnish or provide support for the measure as valid for use among Finnish students.

In the United States, Suldo, Thalji and Ferron (2011) analyzed longitudinal data to determine whether subjective well-being predicted students' academic achievement one year later. Participants were 300 students and the sample was 55% Caucasian, 14% African-American, and 12% Hispanic. The sample was 37% male and 25% low-SES (as measured by free or reduced-price lunch status). Composite SWB scores were calculated for each student by combining life satisfaction scores (as measured by the SLSS) and positive affect scores after subtracting negative affect scores. Positive affect and negative affect were measured using the

Positive and Negative Affect Schedule - Children (PANAS-C). Academic achievement variables were obtained from school records and included student GPA and scaled standardized test scores in reading and math (FCAT; range 1-5). Correlational analyses indicated that students' Time 1 SWB was significantly correlated with Time 1 GPA (r = .24), Time 1 FCAT-reading scores (r = .27), and Time 1 FCAT-math scores (r = .25). SWB at Time 1 was also significantly correlated with Time 2 GPA (r = .30), Time 2 FCAT-reading scores (r = .23), and Time 2 FCAT-math scores (r = .24). Multiple regression analyses were used to predict each academic outcome at Time 2 from Time 1 SWB. Demographic variables and the relevant school functioning variable at Time 1 were controlled for in each analysis. Results indicated that Time 1 SWB was a small but significant predictor of Time 2 GPA (β =.14) after controlling for all demographic variables and Time 1 GPA. SWB was not a significant predictor of FCAT-reading scores or FCAT-math scores. Suldo et al. (2011) noted that students' FCAT scores were very stable over the year long period between Time 1 and Time 2 because they were scaled scores on a statewide standardized achievement test, and they suggested that this may be why SWB was not found to be a significant predictor of FCAT scores. In the future, using standardized test scores that capture more variability in performance, such as FCAT developmental scaled scores (DSS; range 772-3008), may be more useful when investigating the relationship between well-being and academic achievement.

Life satisfaction has also been found to predict grades among college students. Specifically, Rode et al. (2005) conducted a second, smaller longitudinal study with 140 of their original participants. In this second study, students' semester GPAs were obtained from school records for the semester after the original study was completed (Time 2 GPA). Then, the researchers used the students' already-collected life satisfaction scores to predict Time 2 GPA.

Results from that SEM analysis indicated that students' life satisfaction was significantly related to their Time 2 GPAs (path coefficient = .17).

While both Suldo et al. (2011) and Rode et al. (2005) used longitudinal data to predict academic achievement from subjective well-being scores, subjective well-being was not considered as a possible outcome variable. Ng et al. (2015) sought to close that gap in the literature by investigating the potential bidirectional relationship between early adolescents' life satisfaction and academic achievement using longitudinal data. The authors also considered school-related positive affect and school-related negative affect acted as moderators to that relationship. Data from 821 7th and 8th grade students in the United States were used in this study. The sample was 46% male, 22% low-SES (as measured by free or reduced-price lunch status), 62% Caucasian, 31% African-American, and 7% other ethnic group. Students' 9-week grading period GPAs were collected from school records at Time 1 and five months later at Time 2. At both time points, life satisfaction was measured using the SLSS and positive and negative affect were measured using a version of the PANAS-C that was modified to assess emotions at school. Students' baseline level of the outcome variable and demographic variables including age, race, gender, and free/reduced lunch status were controlled for in all analyses. Results from multiple regression analyses revealed that life satisfaction at Time 1 was a significant predictor of GPA at Time 2 (β =.07, p<.05) after controlling for Time 1 GPA. Neither positive affect nor negative affect were significant moderators of this relationship; instead, greater life satisfaction predicted better grades similarly for students with high or low levels of negative or positive affect. This was somewhat contrary to hypotheses, as based on prior related studies the researchers expected that students with low positive affect or high negative affect would "derive more academic benefits from high life satisfaction…the positive association of life satisfaction

with academic performance would be stronger in the absence (or low levels) of positive affect or the presence (or high levels) of negative affect" (p. 482).

Additionally, Ng et al. (2015) found GPA at Time 1 was a significant predictor of life satisfaction at Time 2 (β =.08, p<.05) after controlling for Time 1 life satisfaction. Neither positive nor negative affect significantly moderated this relationship, suggesting better achievement predicts higher life satisfaction regardless of students' baseline levels of affect at school. However, the research team noted this lack of moderation may be because they assessed affect at school (via the modified version of the PANAS-C) rather than in general (via the typical version of the PANAS-C that assesses frequency of emotions experienced in any context). It should also be noted that due to the relatively short time period between Time 1 and Time 2 (five months), both GPA and life satisfaction were relatively stable, which may have impacted the results of this study. Additionally, only GPA was used as a measure of academic achievement, which may not fully represent how life satisfaction impacts and is impacted by academic achievement.

The existing longitudinal research investigating the relationship between students' life satisfaction and academic achievement has supported a significant relationship both when achievement is considered as a predictor variable (Leung et al., 2004; Marques et al., 2011; Salmela-Aro & Tuominen-Soini, 2010) and when life satisfaction is considered as a predictor variable (Suldo et al., 2011). Additionally, the predictive relationship between academic achievement and life satisfaction has been supported using longitudinal data ranging from five months (Ng et al., 2015; Salmela-Aro & Tuominen-Soini, 2010) to two years (Marques et al., 2011). However, as high school students were only included in one study (Salmela-Aro & Tuominen-Soini, 2010), there is a need for further research among middle adolescents. Finally,

Ng et al. (2015) were the first to investigate the potential reciprocal relationship between students' life satisfaction and academic achievement, and this work was replicated and extended in the current study.

Positive and Negative Affect as Potential Moderators

As the above-described study by Ng et al. (2015) suggests, positive and negative affect should be investigated as potential moderators of the relationship between academic success and life satisfaction. Previous research has indicated that both positive and negative affect are significantly related to life satisfaction (e.g., Saklofske, Austin, Mastoras, Beaton, & Osborne, 2012), and other research supports links to academic achievement. For example, Pekrun, Elliot and Maier (2009) determined which of eight specific achievement emotions were predictive of college students' academic performance. Participants included 218 undergraduate students in the same psychology course (mean age = 19.4 years), with 67% of the sample being female. The eight emotions of interest were hope, pride, boredom, anger, anxiety, hopelessness, and shame, which were measured using the Achievement Emotions Questionnaire. Students' academic performance was measured by performance on the course midterm exam. Correlational analyses revealed that both positive emotions were correlated with exam performance (r = .30 to r = .35) and all six negative emotions were also correlated with exam performance (r = -.43 to r = -.13). Regression analyses indicated that the following emotions were predictive of student performance: hope (β = .27), pride (β = .29), boredom (β = -.14), anger (β = -.30), anxiety (β = -.26), hopelessness (β = -.41) and shame (β = -.44). However, because all participants were students in the same psychology course, it is unclear whether these results are generalizable to students in other academic fields or high school students.

Expanding on the above research, Saklofske et al. (2012) investigated the cross-sectional relationships between students' positive affect, negative affect, life satisfaction, and academic achievement. The study's original sample consisted of 238 undergraduate students in Scotland (mean age = 20 years), and the sample was 22% male. Complete academic performance data were only available for 163 of those participants. Students' affect was measured using the PANAS, and life satisfaction was measured with the SWLS. Academic performance was assessed using students' "year mark", which was each student's average course score for the year (range 0-100) based on school records. Results of this study indicated that students' year mark was correlated with positive affect (r = .22), but not with life satisfaction or negative affect. Additionally, positive affect was positively correlated with life satisfaction (r = .40) and negative affect was negatively correlated with life satisfaction (r = .49).

Rogaten, Moneta, and Spada (2013) also investigated the potential direct influences of positive and negative affect on the academic performance of students. The goal of this research was to determine whether affect during studying was associated with academic performance among college students. Participants included 206 undergraduate students in the United Kingdom, and the sample was 24% male. The International Short Form of the Positive and Negative Affect Schedule (I-PANAS-SF) was used to assess students' affect during studying and student grades (in percentages) for the current semester were obtained from school records. The researchers then calculated exam grades, course grades, and GPA for each student. Hierarchical regression modeling was used to predict each measure of academic performance. Results indicated that positive affect was a significant predictor of exam grades (β = .19), course grades (β = .17) and GPA (β = .15). In contrast, negative affect did not significantly predict any of the measures of academic performance.

In regard to the moderating role of affect on change in students' outcomes, Froh, Kashdan, Ozimkowski, and Miller (2009) considered positive affect as a moderator of the effectiveness of a gratitude intervention targeted at youth in 3rd, 8th, and 12th grades. Participants were 89 students between the ages of 8 -19 (mean age = 12.7 years old) and the sample was 51% female. In regard to ethnicity, the sample was 67% Caucasian, 12% Asian American, 9% African American, 9% Hispanic, and 2% other ethnicity. All students in the sample attended the same parochial school. The sample was divided into a control group and a treatment group, with the treatment group receiving a gratitude intervention that lasted for two weeks. All students completed the Gratitude Adjective Checklist and PANAS-C at the following time points: pretest, posttest, one-month follow-up, and two-month follow-up. Hierarchical regression analyses indicated that students' pretest (Time 1) positive affect moderated the influence of the intervention on students' posttest (Time 2) gratitude. The interaction term (Time 1 positive affect x intervention condition) was significant ($\beta = .11$, $p<.01$), with the intervention having more of an impact on gratitude for students who reported low positive affect at Time 1. This research provides initial support for the moderating effect of positive affect on youth well-being, although this study did not consider negative affect as a potential moderator.

Additionally, Kapikiran (2012) investigated whether positive affect and negative affect moderated the relationship between optimism and life satisfaction among Turkish students. Participants included 397 undergraduate students between the ages of 18 and 27 (mean age = 20.9 years old) and the sample was 57% female. The SWLS was used to measure students' life satisfaction, the Life Orientation Test was used to assess optimism, and the PANAS was used to measure positive affect and negative affect. Hierarchical regression analyses with optimism as the predictor variable indicated that neither positive affect nor negative affect significantly

moderated the link between optimism and life satisfaction. Given that this research focused on the predictor variable of optimism rather than a measure of academic achievement or academic engagement, these findings may not be generalizable to the constructs of primary focus in the current study.

To date, there has been limited research regarding the potential moderating role of positive affect and negative affect in the association between life satisfaction and student outcomes (e.g., academic success). Previous research has been inconsistent, with some researchers reporting a lack of significant moderation (e.g., Kapikiran, 2012), and some reporting that positive affect alone was a significant moderator (e.g., Froh et al., 2009). Thus, future research is needed to determine if and how positive affect and/or negative affect moderate the relationship between life satisfaction and academic achievement among adolescents.

Conclusions

In sum, while there are many studies that have investigated the concurrent relationship between academic achievement and life satisfaction, relatively few studies have explored the predictive relationship between the two variables using cross-sectional data. Even fewer studies have examined that relationship using longitudinal data, and to date, only one study (Ng et al., 2015) has investigated the potentially bidirectional nature of the relationship between life satisfaction and academic achievement. Ng et al. (2015) posited that positive and negative affect should be considered as potential moderators of this relationship, with previous research regarding the influence of positive and negative affect on academic success being mixed. Additionally, most studies in this area have used GPA to measure academic achievement, with only a few studies (e.g., Suldo et al., 2011; Forrest et al., 2013) considering standardized test scores as an additional measure of academic achievement. Furthermore, studies that use GPA as

a measure of academic achievement often use self-reported GPA, which has been found to be unreliable for certain subgroups of students, including high school students and low-achieving students (Kuncel et al., 2005). Similarly, academic engagement has also rarely been used to measure academic success in such studies. Finally, the existing research regarding life satisfaction and academic achievement is marked by mixed findings, with several studies reporting no significant relationship between the two variables while other studies have reported a significant relationship. Thus, future research in this area is needed to address the gaps and inconsistencies in the literature described above.

The purpose of the current study was to replicate and extend a recent study (Ng et al., 2015) investigating the potential bidirectional relationship between students' life satisfaction and their academic achievement, as well as the potentially moderating effects of positive and negative affect using longitudinal data. The current study also addressed several gaps in the existing literature by including GPA and standardized test scores from school records, and two measures of academic engagement as indicators of academic achievement. Finally, the current study utilized longitudinal data collected one year apart. Several researchers (e.g., Ng et al., 2015; Suldo, Thalji, & Ferron, 2011) have noted that their achievement data were relatively stable over time, and by using indicators of academic achievement that may allow for the detection of more variability (i.e. FCAT DSS scores), the current study sought to clarify the bidirectional relationship identified by Ng et al. (2015) in an older sample of high school students.

Chapter Three:

Method

This study performed secondary analyses of an archival longitudinal dataset to investigate the existence of a reciprocal relationship between high school students' life satisfaction and academic achievement. This chapter provides an overview of the study's participants and the process used to select participants. Next, data collection procedures, including information on the measures utilized for data collection, are described. Last, statistical analyses, limitations and contributions to the literature are discussed.

Participants

The archival data set that was analyzed in the current study is part of a larger research study examining the relationships between SWB and psychopathology in regard to academic achievement, physical health, social relationships, and attitudes toward school using a sample of high school students (Suldo, Gelley, Roth, & Bateman, 2015; Suldo, Thalji-Raitano, Kiefer, & Ferron, 2015). Specifically, the current study accessed archival data from the same participants included in (a) Suldo, Thalji-Raitano, Kiefer, and Ferron's (2015) cross-sectional examination of the dual-factor model of mental health in high school students, and (b) McMahan's (2012) longitudinal follow-up of the stability of mental health groups as indicated by a dual-factor model. This dataset consisted of two waves of data, with Time 1 data collected in December 2010 and Time 2 data collected one year later, in December 2011. A total of 425 students with complete data for Time 1 and Time 2 were included in the final dataset analyzed in this study. The final sample was 60% female and 49% of students received free or reduced-price lunch. In

regard to ethnicity, the final sample was 44% White Non-Hispanic, 35% Hispanic, 9% multi-ethnic, 7% African-American, 3% Asian, and 1% other ethnic group.

As reported by McMahan (2012), the participants in the current study attended two large high schools in the same school district in a Southeastern state. These two high schools were chosen for involvement in the study because the schools' administrators expressed interest in participating in a larger study on understanding and promoting students' mental health and well-being. During the 2009-2010 school year, a total of 2,494 students attended School A. School A is an urban high school with approximately 49% of students receiving free or reduced-price lunch, which is used in the current study as an indicator of economic disadvantage. Students in 9th, 10th, and 11th grades were sampled for participation because those students would be present in high school for the duration of the longitudinal study. In regard to School B, a total of 2,224 students attended the school during the 2009-2010 school year. School B is a rural high school with approximately 40% of students receiving free or reduced-price lunch. As in School A, students in 9th, 10th and 11th grades were sampled for participation because those students would be present in high school for the duration of the longitudinal study.

Before recruitment procedures began, the following students were excluded from participation in the longitudinal study: students in the 12th grade; students taught in self-contained classrooms for students in Exceptional Student Education; and students with limited English proficiency. Students in the 12th grade were excluded because they would not be present in high school for the duration of the longitudinal study. Students in self-contained classrooms and students with limited English proficiency were excluded because all measures in the study were written in English at a 3rd grade reading level.

As described by McMahan (2012), in order to recruit students from School A, the researchers first randomly selected half of the school's 9th, 10th and 11th grade homeroom classrooms (N = 70) for recruitment. A total of 35 teachers participated in the recruitment process, and class sizes ranged from 17 to 37 students. Teachers were provided with a script to read to students that explained the purpose of the study, participation requirements, and incentives offered for participation (i.e. receipt of a pre-paid movie pass and entry into a drawing for a $50 gift card to a local mall). Teachers then distributed parent consent forms to all students in their classrooms. A total of 1,066 students from School A were recruited and 256 students returned consent forms, for a response rate of 24.02%.

In order to recruit students from School B, the researchers explained the study, including the teacher's role, the purpose of the study, and associated incentives, to all 9th, 10th, and 11th grade English teachers. Teachers were then given a script to read to their students explaining the purpose of the study, participation requirements, and incentives offered for participation (i.e. receipt of a pre-paid movie pass and entry into a drawing for a $50 gift card to a local mall). Teachers then distributed parent consent forms to all students in their classrooms. A total of 941 students were recruited from School B and 270 students returned consent forms, for a response rate of 28.69%.

Overall, a total of 2,007 students were recruited from School A and School B. Of those students, 526 returned parent consent forms for a total response rate of 26.21%. Four returned consent forms refused participation, and of the 522 students with affirmative parental consent, three students refused to assent to participation. Of the 519 remaining students, 507 were in attendance on the day(s) the self-report surveys were administered. At Time 1, three participants had incomplete self-report data and were excluded from the final sample. Complete Time 1 data

were collected from 504 students. Of those students with complete Time 1 data, four were excluded from the final sample due to invalid responding (as determined by the validity index of the Behavior Assessment System for Children, a measure not used in the current study). The final Time 1 sample was 59% female and 49% of participants received free or reduced-price lunch. In regard to ethnicity, the sample was 44% White Non-Hispanic, 34% Hispanic, 10% multi-ethnic, 8% African-American, 3% Asian, and 1% other ethnic group.

One year later, at Time 2, all 500 students who participated in Time 1 data collection were sought out for participation. Of those students, 428 were in attendance on the day(s) the self-report surveys were administered. Three students with complete data at Time 2 were excluded from the final sample due to invalid responding. A total of 425 students with complete data at Time 1 and Time 2 were included in the final dataset analyzed in this study. The demographic features of this longitudinal sample are displayed in Table 1.

McMahan (2012) conducted attrition analyses to determine whether the 72 students who did not participate in Time 2 data collection were significantly different from students who participated at Time 2 in regard to any demographic variables. Chi-squared tests of independence found no significant differences in regard to ethnicity, χ^2 (6, N = 500) = 10.02, p = .12, socio-economic status/school lunch status, χ^2 (1, N = 500) = 0.03, p = .85, gender, χ^2 (1, N = 500) = 1.44, p = .23, grade, χ^2 (2, N = 500) = 2.07, p = .36, or school, χ^2 (1, N = 500) = 0.64, p = .42.

Data Collection Procedures

As reported in McMahan (2012), Time 1 data were collected in December 2010 and Time 2 data were collected one year later, in December 2011. Prior to collecting data, the research team obtained approval of study procedures from the school district in which the

Table 1

Sample Demographic Features

Demographics Variable	Total Sample (N = 425) %
Gender	
Male	39.53%
Female	60.47%
Grade	
9	44.94%
10	35.29%
11	19.76%
Ethnicity	
White	43.76%
African-American	7.53%
Hispanic	35.06%
Multi-racial	9.41%
Other	4.24%
Socioeconomic Status	
Free/reduced lunch	49.17%
School	
School A	49.88%
School B	50.12%

schools were located, as well as the University of South Florida Institutional Review Board (IRB; study #Pro00001693, "Subjective Well-Being of High School Students"; PI: Shannon Suldo). Parental consent and student assent were obtained for participation in the entire longitudinal study prior to data collection at Time 1.

At Time 1, students with parental consent were called to the school's auditorium and/or cafeteria in groups of 50-70 students in order to complete a packet of self-report questionnaires.

After members of the research team obtained student assent, each student independently completed a demographic questionnaire (Appendix A) and all surveys in counterbalanced order. Measures were presented in a counterbalanced order to limit any possible order effects. During this time, the research team answered student questions and monitored student responses to ensure each student was responding independently. When students returned their packets, a member of the research team visually checked for any missing items and, if necessary, instructed students to complete the missing item(s). Each student then received a pre-paid movie ticket (worth approximately $7.00).

At Time 2, all students still in attendance who had complete Time 1 data were sought for participation. Data collection procedures from Time 1 were repeated at Time 2. Students were again called to the school's auditorium and/or cafeteria in groups of 50-70 in order to complete a packet of self-report questionnaires. Each student was given a questionnaire packet labeled with the student's specific code number (to permit linking of Time 1 data and Time 2 data). Students then completed all surveys in counterbalanced order. During this time, the research team answered student questions and monitored student responses to ensure each student was responding independently. When students returned their packets, a member of the research team checked for any missing items and, if necessary, asked students to complete the missing item(s). Each student then received a pre-paid movie ticket (worth approximately $7.00). The author of this thesis was not involved in the data collection process at Time 1 or Time 2, but joined the same research group (USF Positive Psychology Research Group, supervised by Dr. Shannon Suldo) in 2014.

Measures

Demographics form. The questionnaire administered at Time 1 (see Appendix A) included items regarding participant age, grade level, gender, socio-economic status (SES), and race/ethnicity.

Students' Life Satisfaction Scale (SLSS; Huebner, 1991c). The SLSS (see Appendix B) is a seven-item measure of students' global life satisfaction. The measure is intended to be used by students in grades 3 and above, and was completed by participants in the current study at Time 1 and Time 2. The SLSS asks students to indicate the extent to which they agree with statements about their life (e.g., "I have a good life." "I wish I had a different kind of life.") on a six-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Two of the items on the SLSS are negatively worded and must be reverse-scored before a mean score can be obtained. A student's mean score is calculated by summing the responses and dividing the sum by the number of items in order to determine an overall life satisfaction score. Higher scores on the SLSS indicate higher levels of global life satisfaction.

In regard to reliability, item-total correlations on the SLSS are acceptable and range from $r = .46$ to $r = .72$. Huebner (1991c) reported a two-week test-retest reliability coefficient of $r = .74$, while Gilman and Huebner (1997) reported a four-week test-retest reliability coefficient of $r = .64$, both of which are considered adequate. Further, Huebner, Funk and Gilman (2000) reported that the SLSS had a moderately stable one-year test-retest reliability ($r = .53$). The SLSS has adequate internal consistency as identified by Huebner (1991c; alpha = .82) and Gilman and Huebner (1997; alpha = .84). Huebner (1991c) reported that the SLSS has acceptable construct validity with the Andrews-Withey life satisfaction item ($r = .62$) and the Piers-Harris happiness subscale ($r = .52$). As reported by Funk, Huebner, and Valois (2006), the SLSS also

has adequate construct validity with the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS; r = .74). Furthermore, a factor analysis conducted by Huebner (1991b) found that items from the SLSS loaded onto a separate factor when evaluated with items developed by the researcher to assess positive affect and negative affect. This finding supports the construct validity of the SLSS because life satisfaction, positive affect, and negative affect are conceptualized as separate components of SWB (Andrews & Withey, 1976). As reported by Dew and Huebner (1994), the SLSS also has adequate internal consistency (alpha = .86) when used with adolescents in 8th, 10th, and 12th grades. When used with adolescents, the SLSS has acceptable construct validity (r = .58) when compared to the Perceived Life Satisfaction Scale (Dew & Huebner, 1994). Cronbach's alpha was calculated using participants' SLSS scores from each wave of the current study to determine the reliability of the data collected.

Positive and Negative Affect Schedule – Children (PANAS-C; Laurent et al., 1999). The PANAS-C (see Appendix C) is a 27-item measure that is used to assess the frequency of positive and negative emotions in children. Specifically, the positive affect (PA) subscale includes 12 items, and the negative affect (NA) subscale includes 15 items. Using a five-point Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*), students are asked to indicate the extent to which they have experienced each mood or feeling (e.g., "sad", "nervous", "delighted", and "excited") during the past few weeks. Students in the current study completed this measure at Time 1 and Time 2, and scores were split into PA subscale scores and NA subscale scores.

Laurent et al. (1999) created the PANAS-C to use with children and adolescents based on the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988). The PANAS was developed to assess the frequency of positive and negative emotions in adults

and includes several emotions (e.g., jittery, hostile) that may be too cognitively complex for children and adolescents. The PANAS-C was developed with students in 4th through 8th grades and includes 11 items from the PANAS. The PA subscale has adequate internal consistency (alpha = .89), as does the NA subscale (alpha =.92, Laurent et al., 1999). Additionally, all item-total correlations were reported to be above *r* = .30, which is considered acceptable. Lauren et al. (1999) also reported adequate construct validity for the NA subscale compared to the Children's Depression Inventory (*r* = .59) and the Trait Anxiety Scale (*r* = .62). The PA subscale also has acceptable construct validity compared to the Children's Depression Inventory (*r* = -.42; Laurent et al., 1999). Finally, a factor analysis conducted by Laurent et al., (1999) further supported the construct validity of the PANAS-C, as the PA subscale items and NA subscale items loaded on different factors. Laurent et al. (1999) determined that the PANAS-C is appropriate for use with both school-based youth and clinical youth populations in grades 4 and above. Cronbach's alpha was calculated using participants' PANAS-C PA and NA scores from each wave of the current study to determine the reliability of the data collected.

Indicators of Academic Achievement

Grade point average (GPA). Grade point averages for the duration of the study were obtained from school records at Time 1 and Time 2. At Time 1, the first two nine-week grading periods of the 2010-2011 academic year were included in the calculation of semester GPA, and at Time 2, the first two nine-week grading periods of the 2011-2012 academic year were included in the calculation of semester GPA. GPA was calculated by assigning numerical values to letter grades earned for academic performance in each subject (i.e. A= 4.0, B= 3.0, C =2.0, D=1.0, F=0.0). Numerical values were then summed and divided by the total number of credit

hours attempted. For example, if a student received two “A”s and four “B”s, they would be assigned a 3.33 GPA.

Standardized test scores. Prior to 2015, all students in Florida in grades 3 through 11 were administered the Florida Comprehensive Assessment Test (FCAT; Florida Department of Education, 2015). The FCAT was a criterion-referenced assessment used to measure student progress toward state benchmarks (i.e., Sunshine State Standards) in mathematics, reading, science and writing. In 2010, FCAT scores for each subject were expressed as levels (range 1-5) that stemmed from developmental scale scores (DSS), which ranged from 722 to 3008. In 2011, FCAT DSS scores ranged from 178 to 302 and corresponded with a level score (range 1-5). DSS scores were equated to the base year (the student’s first year of testing), which allowed for comparison of DSS scores from year to year. Each student was then assigned an achievement level for each subject based on his or her developmental scaled score. Achievement levels ranged from one to five, with Level 1 as lowest and Level 5 as the highest. In order to pass, students needed to score at Level 3 or higher. Only FCAT-reading scores were included in the current study because reading was the domain most frequently tested among high school students. DSS scores were analyzed in order to include a more sensitive indicator of student growth (DSS scores), which may allow the detection of more variability than would be possible if level scores were included. Because only students in grades 9 and 10 were scheduled to take FCAT-reading (older students might retake an earlier version of test they failed previously), FCAT-reading DSS scores at both Time 1 and Time 2 were available for only 188 participants in the current study, which corresponds to the number of participants who began as 9th grade students at Time 1 and have complete data. Thus, the sample size for analyses that include this academic variable was substantially smaller than the sample size for analyses that involve other academic variables.

School Attitude Assessment Survey – Revised (SAAS-R; McCoach & Siegle, 2003). The SAAS-R is a 35-item measure of students' beliefs about school. The complete measure includes five subscales: academic self-perceptions, attitudes towards teachers, attitude towards school, goal valuation, and motivation/self-regulation. Using a Likert scale ranging from 1 (*strongly disagree)* to 7 (*strongly agree*), students are asked to indicate the extent to which they agree with each item. In the current study, only the attitude towards school (ATS) subscale, which assesses students' feelings of belonging in school, and the goal valuation (GV) subscale, which assesses the degree to which students value school and their grades, will be analyzed (see Appendix D). The ATS subscale contains five items and the GV subscale contains six items. Items from the ATS subscale include "I am glad that I go to this school" and "This school is a good match for me." Items from the GV subscale include "I want to get good grades in school" and "It is important for me to do well in school." The SAAS-R was developed for use with secondary students in 9th through 12th grades (McCoach & Siegle, 2003).

McCoach and Siegle (2003) reported adequate internal consistency for both the ATS subscale (alpha = .87) and the GV subscale (alpha =.89). In regard to construct validity, McCoach and Siegle (2003) determined that the SAAS-R is able to adequately discriminate between high achieving and low achieving students (effect sizes ranged from d = .67 to d = 1.29). Additionally, research by Suldo, Shaffer and Shaunessy (2008) aimed to further validate the SAAS-R among high school students in both college preparatory curriculum and general education curriculum. Suldo et al. (2008) reported that the GV subscale was significantly correlated with GPA (r = .36), self-reported homework completion (r = .30), and academic self-efficacy as measured by the Self-Efficacy Questionnaire for Children (r = .45). Furthermore, the ATS subscale was found to be significantly correlated with school satisfaction as measured by

the MSLSS (r = .54) and two subscales of the high school version of the School Climate Survey: the student-teacher relations subscale (r = .58) and the peer relations subscale (r = .52). Cronbach's alpha was calculated using participants' SAAS-R GV and ATS scores from each wave of the current study to determine the reliability of the data collected.

Data Analysis

Following committee approval for the analytic procedures planned for this thesis, this author was added as a member of the Study Staff of #1693 for the specific purposes of data analysis and manuscript preparation. Dr. Suldo provided this researcher with access to this dataset. The longitudinal sample has been previously described in regard to grade level, gender, ethnicity/race, and SES (see Suldo et al., 2015). The initial sample (i.e. 500 participants at Time 1) was compared to the longitudinal sample (i.e. 425 participants with complete data at Time 2) and it was determined that there was no significant effect of attrition from the study (McMahan, 2012). In regard to descriptive statistics, Cronbach's alpha were calculated for participants' scores on the SLSS, PANAS-C, and SAAS-R to determine the reliability of the data collected.

Pearson product-moment correlation coefficients were calculated between SLSS scores, GPA, FCAT-reading DSS, PANAS-C positive affect scores, PANAS-C negative affect scores, SAAS-R attitude towards school scores, and SAAS-R goal valuation scores at both time points in order to determine the concurrent and across-time relationships between the variables.

In order to answer the research questions of the current study, a series of simultaneous and then moderated multiple regression analyses were conducted four separate times due to the fact that four different indicators of academic achievement were examined. First, to determine if life satisfaction scores at Time 1 predict academic achievement (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 2, regression analyses were

conducted in which life satisfaction at Time 1 was used to predict a specific achievement variable above and beyond the influence of baseline (Time 1) achievement, main effects of positive and negative affect, and demographic control variables. For example, in the regression analysis predicting Time 2 GPA, predictors included: GPA from Time 1, demographic covariates, and then Time 1 levels of positive affect, negative affect, and life satisfaction. Then, this regression equation was repeated but with the additional inclusion of two interaction terms to test for moderation: a positive affect and life satisfaction interaction term and a negative affect and life satisfaction interaction term. The interaction terms were calculated from the cross-product between the predictor variable and the moderator variable.

Statistical significance for a given analysis was determined using alpha level of .05 for each statistical test. All predictor variables were centered to limit the correlation between the interaction terms and predictor variables. Additionally, residuals from each regression model were examined in order to check for normality and homoscedasticity. Demographic variables (e.g., SES, race, high school) were controlled for in each regression analysis due to previous research indicating that both SES and race are significantly related to students' academic achievement (Sirin, 2005). SES was measured by a combined variable that included free or reduced lunch status and parental education levels. Students' high school was considered as a demographic variable in order to control for any potential differences between students attending School A and students attending School B. Race was dummy coded, with white as the reference group, before being entered into the regression analyses as a control variable.

Similarly, a series of simultaneous and then moderated multiple regression analyses were conducted in order to determine whether academic achievement variables (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 1 predicted life

satisfaction scores at Time 2 above and beyond the influence of baseline (Time 1) life satisfaction, main effects of positive and negative affect, and demographic control variables Then, these regression equations were repeated with the additional inclusion of two interaction terms to test for moderation: a positive affect and academic achievement interaction term and a negative affect and academic achievement interaction term. The interaction terms were calculated from the cross-product between the relevant predictor variable and the moderator variable for each of the four academic achievement variables.

After the above-described series of regression analyses were conducted, another simultaneous regression analysis was conducted in which all four achievement variables (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 1 were included as predictors of life satisfaction scores at Time 2 above and beyond the influence of baseline (Time 1) life satisfaction, main effects of positive and negative affect, and demographic control variables. Then, this simultaneous regression analysis was repeated with the additional inclusion of eight interaction terms to test for moderation (affect X academic achievement indicator, e.g., positive affect X GPA, negative affect X goal valuations).

Alpha was set at .05 for each statistical test. For moderated regression analyses, all predictor variables were centered in order to limit the correlation between the interaction terms and the predictor variables. Residuals for each regression model were examined in order to check for normality and homoscedasticity. Additionally, demographic variables (e.g., SES, race, high school) were controlled for in each regression analysis.

Chapter Four:

Results

This chapter provides the results of the secondary analyses conducted to address the research questions in the current study. First, descriptive statistics and correlations among variables are provided to describe the concurrent relationships between students' life satisfaction and academic achievement (i.e., grade point average, standardized test scores, goal valuation, and attitude towards school). Next, results from multiple regression analyses determining the bidirectional relationship between academic achievement and life satisfaction are summarized. Finally, results from moderated regression analyses determining whether positive affect and/or negative affect moderate the relationship between life satisfaction and academic achievement are presented.

Data Screening

The dataset was screened for errors and accuracy by examining the minimum and maximum scores of each variable. One participant was noted to have an FCAT Reading DSS score outside of the possible range at Time 2. This score was corrected after paper copies of the raw data (printout from school database that included each participant's test scores) were examined and it was discovered that a typographical error was made during data entry. No other irregular scores were noted during data screening.

Scale Reliability

Prior to analyses, all scales utilized within the study (i.e. SLSS, PANAS-C, SAAS-R) were analyzed to determine the internal reliability of each within the sample of 425 students at each time point.

Time 1. At Time 1, internal consistency (as measured by coefficient alpha) for the SLSS was .88. Coefficient alpha values at Time 1 for the PANAS-C subscales were .90 and .91 for positive and negative affect, respectively. The internal consistency of the goal valuation and attitudes toward school subscales of the SAAS-R at Time 1 were .90 and .95, respectively.

Time 2. At Time 2, coefficient alpha for the SLSS was .90. At Time 2, coefficient alpha values for the PANAS-C subscales were .92 and .93 for positive and negative affect, respectively. The internal consistency of the goal valuation and attitudes toward school subscales of the SAAS-R at Time 2 were .93 and .95, respectively.

Descriptive Analyses

Descriptive statistics for all variables in the data set are presented in Table 2. The Florida Department of Education (2016) changed the metric for the FCAT-reading DSS scale during the 2010-2011 school year, which occurred between Time 1 and Time 2. Thus, the means and ranges of FCAT-reading DSS scores at Time 1 and Time 2 differ as a result of the differing scales used at these time points.

To assess univariate normality, skew and kurtosis for each of the 14 variables were calculated. Variables were considered normally distributed if skewness and kurtosis were between -1.0 and +1.0. At Time 1, two variables demonstrated skewness and kurtosis values significantly outside normal limits. These two variables were reading DSS (skew = -0.62,

Table 2

Means, Standard Deviations, Ranges, Skew, and Kurtosis of Non-Transformed Variables

Variable	*N*	*M*	*SD*	Range	Skewness	Kurtosis
T1 Life Satisfaction	425	4.26	1.01	1.00 – 6.00	-0.45	-0.27
T1 Positive Affect	425	3.63	0.77	1.08 – 5.00	-0.54	0.24
T1 Negative Affect	425	1.87	0.73	1.00 – 4.47	1.07	0.52
T1 Goal Valuation	425	6.58	0.65	2.83 – 7.00	-2.16	5.67
T1 Attitudes Toward School	425	5.24	1.42	1.00 – 7.00	-0.99	0.65
T1 GPA	425	3.02	0.66	0.71 – 4.00	-0.69	0.14
T1 Reading DSS	188	2017.30	230.76	999 – 2943	-0.62	4.20
T2 Life Satisfaction	425	4.48	1.00	1.00 - 6.00	-0.58	-0.04
T2 Positive Affect	425	3.72	0.80	1.00 – 5.00	-0.65	0.20
T2 Negative Affect	425	1.88	0.75	1.00 – 4.73	1.14	0.76
T2 Goal Valuation	425	6.46	0.77	2.67 – 7.00	-1.84	3.80
T2 Attitude Towards School	425	5.24	1.45	1.00 – 7.00	-0.92	0.48
T2 GPA	425	2.95	0.66	1.00 – 4.00	-0.55	-0.08
T2 Reading DSS	188	248.10	18.03	194 – 302	0.10	0.52

Note. T1 = December 2010, T2 = December 2011, GPA = grade point average, DSS = developmental scale score; Higher scores reflect increased levels of the construct indicated by the variable name.

kurtosis = 4.20) and goal valuation (skew = -2.16, kurtosis = 5.67). At Time 2, one variable demonstrated values of skewness and kurtosis that were outside normal limits. This variable was goal valuation (skew = -1.84, kurtosis = 3.80). Outliers for these variables were identified (n = 2 to 3) and removed from the sample. However, it was determined that removal of the outlying values did not significantly impact results of the statistical analyses, so outliers were retained in the dataset. After regression residuals were examined, it was determined that only goal valuation at Time 1 was negatively skewed. This variable was transformed using square root transformation and log transformation; analyses were not significantly impacted as a result of either transformation. Thus, the non-transformed goal valuation variable was utilized in all regression analyses.

Correlational Analyses

To determine the relationships between all variables within the sample, Pearson product-moment correlation coefficients were calculated between all variables at Time 1 and Time 2. Correlations are presented in Table 3. An alpha level of .05 was utilized to determine statistical significance. Life satisfaction and goal valuation were significantly correlated at a given time point (r =.23 at Time 1 and r =.32 at Time 2), as were life satisfaction and attitude towards school at a given time point (r =.29 at Time 1 and r =.34 at Time 2). As expected, life satisfaction at Time 1 was significantly and positively correlated with Time 2 goal valuation (r =.18, p<.05) and attitude towards school (r = .25, p<.05). However, Time 1 life satisfaction was not significantly correlated with grade point average at Time 2 (r =.04, p=.39), whereas small but significant positive correlations were apparent at a given time point (r = .15 at Time 1 and r = .12 at Time 2). Time 1 and Time 2 life satisfaction scores were not significantly correlated with standardized reading scores at Time 1, but Time 1 life satisfaction was significantly and

negatively correlated with Time 2 standardized reading DSS scores (r = -.15, p<.05), which was unexpected. In regards to academic achievement, Time 1 GPA was significantly correlated with life satisfaction at Time 2 (r = .14, p<.05); Time 1 attitude towards school was significantly correlated with Time 2 life satisfaction (r = .20, p<.05); and Time 1 goal valuation was significantly correlated with Time 2 life satisfaction (r = .16, p<.05). Students' GPA remained remarkably stable across time (r =.69), as did students' reading DSS scores (r =.66).

Regression Analyses

In order to determine the extent to which life satisfaction at Time 1 predicted academic achievement (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 2, four separate simultaneous multiple regressions were conducted. Each outcome variable of interest was predicted using control variables and life satisfaction. An alpha level of .05 was used to determine statistical significance. Standardized multiple regression coefficients (beta weights) and t-values were examined to determine the relative importance of the predictor variable and covariates in the prediction of each academic achievement variable at Time 2.

For all analyses utilizing FCAT-reading DSS scores, the sample size was reduced to 188 due to the fact that only students in 9th grade (at Time 1) had complete FCAT data at Time 1 and Time 2. Before all analyses, FCAT-reading DSS scores were converted into z-scores to allow for comparison between Time 1 scores and Time 2 scores. Four regression equations were computed estimating the effects of life satisfaction on later academic achievement. Beta weights and t-values are presented in Table 4.

In the regression analysis conducted to determine the extent to which life satisfaction at Time 1 uniquely predicts GPA at Time 2, the linear combination of demographic variables (SES,

Table 3

Correlations between Variables (N=425)

	T1 LS	T1 PA	T1 NA	T1 GV	T1 ATS	T1 GPA	T1 R-DSS[a]	T2 LS	T2 PA	T2 NA	T2 GV	T2 ATS	T2 GPA	T2 R-DSS[a]
T1 LS	1.0													
T1 PA	.46*	1.0												
T1 NA	-.52*	-.23*	1.0											
T1 GV	.23*	.27*	-.09	1.0										
T1 ATS	.29*	.25*	-.17*	.28*	1.0									
T1 GPA	.15*	.05	.01	.25*	.13*	1.0								
T1 R-DSS[a]	-.09	-.08	.02	-.04	.03	.42*	1.0							
T2 LS	.59*	.39*	-.31*	.16*	.20*	.14*	.05	1.0						
T2 PA	.33*	.52*	-.19*	.16*	.22*	.05	.02	.57*	1.0					
T2 NA	-.40*	-.21*	.43*	-.002	-.09	.04	.05	-.59*	-.41*	1.0				
T2 GV	.18*	.25*	-.03	.41*	.15*	.26*	.10	.32*	.34*	-.14*	1.0			
T2 ATS	.25*	.24*	-.11*	.21*	.51*	.12*	.05	.34*	.40*	-.27*	.40*	1.0		
T2 GPA	.04	.01	.03	.17*	.04	.69*	.42*	.12*	.07	-.02	.29*	.13*	1.0	
T2 R-DSS[a]	-.15*	-.16*	.03	-.16*	.02	.41*	.66*	.01	-.04	.10	.09	.03	.48*	1.0

Note. T1 = December 2010, T2 = December 2011, LS = life satisfaction, PA = positive affect, NA = negative affect, GV = goal valuation, ATS = attitude towards school, GPA = grade point average, R-DSS = reading developmental scale score.

[a] $N = 188$ for R-DSS at T1 and T2

*$p < .05$

Table 4

Student Academic Achievement Predicted by Life Satisfaction (N=425)

Outcomes	R^2	Parameter Estimates			
		B	*SE B*	β	*t*
T2 GPA	.49				
1. SES		.07	.04	.08	1.89
2. Black		-.11	.09	-.04	-1.14
3. Hispanic		-.07	.06	-.05	-1.10
4. Multiracial		-.11	.09	-.05	-1.31
5. Other race		-.01	.12	-.002	-0.04
6. School		-.05	.05	-.04	-1.03
7. T1 GPA		.67	.04	.67	18.16***
8. T1 PA		.01	.03	.02	0.38
9. T1 NA		-.01	.04	-.01	-0.18
10. T1 LS		-.05	.03	-.09	-1.91
T2 Reading DSS[a]	.47				
1. SES		.08	.08	.06	1.00
2. Black		-.37	.23	-.09	-1.60
3. Hispanic		-.11	.14	-.05	-0.82
4. Multiracial		-.28	.21	-.08	-1.35
5. Other race		.22	.28	.04	0.78
6. School		-.05	.12	-.03	-0.43
7. T1 Reading DSS		.61	.06	.61	10.52***
8. T1 PA		-.06	.08	-.04	-0.69
9. T1 NA		-.08	.10	-.06	-0.87
10. T1 LS		-.15	.08	-.15	-1.91
T2 Goal Valuation	.22				
1. SES		.08	.05	.08	1.62
2. Black		-.05	.13	-.02	-0.38
3. Hispanic		.18	.09	.11	2.14*

Table 4 (Continued)

4. Multiracial		.06	.12	.02	0.51
5. Other race		.04	.17	.01	0.21
6. School		.07	.07	.05	0.97
7. T1 GV		.45	.06	.37	8.09***
8. T1 PA		.11	.05	.11	2.23*
9. T1 NA		.08	.05	.07	1.42
10. T1 LS		.05	.04	.07	1.17
T2 Attitude Towards School	.32				
1. SES		-.13	.09	-.07	-1.51
2. Black		-.16	.24	-.03	-0.72
3. Hispanic		.01	.15	.003	0.05
4. Multiracial		.11	.22	.02	0.50
5. Other race		.04	.20	.01	0.13
6. School		.57	.13	.20	4.47***
7. T1 ATS		.49	.04	.48	11.16***
8. T1 PA		.15	.09	.08	1.67
9. T1 NA		.06	.09	.03	0.64
10. T1 LS		.14	.08	.09	1.75

Note. White was used as the reference dummy for the race variable; T1 = December 2010, T2 = December 2011, LS = life satisfaction, PA = positive affect, NA = negative affect, GV = goal valuation, ATS = attitude towards school, GPA = grade point average, R-DSS = reading developmental scale score.
[a]*N* = 188 for analyses including R-DSS scores
*p<.05, **p<.01, ***p<.0001

race groups), fixed effect of school, baseline (Time 1) positive and negative affect, baseline (Time 1) life satisfaction, and baseline (Time 1) GPA explained 48.81% of the variance in Time 2 GPA, a significant amount, F (10, 414) = 39.47, p<.0001. The only significant unique predictor variable was Time 1 GPA (t = 18.16, p<.0001). Specifically, higher GPA at Time 1 predicted

higher GPA at Time 2. Time 1 life satisfaction was not identified as a significant predictor of later GPA at Time 2.

When Time 1 life satisfaction was examined as a predictor of Time 2 FCAT-reading DSS scores, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, and baseline reading DSS scores explained 47.30% of the variance in Time 2 FCAT-reading DSS scores, a significant amount F (10, 174) = 15.62, p<.0001. Time 1 FCAT-reading DSS score was the only significant unique predictor variable (t = 10.52, p<.0001). Specifically, higher FCAT-reading DSS score at Time 1 predicted higher FCAT-reading DSS score at Time 2. Time 1 life satisfaction was not identified as a significant predictor of later FCAT-reading DSS scores at Time 2.

When predicting Time 2 goal valuation, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, and baseline goal valuation explained 21.54% of the variance in Time 2 goal valuation scores, a significant amount F (10, 414) = 11.37, p<.0001. The following control variables were unique significant predictors: Hispanic race (t = 2.14, p<.05), Time 1 goal valuation (t = 8.09, p<.0001), and Time 1 positive affect (t = 2.23, p<.05). Specifically, Hispanic students had higher goal valuation scores at Time 2 compared to students of other racial groups; students with higher Time 1 goal valuation scores had higher goal valuation at Time 2; and students with higher Time 1 positive affect scores had higher Time 2 goal valuation. Although Time 1 life satisfaction was not a significant unique predictor, it is notable that positive affect, another indicator of subjective well-being, significantly predicted Time 2 goal valuation in a positive direction (i.e., higher levels of baseline positive affect predicted more goal valuation the next year).

When predicting Time 2 attitude towards school, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, and baseline attitude towards school explained 31.81% of the variance in Time 2 attitude towards school scores, a significant amount F (10, 414) = 19.31, p<.0001. Students' school (t = 4.47, p<.0001) and Time 1 attitude towards school (t = 11.16, p<.0001) were identified as significant unique predictors. Specifically, students attending School B had higher Time 2 attitude towards school scores, and students with higher attitude towards school scores at time 1 had higher Time 2 attitude towards school scores. Time 1 life satisfaction was not identified as a significant predictor of later attitude towards school at Time 2.

Similarly, in order to determine the extent to which academic achievement (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 1 predicted life satisfaction at Time 2, four separate simultaneous multiple regression analyses were conducted. Beta weights and t-values are presented in Table 5.

When Time 1 GPA was examined as a predictor of Time 2 life satisfaction, the linear combination of demographic variables (SES, race groups), fixed effect of school, baseline (Time 1), positive and negative affect, baseline (Time 1) life satisfaction, and baseline (Time 1) GPA explained 37.27% of the variance in Time 2 life satisfaction, a significant amount F (10, 414) = 24.60, p<.0001. Time 1 life satisfaction (t = 9.70, p<.0001) and Time 1 positive affect (t = 3.18, p<.01) were found to be uniquely significant, with higher Time 1 life satisfaction predicting higher Time 2 life satisfaction and higher Time 1 positive affect predicting higher Time 2 life satisfaction. Time 1 GPA was not found to be a significant predictor of later life satisfaction at Time 1.

Table 5

Student Life Satisfaction Predicted by Academic Achievement (N=425)

Outcome	R^2	Parameter Estimates			
		B	*SE B*	β	*t*
T2 Life Satisfaction	.37				
1. SES		.06	.06	.04	0.93
2. Black		-.05	.16	-.01	-0.29
3. Hispanic		.05	.10	.02	0.48
4. Multiracial		-.004	.14	-.001	-0.03
5. Other		-.12	.20	-.02	-0.61
6. School		-.04	.08	-.01	-0.44
7. T1 LS		.50	.05	.50	9.70***
8. T1 PA		.19	.06	.14	3.18**
9. T1 NA		-.02	.06	-.01	-0.25
10. T1 GPA		.08	.06	.05	1.32
T2 Life Satisfaction[a]	.42				
1. SES		.17	.09	.13	1.94
2. Black		.06	.25	.01	0.24
3. Hispanic		.07	.15	.03	0.46
4. Multiracial		.22	.23	.06	0.97
5. Other race		.08	.30	.02	0.27
6. School		-.26	.13	-.12	-2.03*
7. T1 LS		.47	.08	.47	5.61***
8. T1 PA		.35	.09	.26	3.92**
9. T1 NA		.04	.11	.02	0.35
10. T1 Reading DSS		.09	.06	.09	1.48
T2 Life Satisfaction	.37				
1. SES		.07	.06	.05	1.21
2. Black		-.07	.16	-.02	-0.45
3. Hispanic		.05	.10	.02	0.45

Table 5 (Continued)

4. Multiracial		-.001	.14	-.0004	-0.01
5. Other race		-.11	.20	-.02	-0.56
6. School		-.04	.08	-.02	-0.51
7. T1 LS		.51	.05	.51	9.81***
8. T1 PA		.19	.06	.14	3.11**
9. T1 NA		-.01	.06	-.01	-0.11
10. T1 GV		.01	.06	.01	0.15
T2 Life Satisfaction	.37				
1. SES		.07	.06	.06	1.22
2. Black		-.07	.16	-.02	-0.43
3. Hispanic		.04	.10	.02	0.43
4. Multiracial		-.002	.14	-.0005	-0.01
5. Other		-.11	.20	-.02	-0.53
6. School		-.04	.08	-.02	-0.48
7. T1 LS		.51	.05	.51	9.69***
8. T1 PA		.19	.06	.14	3.15**
9. T1 NA		-.01	.06	-.004	-0.10
10. T1 ATS		.01	.03	.01	0.21

Note. White was used as the reference dummy for the race variable; T1 = December 2010, T2 = December 2011, LS = life satisfaction, PA = positive affect, NA = negative affect, GV = goal valuation, ATS = attitude towards school, GPA = grade point average, R-DSS = reading developmental scale score.
[a]*N* = 188 for analyses including R-DSS scores
*p<.05, **p<.01, ***p<.0001

When Time 1 FCAT-reading DSS score was used to predict Time 2 life satisfaction, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, and Time 1 FCAT-reading DSS score explained 42.29% of the variance in Time 2 life satisfaction, a significant amount F (10, 177) = 12.97, p<.0001. Students' school (t = -2.03,

$p<.05$), Time 1 life satisfaction ($t = 5.61$, $p<.0001$), and Time 1 positive affect ($t = 3.92$, $p<.01$) were found to be uniquely significant. Specifically, students attending School B had lower life satisfaction scores at Time 2; students with higher life satisfaction at Time 2 had higher life satisfaction at Time 2; and students with higher Time 1 positive affect had higher Time 2 life satisfaction. Time 1 FCAT-reading DSS score was not found to be a significant predictor of later life satisfaction at Time 2.

In the regression analysis considering Time 1 goal valuation as a predictor of Time 2 life satisfaction, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, and Time 1 goal valuation explained 37.01% of the variance in Time 2 life satisfaction, a significant amount F (10, 414) = 24.33, $p<.0001$. The following control variables were found to be significant: Time 1 life satisfaction ($t = 9.81$, $p<.0001$) and Time 1 positive affect ($t = 3.11$, $p<.01$). Specifically, higher life satisfaction at Time 1 predicted higher life satisfaction at Time 2, and higher Time 1 positive affect predicted higher Time 2 life satisfaction. Time 1 goal valuation was not a unique predictor of later life satisfaction at Time 2.

When Time 1 attitude towards school was used to predict Time 2 life satisfaction, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, and Time 1 attitude towards school explained 37.01% of the variance in Time 2 life satisfaction, a significant amount F (10, 414) = 24.33, $p<.0001$. Both Time 1 life satisfaction ($t = 9.69$, $p<.0001$) and Time 1 positive affect ($t = 3.15$, $p<.01$) were significant predictors. Specifically, higher life satisfaction at Time 1 predicted higher life satisfaction at Time 2, and higher Time 1 positive affect predicted higher Time 2 life satisfaction. Time 1 attitude towards school was not a significant predictor of later life satisfaction at Time 2.

Finally, in order to determine the extent to which all four academic achievement variables (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 1 when considered together predicted life satisfaction at Time 2, one final simultaneous multiple regression analyses was conducted. For this analysis, the sample size was reduced to 188 due to the fact that only students in 9th grade had complete FCAT data at Time 1 and Time 2. Beta weights and t-values are presented in Table 6. The linear combination of demographic variables (SES, race groups), fixed effect of school, baseline (Time 1) positive and negative affect, baseline (Time 1) life satisfaction, baseline (Time 1) GPA, baseline (Time 1) FCAT-reading DSS scores, baseline (Time 1) goal valuation, and baseline (Time 1) attitude towards school explained 42.36% of the variance in Time 2 life satisfaction, a significant amount F (13, 174) = 9.83, p<.0001. Of the variables included in the equation, none of the academic achievement variables significantly predicted Time 2 life satisfaction over and above the influence of the control variables. The control variables identified as unique significant predictors were students' school (t = -2.04, p<.05), Time 1 life satisfaction (t = 5.51, p<.0001), and Time 1 positive affect (t = 3.63, p<.01). Specifically, students at School B had lower Time 2 life satisfaction; higher Time 1 life satisfaction predicted higher Time 2 life satisfaction; and higher Time 1 positive affect predicted higher life satisfaction at Time 2.

Moderated Regression Analyses

In order to evaluate whether positive affect and/or negative affect moderate the relationship between Time 1 life satisfaction and subsequent academic achievement (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 2, four separate moderated multiple regressions were conducted. Each outcome variable of interest was predicted using control variables, life satisfaction, and two interaction terms (i.e., positive affect X life

Table 6

Student Time 2 Life Satisfaction Predicted by all Academic Outcomes Considered Together (N = 188)

Outcome	R^2	Parameter Estimates			
		B	*SE B*	β	*t*
T2 Life Satisfaction	.42				
1. SES		.18	.09	.13	1.92
2. Black		.04	.26	.01	0.16
3. Hispanic		.08	.15	.03	0.51
4. Multiracial		.22	.23	.06	0.97
5. Other		.07	.32	.01	0.23
6. School		-.27	.13	-.13	-2.04*
7. T1 LS		.46	.08	.46	5.51***
8. T1 PA		.34	.09	.25	3.63**
9. T1 NA		.04	.11	.03	0.33
10. T1 GPA		-.01	.11	-.01	-0.07
11. T1 Reading DSS		.10	.07	.09	1.37
12. T1 GV		.05	.12	.03	0.45
13. T1 ATS		-.01	.05	-.01	-0.11

Note. White was used as the reference dummy for the race variable; T1 = December 2010, T2 = December 2011, LS = life satisfaction, PA = positive affect, NA = negative affect, GV = goal valuation, ATS = attitude towards school, GPA = grade point average, R-DSS = reading developmental scale score.
*p<.05, **p<.01, ***p<.0001

satisfaction; negative affect X life satisfaction) to test for moderation. Interaction terms were calculated from the cross-product between the predictor variable and the moderator variable. Before interaction terms were calculated, all variables were centered in order to limit the correlation between the interaction terms and predictor variables. An alpha level of .05 was used to determine statistical significance. Beta weights and t-values were examined to determine the

relative importance of the predictor variable, moderator variables, and covariates in the prediction of each academic achievement variable at Time 2.

For all analyses utilizing FCAT-reading DSS scores, the sample size was reduced to 188 due to the fact that only students in 9th grade had complete FCAT data at Time 1 and Time 2. FCAT-reading DSS scores has previously been converted into z-scores to allow for comparison between Time 1 scores and Time 2 scores.

Four regression equations were computed estimating the effects of life satisfaction on later academic achievement when considering positive affect and negative affect as potential moderators. Beta weights and t-values are presented in Table 7. When predicting Time 2 GPA, the linear combination of demographic variables (SES, race groups), fixed effect of school, baseline (Time 1) positive and negative affect, baseline (Time 1) life satisfaction, baseline (Time 1) GPA, the positive affect X life satisfaction interaction term, and the negative affect X life satisfaction interaction term explained 48.90% of the variance in Time 2 GPA, a significant amount F (12, 412) = 32.86, p<.0001. The predictor variable of interest (i.e., Time 1 life satisfaction) and the moderator variables were not found to be significant. In this analysis, only Time 1 GPA (t = 17.98, p<.0001) was identified as a unique significant predictor of Time 2 GPA, just as in the regressions presented earlier that did not include the two interaction terms. Specifically, higher Time 1 GPA was predictive of higher Time 2 GPA.

In the analysis predicting Time 2 FCAT-reading DSS, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, Time 1 FCAT-reading DSS, the positive affect X life satisfaction interaction term, and the negative affect X life satisfaction interaction term explained 47.74% of the variance in Time 2 FCAT-reading DSS scores, a significant amount F (12, 172) = 16.09, p<.0001. Time 1 FCAT-reading

Table 7
Student Academic Achievement Predicted by Life Satisfaction with Moderators (N=425)

Outcomes	R^2	Parameter Estimates *B*	*SE B*	β	*t*
T2 GPA	.49				
1. SES		.07	.04	.08	1.89
2. Black		-.10	.09	-.04	-1.09
3. Hispanic		-.06	.06	-.05	-1.08
4. Multiracial		-.11	.09	-.05	-1.34
5. Other race		-.01	.12	-.001	-0.05
6. School		-.05	.12	-.04	-1.09
7. T1 GPA		.67	.04	.67	17.98***
8. T1 PA		.02	.04	.02	0.48
9. T1 NA		.002	.04	.002	0.06
10. T1 LS		-.06	.03	.09	-1.89
11. PA x LS		.02	.03	.03	0.70
12. NA x LS		.02	.03	.03	0.70
T2 Reading DSS[a]	.48				
1. SES		.10	.08	.08	1.16
2. Black		-.37	.23	-.10	-1.62
3. Hispanic		-.23	.14	-.05	-0.84
4. Multiracial		-.29	.21	-.08	-1.37
5. Other race		.24	.28	.05	0.84
6. School		-.07	.12	-.04	-0.60
7. T1 Reading DSS		.60	.06	.60	10.08***
8. T1 PA		-.03	.08	-.03	-0.39
9. T1 NA		-.06	.11	-.04	-0.58
10. T1 LS		-.14	.08	-.15	-1.88
11. PA x LS		.09	.08	.07	1.19
12. NA x LS		.04	.08	.03	0.51
T2 Goal Valuation	.22				

Table 7 (Continued)

1. SES		.08	.05	.08	1.65
2. Black		-.06	.14	-.02	-0.45
3. Hispanic		.17	.09	.11	2.00*
4. Multiracial		.06	.12	.02	0.47
5. Other race		.02	.17	.01	0.11
6. School		.06	.07	.04	0.87
7. T1 GV		.45	.06	.38	8.18***
8. T1 PA		.11	.05	.11	2.19*
9. T1 NA		.10	.06	.09	1.76
10. T1 LS		.04	.04	.06	0.98
11. PA x LS		-.01	.04	-.02	-0.33
12. NA x LS		.06	.05	.06	1.26
T2 Attitude Towards School	.32				
1. SES		-.13	.09	-.07	-1.47
2. Black		-.16	.24	-.03	-0.68
3. Hispanic		.01	.15	.003	0.05
4. Multiracial		.10	.22	.02	0.46
5. Other race		.04	.31	.01	0.12
6. School		.56	.13	.19	4.40***
7. T1 ATS		.50	.04	.48	11.17***
8. T1 PA		.16	.09	.08	1.74
9. T1 NA		.08	.10	.04	0.83
10. T1 LS		.14	.08	.09	1.71
11. PA x LS		.04	.07	.02	0.54
12. NA x LS		.06	.09	.03	0.70

Note. White was used as the reference dummy for the race variable; T1 = December 2010, T2 = December 2011, LS = life satisfaction, PA = positive affect, NA = negative affect, GV = goal valuation, ATS = attitude towards school, GPA = grade point average, R-DSS = reading developmental scale score.

[a]*N* = 188 for analyses including R-DSS scores

*p<.05, **p<.01, ***p<.0001

DSS (t = 10.08, p<.0001) was the only significant predictor identified. Specifically, higher DSS scores at Time 1 predicted higher DSS scores at Time 2. The (null) association between baseline life satisfaction and Time 2 FCAT reading was the same across student levels of positive affect and negative affect.

When Time 1 life satisfaction was used to predict Time 2 goal valuation, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, Time 1 goal valuation, the positive affect X life satisfaction interaction term, and the negative affect X life satisfaction interaction term explained 21.94% of the variance in Time 2 goal valuation, a significant amount F (12, 412) = 9.65, p<.0001. The following control variables were found to be significant: Hispanic race (t = 2.00, p<.05), Time 1 goal valuation (t = 8.18, p<.0001), and Time 1 positive affect (t = 2.19, p<.05). Specifically, Hispanic students had higher Time 2 goal valuation; higher Time 1 goal valuation predicted higher Time 2 goal valuation; and higher Time 1 positive affect predicted higher goal valuation at Time 2. Although Time 1 life satisfaction was not a significant predictor, it is notable that positive affect, another indicator of subjective well-being, significantly predicted Time 2 goal valuation.

When Time 1 life satisfaction was used to predict Time 2 attitude towards school, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, Time 1 attitude towards school, the positive affect X life satisfaction interaction term, and the negative affect X life satisfaction interaction term explained 31.91% of the variance in Time 2 attitude towards school, a significant amount F (12, 412) = 13.09, p<.0001. The following variables were found to significant predict Time 2 attitude towards school: students' school (t = 4.40, p<.0001), and Time 1 attitude towards school (t = 11.17, p<.0001). Specifically, students attending School B had higher Time 2 attitude towards school scores, and

higher Time 1 attitude towards school scores predicted higher attitude towards school scores at Time 2.

Similarly, in order to determine the extent to which positive and/or negative affect moderated the relationship between academic achievement (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 1 and subsequent life satisfaction at Time 2, four separate moderated multiple regression analyses were conducted. Beta weights and t-values are presented in Table 8.

In the first moderated regression analysis predicting Time 2 life satisfaction from Time 1 GPA, the linear combination of demographic variables (SES, race groups), fixed effect of school, baseline (Time 1) positive and negative affect, baseline (Time 1) life satisfaction, baseline (Time 1) GPA, the positive affect X GPA interaction term, and the negative affect X GPA interaction term explained 37.88% of the variance in Time 2 life satisfaction, a significant amount F (12, 412) = 20.94, p<.0001.Time 1 life satisfaction (t = 9.74, p<.0001) and Time 1 positive affect (t = 2.93, p<.01) were unique significant predictors. Specifically, higher Time 1 life satisfaction predicted higher life satisfaction at Time 2, and higher positive affect at Time 1 predicted higher Time 2 life satisfaction. Additionally, the interaction of baseline negative affect and GPA was significant (t = -2.01, p<.05), indicating that the association between initial GPA and later life satisfaction differed as a function of student baseline level of negative affect. Figure 1 depicts the relationship between baseline negative affect, baseline GPA, and later life satisfaction at Time 2. Predicted values for life satisfaction were calculated for each group of students in the following manner. High levels of a variable (i.e., GPA, negative affect) were defined as being one standard deviation above the sample mean and low levels of a variable were defined as being one standard deviation below the mean. These numbers were then included in the appropriate regression

Table 8

Student Life Satisfaction Predicted by Academic Achievement with Moderators (N=425)

Outcome	R^2	Parameter Estimates			
		B	*SE B*	B	*t*
T2 Life Satisfaction	.38				
1. SES		.06	.06	.05	1.05
2. Black		-.01	.16	-.003	-0.08
3. Hispanic		.06	.10	.03	0.64
4. Multiracial		.02	.14	.01	0.11
5. Other race		-.13	.20	-.03	-0.66
6. School		-.04	.08	-.02	-0.49
7. T1 LS		.51	.05	.51	9.74***
8. T1 PA		.17	.06	.13	2.93**
9. T1 NA		-.03	.06	-.02	-0.42
10. T1 GPA		.08	.06	.05	1.29
11. PA x GPA		-.05	.08	-.03	-0.60
12. NA x GPA		-.18	.09	-.08	-2.01*
T2 Life Satisfaction[a]	.44				
1. SES		.20	.09	.15	2.20*
2. Black		.06	.25	.01	0.23
3. Hispanic		.09	.15	.04	0.58
4. Multiracial		.25	.23	.07	1.10
5. Other race		.12	.30	.02	0.40
6. School		-.28	.13	-.13	-2.15*
7. T1 LS		.44	.08	.44	5.34***
8. T1 PA		.32	.09	.24	3.56**
9. T1 NA		.01	.11	.01	0.14
10. T1 Reading DSS		.11	.06	.11	1.76
11. PA x DSS		.19	.09	.13	2.21*
12. NA x DSS		-.03	.09	-.02	-0.29

Table 8 (Continued)

T2 Life Satisfaction	.37				
1. SES		.07	.06	.05	1.20
2. Black		-.07	.16	-.02	-0.44
3. Hispanic		.06	.10	.03	0.58
4. Multiracial		.01	.14	.001	0.04
5. Other race		-.11	.20	-.02	-0.55
6. School		-.04	.08	-.02	-0.49
7. T1 LS		.51	.05	.51	9.72***
8. T1 PA		.18	.06	.14	3.03**
9. T1 NA		-.02	.06	-.01	-0.24
10. T1 GV		.01	.07	.003	0.07
11. PA x GV		-.08	.09	-.04	-0.90
12. NA x GV		-.10	.08	-.05	-1.34
T2 Life Satisfaction	.37				
1. SES		.07	.06	.05	1.21
2. Black		-.07	.16	-.02	-0.44
3. Hispanic		.04	.10	.02	0.43
4. Multiracial		-.001	.14	-.0002	-0.00
5. Other race		-.11	.20	-.02	-0.52
6. School		-.04	.10	.02	0.43
7. T1 LS		.51	.05	.51	9.55***
8. T1 PA		.19	.06	.14	3.14**
9. T1 NA		-.01	.06	-.01	-0.11
10. T1 ATS		.001	.03	.001	0.22
11. PA x ATS		-.003	.04	-.004	-0.10
12. NA x ATS		-.002	.04	-.003	-0.07

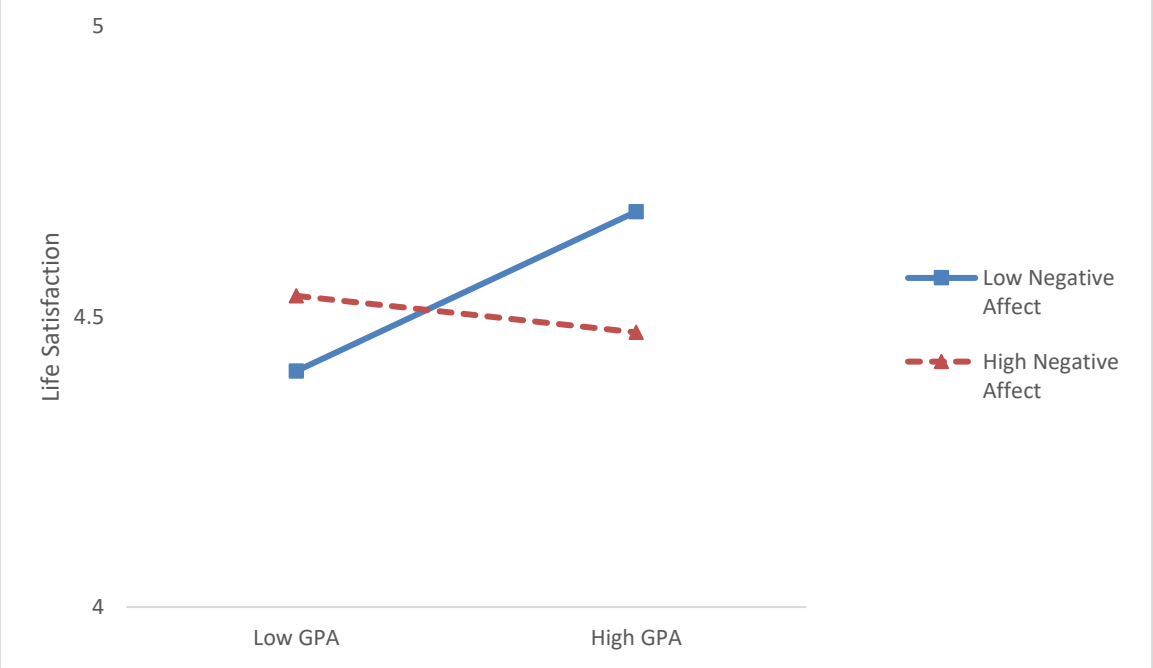
Note. White was used as the reference dummy for the race variable; T1 = December 2010, T2 = December 2011, LS = life satisfaction, PA = positive affect, NA = negative affect, GV = goal valuation, ATS = attitude towards school, GPA = grade point average, R-DSS = reading developmental scale score.

[a]*N* = 188 for analyses including R-DSS scores

*p<.05, **p<.01, ***p<.0001

equation (while holding all other variables constant at a value of 0, given that continuous variables included in the moderated regression equations had previously been centered and categorical variables had been dummy coded) to calculate the predicted life satisfaction score for students in each of the four groups: high GPA/high negative affect; high GPA/low negative affect; low GPA/high negative affect; and low GPA/low negative affect. As depicted in Figure 1, as Time 1 GPA increases, students with low negative affect at Time 1 were more likely to have high life satisfaction at Time 2. In comparison, students with high negative affect at Time 1 are more likely to experience relatively stable life satisfaction regardless of GPA.

Figure 1. Predicted life satisfaction for students who have high and low levels of negative affect.



Note. GPA = grade point average.

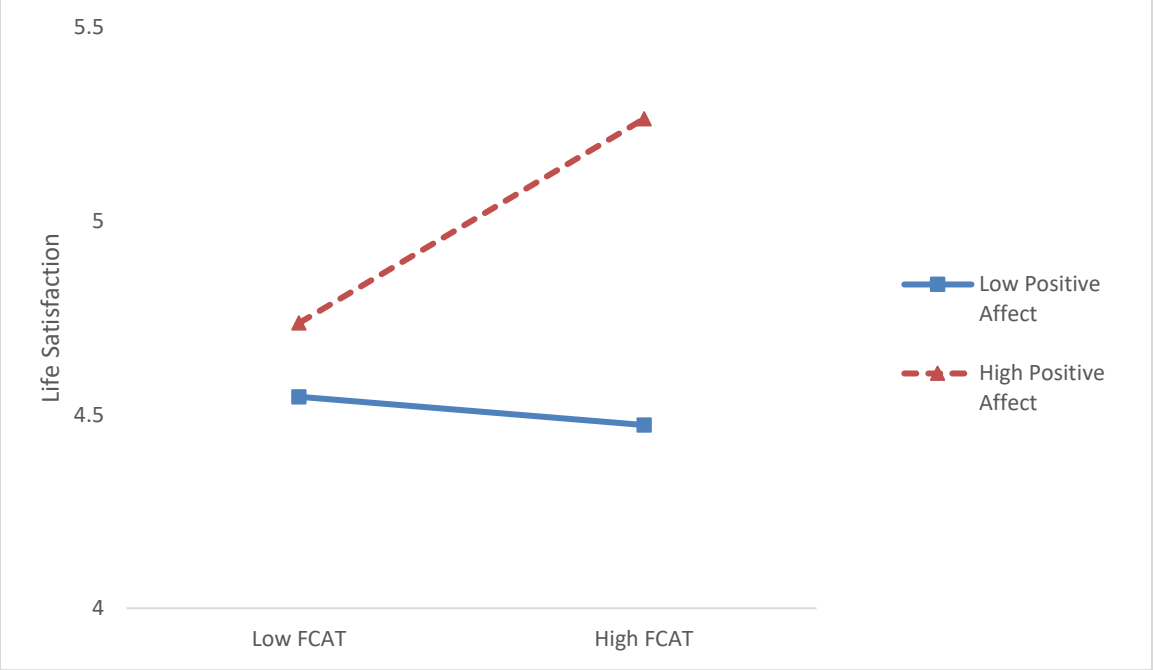
In the moderated regression analysis predicting Time 2 life satisfaction from Time 1 FCAT-reading DSS, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, Time 1 FCAT-reading DSS, the positive affect X DSS

score interaction term, and the negative affect X DSS score interaction term explained 43.89% of the variance in Time 2 life satisfaction, a significant amount F (12, 175) = 20.18, p<.0001. The following control variables were statistically significant: socio-economic status (SES; t = 2.20, p<.05), school (t = -2.15, p<.05), Time 1 life satisfaction (t = 5.34, p<.0001), and Time 1 positive affect (t = 3.56, p<.01). Specifically, students with higher SES had higher Time 2 life satisfaction; students attending School B had lower Time 2 life satisfaction; higher Time 1 life satisfaction predicted higher life satisfaction at Time 2; and higher positive affect at Time 1 predicted higher life satisfaction at Time 2. Additionally, the positive affect by FCAT-reading DSS moderator (t = 2.21, p<.05) was also a significant predictor of Time 2 life satisfaction. Figure 2 depicts the relationship between baseline positive affect, baseline FCAT-reading DSS, and life satisfaction at Time 2. Predicted values for life satisfaction were calculated for each group of students in the following manner. High levels of a variable (i.e., FCAT-reading DSS, positive affect) were defined as being one standard deviation above the sample mean and low levels of a variable were defined as being one standard deviation below the mean. These numbers were then included in the appropriate regression equation (while holding all other variables constant at a value of 0, given that continuous variables included in the moderated regression equations had previously been centered and categorical variables had been dummy coded) to calculate the predicted life satisfaction score for students in each of the four groups: high FCAT-reading DSS/high positive affect; high FCAT-reading DSS/low positive affect; low FCAT-reading DSS/high positive affect; and low FCAT-reading DSS/low positive affect. As depicted in Figure 2, as FCAT-reading DSS score increases, students with higher positive affect at Time 1 were more likely to have higher life satisfaction scores at Time 2. Conversely, students

with lower positive affect at Time 1 tended to have similar life satisfaction scores at Time 2 regardless of baseline FCAT-reading DSS score.

When Time 1 goal valuation was used to predict Time 2 life satisfaction, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, Time 1 goal valuation, the positive affect X goal valuation interaction term, and the negative affect X goal valuation interaction term explained 37.36% of the variance in Time 2 life satisfaction, a significant amount F (12, 412) = 20.47, p<.0001. Only Time 1 life satisfaction (t = 9.72, p<.0001) and Time 1 positive affect (t = 3.03, p<.01) were unique significant predictor

Figure 2. Predicted life satisfaction for students who have high and low levels of positive affect.



Note. FCAT = Florida Comprehensive Assessment Test scores.

variables. Specifically, higher Time 1 life satisfaction predicted higher Time 2 life satisfaction, and higher positive affect at Time 1 predicted higher life satisfaction at Time 2. The (null)

association between baseline goal valuation and later life satisfaction was the same across student levels of baseline positive affect and negative affect.

Finally, when Time 1 attitude towards school was used to predict Time 2 life satisfaction, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, Time 1 attitude towards school, the positive affect X attitude towards school interaction term, and the negative affect X attitude towards school interaction term explained 37.02% of the variance in Time 2 life satisfaction, a significant amount F (12, 412) = 11.41, p<.0001. Time 1 life satisfaction (t = 9.55, p<.0001) and Time 1 positive affect (t = 3.14, p<.01) were the only unique significant predictors identified. Specifically, higher Time 1 life satisfaction predicted higher life satisfaction at Time 2, and higher positive affect at Time 1 predicted higher Time 2 life satisfaction. The (null) association between baseline attitudes towards school and later life satisfaction was the same across student levels of baseline positive affect and negative affect.

Finally, in order to determine the extent to which positive and negative affect acted as moderators of the association between baseline academic achievement and later life satisfaction when all four academic achievement variables (i.e., GPA, FCAT-reading DSS scores, attitude towards school, and goal valuation) at Time 1 were used to predicted life satisfaction at Time 2, one final moderated multiple regression analyses was conducted. For this analysis, there were a total of eight moderator variables included. Beta weights and t-values are presented in Table 9. In this analysis, the linear combination of demographic variables, baseline positive and negative affect, baseline life satisfaction, Time 1 GPA, Time 2 FCAT-reading DSS scores, Time 1 goal valuation, Time 1 attitude towards school, the positive affect X GPA interaction term, the negative affect X GPA interaction term, the positive affect X FCAT-reading DSS score

interaction term, the negative affect X FCAT-reading DSS interaction term, the positive affect X goal valuation interaction term, the negative affect X goal valuation interaction term, the positive affect X attitude towards school interaction term, and the negative affect X attitude towards school interaction term explained 47.20% of the variance in Time 2 life satisfaction, a significant amount F (21, 166) = 7.07, p<.0001. The following control variables were identified as statistically significant: SES (t = 2.19, p<.05), school (t = -2.14, p<.05), Time 1 life satisfaction (t = 5.62, p<.0001), and Time 1 positive affect (t = 2.48, p<.05). Specifically, higher SES predicted higher Time 2 life satisfaction; attendance at School B predicted lower Time 2 life satisfaction, higher life satisfaction at Time 1 predicted higher life satisfaction at Time 2; and higher positive affect at Time 1 predicted higher life satisfaction at Time 2. Consistent with findings reviewed earlier in this chapter, there were no significant main effects of academic achievement on later life satisfaction (none of the four academic variables at Time 1 were found to be significant predictors of later life satisfaction at Time 2). However, the same two moderator variables identified in earlier analyses (that examined one academic predictor at a time) were significant: negative affect by GPA (t = -2.16, p<.05), and positive affect by FCAT-reading DSS (t = 2.48, p<.05). The nature of the moderation is the same as what was reported earlier: As academic achievement (GPA and FCAT-reading scores) at Time 1 increases, students with greater emotional well-being (i.e., lower negative affect and higher positive affect, respectively) at Time 1 were more likely to have higher life satisfaction scores at Time 2. Figures 3 and 4 depict the influence of these two moderator variables, respectively, utilizing the regression equations obtained from this analysis, which included multiple academic predictor variables.

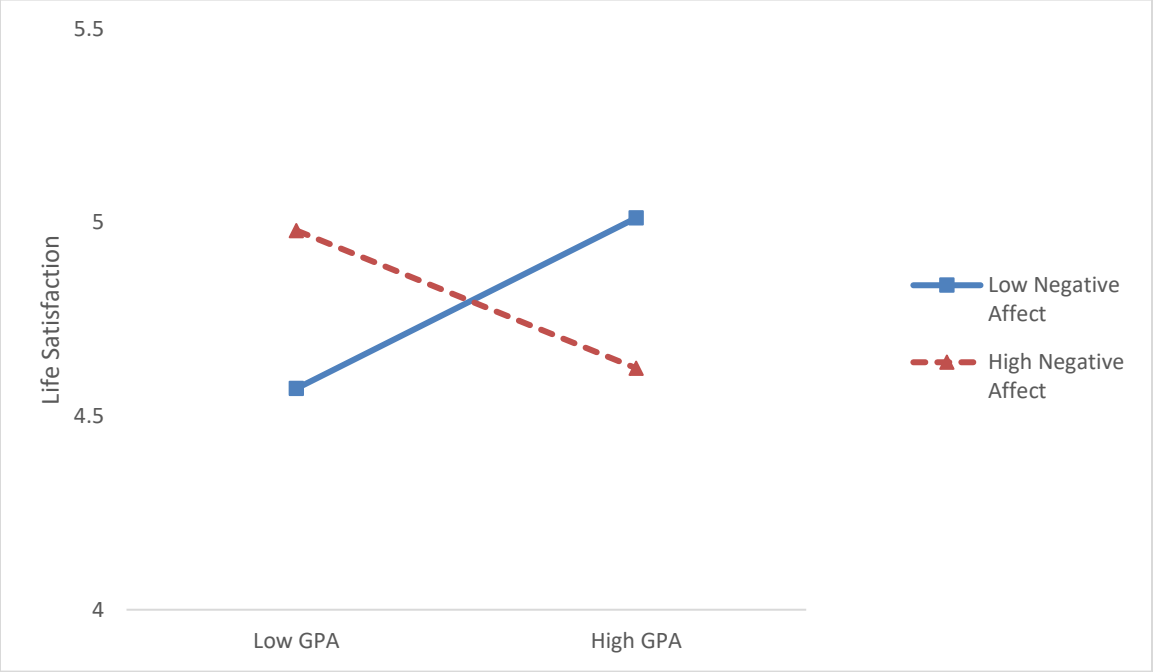
Table 9

Student Life Satisfaction Predicted by Combined Academic Achievement with Moderators (N=188)

Outcome	R^2	Parameter Estimates			
		B	*SE B*	β	*t*
T2 Life Satisfaction	.47				
1. SES		.20	.09	.15	2.19*
2. Black		.25	.27	.06	0.91
3. Hispanic		.13	.15	.06	0.86
4. Multiracial		.29	.23	.08	1.27
5. Other race		-.02	.33	-.004	-0.06
6. School		-.32	.13	-.15	-2.41*
7. T1 LS		.48	.09	.48	5.62***
8. T1 PA		.25	.10	.18	2.48*
9. T1 NA		.01	.11	.01	0.06
10. T1 GPA		.03	.11	.02	0.29
11. T1 Reading DSS		.10	.07	.10	1.41
12. T1 GV		.02	.13	.01	0.14
13. T1 ATS		-.01	.06	-.02	-0.24
14. PA x GPA		-.22	.17	-.10	-1.30
15. NA x GPA		-.41	.19	-.17	-2.16*
16. PA x DSS		.27	.11	.19	2.48*
17. NA x DSS		.07	.13	.04	0.54
18. PA x GV		-.13	.17	-.06	-0.76
19. NA x GV		-.15	.16	-.07	-0.93
20. PA x ATS		.11	.07	.11	1.45
21. NA x ATS		.07	.07	.08	0.99

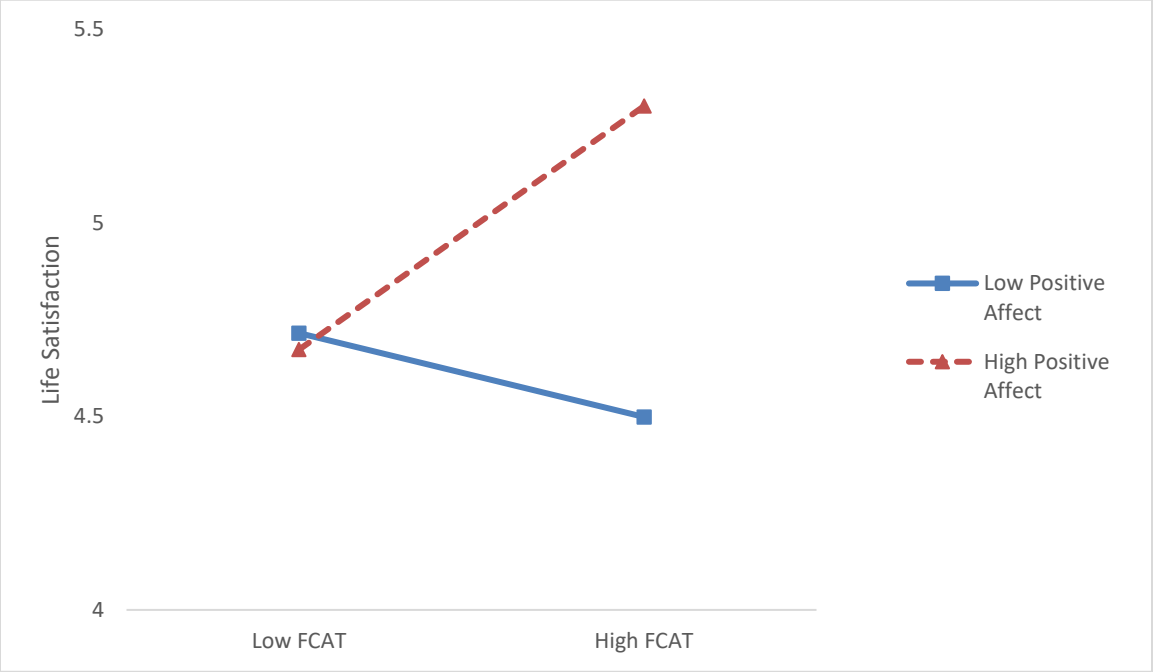
Note. White was used as the reference dummy for the race variable; T1 = December 2010, T2 = December 2011, LS = life satisfaction, PA = positive affect, NA = negative affect, GV = goal valuation, ATS = attitude towards school, GPA = grade point average, R-DSS = reading developmental scale score.
*p<.05, **p<.01, ***p<.0001

Figure 3. Predicted life satisfaction for students who have high and low levels of negative affect.



Note. GPA = grade point average.

Figure 4. Predicted life satisfaction for students who have high and low levels of positive affect.



Note. FCAT = Florida Comprehensive Assessment Test reading scores.

Chapter Five:

Discussion

The current study examined the bidirectional relationships between high school students' life satisfaction and academic achievement, as indicated by objective indicators of skills (GPA, FCAT-reading DSS scores) and proximal indicators of engagement (affective: attitude towards school; cognitive: goal valuation). Specifically, research questions evaluated: (1) the relationship between students' life satisfaction at Time 1 and academic achievement (as measured by four indicators of achievement) one year later at Time 2, and whether positive affect and/or negative affect moderated those relationships; and (2) the relationship between students' academic achievement at Time 1 (as measured by four indicators of achievement) and life satisfaction one year later at Time 2, and whether positive affect and/or negative affect moderated those relationships. The following discussion explores the findings of this study as they relate to the above research questions, as well as in relation to the existing literature on the topic. Next, implications of the current study for school psychologists and contributions to the literature are presented. Limitations of the current study are also discussed. Finally, directions for future research are identified.

Relationships between Life Satisfaction and Academic Achievement

Preliminary analyses. In the current study, correlational analyses were utilized to examine the relationship between students' life satisfaction and academic achievement at a given time point and across time points. The goal of these analyses was to determine the stability of each variable across time and to determine whether bivariate analyses support the link between

students' academic outcomes and life satisfaction. Both GPA and FCAT-reading DSS scores were found to be highly stable across time, with one-year correlations of r = .69 and r = .66, respectively. This level of stability for GPA and FCAT-reading scores has previously been identified by researchers studying younger students (grades 6-8; Suldo et al., 2011). Suldo and colleagues (2011) identified one-year correlations of r = .67 and r = .79 for students' GPA and FCAT-reading level scores, respectively, as students transitioned to grades 7 – 9. The high stability of students' GPA and FCAT-reading DSS scores in the current study likely influenced the findings of the subsequent regression analyses given that baseline achievement was controlled for in the analyses. When variables are highly stable over time, it is mathematically difficult to detect a unique significant influence of another predictor variable on the outcome variable because so much variance in the outcome is accounted for by baseline levels of the outcome.

Correlational, cross-sectional analyses. The bivariate associations between students' life satisfaction and academic outcomes were somewhat smaller than expected in consideration of previous research. For example, Suldo et al. (2008) reported a small, significant correlation between high school students' life satisfaction and GPA at the same time point (r = .21); in the current study the identified correlations were also small (r = .15 at Time 1 and r = .12 at Time 2). Gilman and Huebner (2006) reported that the life satisfaction and student-reported GPA of middle school and high school students was r = .32 when also measured with the SLSS. However, Crede et al. (2015) reported similar correlations among a sample of German high school students, where the correlation between life satisfaction and GPA was r = .14 when life satisfaction was measured using the General Life Satisfaction Scale and GPA was indicated from school records. It may be that younger samples tend to yield larger correlations between life

satisfaction and GPA due to the fact that younger children have fewer aspects of life outside of school that might influence quality of life (Chang et al., 2003). It may also be that Gilman and Huebner's use of student-reported GPA rather than GPA from school records impacted this finding, as students' self-beliefs may contribute to error in actual achievement level.

The current study found that at a given time point, students' FCAT-reading DSS scores and life satisfaction were not significantly correlated. The only previous research investigating the relationship between FCAT-reading scores and a measure of well-being (Suldo et al., 2011) found a small, positive relationship between SWB and FCAT-reading level scores at a given time point (r = .27). The discrepancy between findings from the current study and findings from previous research may be partially explained by the fact that Suldo and colleagues utilized FCAT -reading level scores rather than FCAT-reading DSS scores, and among a younger sample.

In regard to academic engagement, the current study identified small, positive correlations between life satisfaction and goal valuation at a given time point (r = .23 at Time 1 and r = .32 at Time 2). This finding aligns with those reported by Lewis and colleagues (2011), who previously found a similar, although somewhat larger relationship between life satisfaction and cognitive engagement at a given time point (r =.38 at Time 1 and r = .43 at Time 2). The current study also identified small, positive correlations between life satisfaction and attitudes toward school at a given time point (r = .29 at Time 1 and r = .34 at Time 2). Previous research by Oberle et al. (2011) on the relationship between life satisfaction and emotional engagement also supported a positive correlation between the two variables (r = .42), a somewhat larger correlation than those found in the current study. Additionally, Lewis et al. (2011) found a similarly positive relationship between life satisfaction and emotional engagement at a given time point (r = .34 at Time 1 and r = .44 at Time 2). The somewhat larger correlations reported

by Lewis and colleagues (2011) and Oberle et al. (2011) may be partially explained by the fact that both studies utilized samples of middle school students rather than older adolescents like those included in the current study.

Longitudinal analyses. In addition to examining concurrent relationships between the variables of interest, the current study also sought to determine the bidirectional, longitudinal relationship between high school students' life satisfaction and academic achievement, as measured by four variables.

Correlational analyses. Correlational analyses were utilized to determine the bivariate relationship between academic outcomes and life satisfaction across-time. Students' life satisfaction at Time 1 was significantly and positively associated with the following academic outcomes at Time 2: goal valuation (r = .18) and attitude towards school (r = .25). Time 1 life satisfaction was not significantly correlated with Time 2 GPA and was significantly and *negatively* correlated with Time 2 FCAT-reading DSS. The negative, significant correlation between life satisfaction and FCAT-reading DSS across time in the current study differs from previous research by Suldo and colleagues (2011) using the FCAT. Suldo et al. reported that SWB at Time 1 was significantly and positively correlated with later FCAT-reading level scores (r = .23). However, the current study utilized DSS scores rather than level scores used by Suldo et al. (2011), which may partially explain these incongruous findings. Additionally, Suldo et al. examined Time 1 life satisfaction in combination with affect (to create a composite subjective well-being variable) rather than examining life satisfaction independently. The finding that Time 1 life satisfaction was not significantly correlated with GPA at Time 2 also differs from previous research, as past studies have noted a positive and significant correlation between life satisfaction

and later GPA among high school students (r = .33, Salmela-Aro & Tuominen-Soini, 2010) and between SWB and later GPA among middle school students (r =.30, Suldo et al., 2011).

In the current study, GPA at Time 1 was significantly correlated with life satisfaction at Time 2 (r = .14), as was Time 1 goal valuation (r = .16) and Time 1 attitude towards school (r = .20). Time 1 FCAT-reading DSS was not significantly correlated with students' life satisfaction scores at Time 2, providing yet another directional example of a non-relationship between reading skills (as assessed by the FCAT DSS scores) and life satisfaction at a different time point within a subgroup of students who were in 9th grade at the beginning of the study. As in the current study, Lewis et al. (2011) found a significant correlation between students' life satisfaction and later emotional engagement (r = .30) and cognitive engagement (r = .33). Lewis et al. (2011) also found significant correlational relationships between later life satisfaction and baseline emotional engagement (r = .27) and baseline cognitive engagement (r = .38). These relationships are somewhat stronger than those in the current study, which may be due to the shorter time period between data collection (i.e., one semester) utilized by Lewis et al. (2011).

Regression analyses (Research Question 1). For all four regression analyses conducted to answer the first research question identified above, Time 1 life satisfaction was not identified as a significant predictor of academic achievement the following year after baseline levels of achievement were taken into consideration. However, a different indicator of subjective well-being (positive affect) exerted a main effect in the expected direction on one academic variable (cognitive engagement). Table 10 provides a summary of all analyses related to the first research question.

Table 10

Does Life Satisfaction Predict Later Academic Achievement?

	Academic Skills		Academic Engagement	
	GPA	***FCAT-reading DSS***	***Goal Valuation***	***Attitude Towards School***
Bivariate analyses	Not significant	Significant negative correlation	Significant positive correlation	Significant positive correlation
Regression analyses (main effects)	Not significant	Not significant	Not significant (main effect of positive affect only)	Not significant
Moderated regression analyses	Not significant	Not significant	Not significant (main effect of positive affect only)	Not significant

Note. GPA = grade point average, FCAT-reading DSS = Florida Comprehensive Assessment Test reading developmental scaled score.

When considering academic skills (i.e., GPA, FCAT-reading DSS), there was no bivariate support for a positive relationship between Time 1 life satisfaction and later academic skills. Similarly, results from regression analyses and moderated regression analyses failed to support a relationship between students' baseline life satisfaction and measures of academic skills at Time 2.

In regard to academic engagement variables (i.e., goal valuation, attitude towards school), there was bivariate support for the positive relationship between initial life satisfaction and later academic engagement. When regression analyses were used to further examine this relationship, there was no multivariate support for the relationship between Time 1 life satisfaction and Time 2 academic engagement. Regression analyses and moderated regression analyses did support a significant predictive relationship between Time 1 positive affect (a different dimension of subjective well-being) and Time 2 goal valuation, a measure of cognitive engagement.

With regard to predicting academic skills, the findings of the current study differ from findings of previous studies that included younger students. For instance, Suldo et al. (2011) found that among students in 6th through 8th grades, subjective well-being was a significant predictor of GPA one year later even when controlling for baseline GPA and demographic variables. Additionally, Ng and colleagues (2016) found that among 7th and 8th grade students, life satisfaction significantly predicted GPA five months later at Time 2 even when controlling for baseline levels of GPA and other demographic variables. The differing findings of the current study and previous research with younger students may be partially explained by the tendency for younger students to have fewer aspects of life outside of school, which may lead to school performance having a stronger relationship to younger students' life satisfaction and well-being (Chang et al., 2003).

The findings of the current study also differ from those reported by Salmela-Aro and Tuominen-Soini (2010), who found that among Finnish high school students, life satisfaction significantly predicted academic achievement five months later. However, these analyses did not control for baseline levels of academic achievement, which was measured at Time 2 only. This difference may also be explained by cultural factors, given that this research was conducted in Finland. Additionally, while the SWLS was used to assess students' life satisfaction, it is unclear if and how the measure was translated for use with Finnish students.

Of note, the findings of the current study are similar to two other research studies that investigated the relationship between middle school and high school students' life satisfaction and academic achievement. First, Marques et al. (2011) found that for Portuguese students between the ages of 12 and 16, life satisfaction was not a significant predictor of academic achievement two years later. However, the analyses conducted considered baseline levels of

hope as a control variable (but not baseline achievement); hope was not included in the current study and thus may have influenced these findings. The findings of the current study also align with those reported by Suldo et al. (2011) in regard to FCAT-reading scores. Suldo and colleagues found that in part due to the stability of FCAT-reading scores over time, middle school students' subjective well-being was not a significant predictor of FCAT-reading scores one year later in regression analyses that controlled for baseline FCAT-reading scores. The FCAT-reading scores utilized in the current study were also highly stable, which may help to explain the similarity of these findings with those of the current study.

With regard to predicting academic engagement, the findings of the current study differ somewhat from findings of previous studies such as those reported by Lewis and colleagues (2010). Results from that study indicated that baseline life satisfaction significantly predicted later cognitive engagement (β = .09, $p<.05$). This finding may be partially explained due to the fact that Lewis and colleagues did not control for baseline positive affect, which was a control variable in the current study. However, similar to the current study, Lewis and colleagues (2010) reported that baseline life satisfaction was *not* significantly predictive of later emotional engagement. To date, Lewis et al. (2010) have been the only researchers to investigate the longitudinal relationship between life satisfaction and measures of cognitive engagement or emotional engagement.

The findings of the current study indicated that positive affect was a significant predictor of later goal valuation, an indicator of cognitive engagement. This finding of a main effect aligns with Fredrickson's (2009) "broaden and build" theory, which suggests that positive emotions lead to approach behaviors and an openness to opportunities that provides individuals with positive experiences, which then lead to further positive emotions. Among high school students,

this “upward spiral” of positive emotions and experiences has been supported by Stiglbauer, Gnambs, Gamsjager, and Batinic (2013), who found that students who had positive experiences at school reported higher levels of positive affect. High positive affect, in turn, further promoted positive school experiences over time, leading to the “upward spiral” described by Barbara Fredrickson (2009).

Regression analyses (Research Question 2). In all four regression analyses conducted to answer the second research question identified above, Time 1 academic engagement was not identified as a significant predictor of later life satisfaction at Time 2. However, initial levels of academic skills predicted later life satisfaction in the expected direction for students who had higher affective well-being at baseline (Time 1); in contrast, later life satisfaction was relatively unrelated to baseline GPA or FCAT reading scores among students who began the study with lower positive affect and greater negative affect. Table 11 provides a summary of all findings relevant to the second research question.

When considering academic skills (i.e., GPA, FCAT-reading DSS), there was bivariate support for a positive relationship between Time 1 GPA and Time 2 life satisfaction, while there was no bivariate support for the relationship between Time 1 FCAT-reading DSS scores and later life satisfaction. When regression analyses were utilized to further examine this relationship, there were no main effects that initially supported a general relationship between either Time 1 indicator of academic skills and later life satisfaction, although there was support for the relationship between Time 1 positive affect and later life satisfaction. When all four academic outcomes were considered together, there were similar results, with positive affect being the only variable (other than baseline life satisfaction) to exert a main effect on students’ life satisfaction scores at Time 2. When moderated regression analyses were conducted,

Table 11

Does Academic Achievement Predict Later Life Satisfaction?

		Life Satisfaction	
Bivariate	***GPA***	Significant positive correlation	
	FCAT-reading DSS	Not significant	
	Goal Valuation	Significant positive correlation	
	Attitude Towards School	Significant positive correlation	
		Single Academic Outcome	Multiple Academic Outcomes
Regression analyses (main effects)	***GPA***	Not significant (main effect of positive affect only)	No significant effects of any academic variable (main effect of positive affect only)
	FCAT-reading DSS	Not significant (main effect of positive affect only)	
	Goal Valuation	Not significant (main effect of positive affect only)	
	Attitude Towards School	Not significant (main effect of positive affect only)	
		Single Academic Outcome	Multiple Academic Outcomes
Moderated regression analyses	***GPA***	Not significant (main effect of positive affect only) **Significant interaction term: GPA x NA**	No significant effects of any academic variable (main effect of positive affect only) **Significant interaction terms: GPA x NA FCAT x PA**
	FCAT-reading DSS	Not significant (main effect of positive affect only) **Significant interaction term: FCAT x PA**	
	Goal Valuation	Not significant (main effect of positive affect only) No significant interaction terms	
	Attitude Towards School	Not significant (main effect of positive affect only) No significant interaction terms	

Note. GPA = grade point average, FCAT-reading DSS = Florida Comprehensive Assessment Test reading developmental scaled score, NA = negative affect, PA = positive affect.

however, to determine if the association between initial academic functioning and later life satisfaction was consistent across students who began the study with different levels of

emotional well-being, results indicated that academic skills at Time 1 predict later life satisfaction in a positive direction for students who experience greater emotional well-being (i.e., high positive affect, low negative affect) at Time 1.

Specifically, for students with low levels of negative affect at Time 1, Time 1 GPA was found to be a significant predictor of later life satisfaction at Time 2. In comparison, students with high levels of negative affect at Time 1 were found to have relatively stable life satisfaction regardless of GPA at Time 1. This finding is incongruous with ideas advanced by Ng and colleagues (2016) that posited that high levels of negative affect would strengthen the relationship between baseline academic achievement and later life satisfaction. Of note, Ng and colleagues (2016) did not identify any significant interaction between GPA and negative affect, which also differs from the findings of the current study. This may be partially explained by the fact that Ng and colleagues measured negative affect in regard to school only, rather than assessing negative affect more generally as was done in the current study.

Moderated regression analyses in the current study also indicated that for students with high levels of positive affect at Time 1, Time 1 FCAT-reading DSS scores were a significant predictor of later life satisfaction at Time 2. In comparison, students with low levels of positive affect at Time 1 were found to have relatively stable life satisfaction regardless of FCAT-reading DSS scores at Time 1. This finding is also incongruous with ideas advanced by Ng and colleagues (2016), who suggested that low levels of positive affect would strengthen the relationship between baseline academic achievement and later life satisfaction. Notably, while Ng et al. (2016) found a main effect of academic achievement predicting later life satisfaction (a general trend reflecting associations seen among the general sample), they did not identify any significant interactions between academic achievement and positive affect, while the current

study found such an interaction. Ng and colleagues' (2016) contrasting findings pertinent to moderated effects may be partially explained by their use of a different measure, specifically one that only assessed positive affect related to school rather than positive affect more generally, as was the case in the current study.

In regard to positive affect, Barbara Fredrickson (2009) has previously noted the importance of positive emotions with her "broaden and build" theory. Fredrickson suggests that positive emotions are beneficial in that they broaden one's openness to experiences, which in turn builds one's resources to draw from in times of trouble. These resources then promote further thriving and positive emotions, which Fredrickson labels an "upward spiral." The findings of the current study have identified additional possible benefits of experiencing positive emotions. Specifically, high levels of positive affect at baseline seemed to be the condition under which student FCAT-reading DSS scores exerted an influence on later life satisfaction, with higher Time 1 FCAT-reading DSS scores associated with higher life satisfaction at Time 2.

In regard to academic engagement variables (i.e., goal valuation, attitude towards school), there was bivariate support for a small relationship between initial academic engagement and later life satisfaction. When regression analyses were used to further examine this relationship, there was not support for a unique relationship between Time 1 academic engagement and Time 2 life satisfaction after controlling for Time 1 life satisfaction (among other controls), although there was support for a predictive relationship between Time 1 positive affect and later life satisfaction. When all four academic outcomes were considered together, there were similar results, with positive affect being the only non-demographic variable (other than baseline life satisfaction) to exert a main effect on students' life satisfaction scores at Time 2. Moderated regression analyses also failed to support a significant link between baseline academic

engagement and later life satisfaction for students with different levels of positive or negative affect at Time 1.

The main effects yielded in the current study differ from the findings of previous studies that included younger students. For example, Leung and colleagues (2004) reported that among 7th grade students in China, academic *achievement* (skills) significantly predicted life satisfaction seven months later. However, achievement was assessed using student perceptions of their performance compared to others in their class. Additionally, cultural factors may help to explain Leung et al. (2004)'s findings, as the sample utilized in this research consisted of high-achieving students living in China. The current study also differs from findings reported by Ng et al.'s (2016) research, in which GPA was a significant predictor of life satisfaction five months later at Time 2 after controlling for baseline levels of life satisfaction and other demographic variables.

Previous research investigating the predictive relationship between baseline academic *engagement* and later life satisfaction differ somewhat from the findings of the current study. Lewis and colleagues (2010) reported that baseline emotional engagement was not a significant predictor of later life satisfaction scores, which the current study also found. However, Lewis et al. (2010) did find that baseline cognitive engagement was significantly predictive of later life satisfaction scores. However, the current study included positive affect as a predictor in all regression analyses, which was not the case for Lewis and colleagues (2010), and this may help to explain these partially discrepant findings. To date, Lewis et al. (2010) have been the only researchers to investigate whether initial cognitive engagement or emotional engagement are predictive of later life satisfaction.

Finally, the findings of the current study in regard to the second research question align with Fredrickson's (2009) "broaden and build" theory. The findings of the current study

indicated that positive affect was a significant predictor of later life satisfaction in all regression analyses and moderated regression analyses predicting Time 2 life satisfaction using Time 1 academic outcomes.

Implications for School Psychologists

The results of this study have several implications for school psychologists. Specifically, two situations were identified in which students' affect and academic performance interact to influence later life satisfaction. First, for students with low levels of negative affect, higher GPAs are associated with higher subsequent life satisfaction scores. Second, for students with high levels of positive affect, higher FCAT-reading DSS scores are associated with higher subsequent life satisfaction scores. Thus, poor academic skills (as reflected in achievement) may have detrimental effects on positive indicators of mental health among other known academic sequelae such as high school completion, postsecondary educational pursuit and attainment, etc. These findings offer support for providing mental health services to students with relatively high GPAs and standardized test scores who are struggling with internalizing disorders that are associated with high levels of negative affect and/or low levels of positive affect, in part because only students with high emotional well-being (i.e., low negative affect and high positive affect) experienced greater life satisfaction at Time 2 as a result of their higher academic skills (i.e., GPA and FCAT-reading DSS scores) at Time 1.

The current study also demonstrates the importance of high levels of positive affect on students' later life satisfaction and cognitive engagement. Baseline positive affect was found to have a significant main effect on students' subsequent cognitive engagement (as measured by goal valuation) and on students' subsequent life satisfaction. These findings suggest that it is important to promote positive emotions among students not only with the goal of improving their

life satisfaction, but also with the goal of increasing their cognitive engagement. Thus, school psychologists can address barriers to cognitive engagement by providing services aimed at increasing students' positive affect. According to Fredrickson's (2009) "broad and build" theory, increasing positive affect among students may also lead to an upward spiral of positive experiences and further increases in positive emotions. A recent book (Suldo, 2016) developed as a resource for school psychologists and other school mental health practitioners details well-being promotion intervention strategies (e.g., developing one's strengths, practicing gratitude) that have been tied to lasting increases in positive affect (Roth, Suldo, & Ferron, in press). Fredrickson (2000) also suggests building positive affect utilizing mindfulness meditation and relaxation techniques such as progressive muscle relaxation.

Some unexpected findings in the current study also suggest optimal times for school psychologists to influence achievement through targeting positive mental health. Whereas Ng and colleagues' (2015) study with middle school students found reciprocal relationships between life satisfaction and achievement, in the current study of high school students, achievement was relatively stable and later achievement was not influenced by earlier life satisfaction. Taken together, research suggests that interventions targeting subjective well-being may be best positioned as service priorities for the middle school years, given the increased likelihood of influencing academic outcomes in addition to the expected impact on improved mental health.

Limitations of the Current Study

There are several limitations of the current study that should be noted. First, an archival dataset was accessed to answer the research questions of this study. Due to this fact, the author of this thesis was unable to control the data collection procedures used at Time 1 and Time 2. However, written documents obtained from the research team that collected the original data

provide evidence that appropriate steps were taken to ensure the validity of the data collected. For example, the research team monitored student responding during Time 1 and Time 2 data collection in order to ensure that students completed the questionnaires independently. Additionally, surveys were presented in a counterbalanced order to control for possible order effects and student responses were checked to ensure measures were completed appropriately. Therefore, there is no evidence to indicate the archival dataset contains invalid data.

A second limitation of the current study is the use of a non-experimental design. Although demographic variables such as socio-economic status (SES), race, and school of attendance were controlled for in the regression analyses, it is possible that other demographic variables not measured by the original research team may influence students' life satisfaction and/or academic achievement. In order to address this limitation, future research should utilize an intervention-focused research design to investigate the bidirectional relationship between students' life satisfaction and academic achievement.

A final limitation of the current study involves the measurement of students' academic engagement. Although a cognitive component of engagement (i.e., goal valuation) and an affective component of engagement (i.e., attitude towards school) were included in the current study, a behavioral component of engagement was not available. As Appleton et al. (2006) noted, the inclusion of all three components of academic engagement allows for researchers to gain a more complete understanding of student engagement. Thus, future research should include measures of behavioral engagement, such as attendance data or observation data on student participation in class, in order to consider all three components of student engagement from varied data sources.

Contributions to the Literature

Despite these limitations, the current study makes several contributions to the existing literature on students' life satisfaction in relation to their academic achievement. First, only one research study to date (Ng et al., 2015) has used longitudinal data to investigate the potential bidirectional relationship between students' academic achievement and life satisfaction by considering life satisfaction as a predictor variable in addition to an outcome variable. The current study attempted to replicate and extend the research by Ng et al. (2015) using longitudinal data that was collected one year apart. Previous longitudinal research on the bidirectional associations between life satisfaction and academic achievement used data collected five months apart (Ng et al., 2015), which the authors noted did not allow for much variation in life satisfaction or achievement. By using data collected one year apart, the current study was better able to determine the longitudinal relationship between the two variables of interest, although arguably at a duration during which too much time has passed with regard to the many potential influences of extraneous variables on academic achievement and subjective well-being. Although life satisfaction is considered the most stable indicator of SWB, there is considerably more variability in life satisfaction over one year (r = .40 to r = .53; Huebner et al., 2000; Steger & Kashdan, 2007) than over three months (r = .53 to r = .74; Schimmack, Diener, & Oishi, 2002; Steger & Kashdan, 2007). The current study found that life satisfaction was similarly stable over one year (r = .59). Finally, the current study further examined logical notions that positive affect and negative affect may moderate associations between achievement and life satisfaction (Ng et al., 2015), finding that high affective well-being (i.e., low negative affect and high positive affect) moderates the relationship between students' baseline academic skills (as measured by GPA and FCAT-reading DSS scores) and later life satisfaction. The main effect of

baseline positive affect on later life satisfaction and later cognitive engagement discovered in the current study also contributes to the literature by providing further support for Barbara Fredrickson's "broad and build" theory of positive emotions.

Additionally, the current study collected information on student GPAs from school records, which is considered more reliable than self-reported GPA (Kuncel, Crede & Thomas, 2005). The current study also included standardized test scores as a measure of academic achievement, while most previous research has relied primarily on GPA as a measure of academic achievement. The inclusion of standardized test scores enhances understanding of academic achievement in relation to students' life satisfaction by providing an additional source of information regarding student performance. Furthermore, the current study included both distal measures of academic skills (i.e., GPA, standardized test scores) and proximal measures of academic engagement (i.e., attitude towards school, goal valuation). The inclusion of both proximal and distal measure of achievement likely provides a more complete understanding of achievement as it relates to life satisfaction. Finally, the current study utilized data from a reasonably diverse sample of students in terms of ethnicity and SES, which enhances external validity and the generalizability of the results.

Summary and Future Directions

The current study has contributed to the literature by providing the first examination of the bidirectional longitudinal relationship between life satisfaction and academic achievement using a sample of high school students. The current study was also the first to include multiple indicators of academic achievement, including GPA, standardized test scores, and measures of cognitive engagement and affective engagement. The findings of this study did not replicate the findings of previous research in this area, given that life satisfaction was not found to be a

significant predictor of later academic achievement; instead, positive affect exerted a significant main effect on later cognitive engagement and later life satisfaction, in line with Fredrickson's (2009) "broaden and build" theory of positive emotions. The current study found that academic achievement was a determinant of later life satisfaction for only a subset of students (students with high affective well-being at the beginning of the study). These findings add further support to Andrew and Withey's (1976) conceptualization of subjective well-being by suggesting that high positive affect, low negative affect, and life satisfaction are independent, yet related constructs.

In order to gain a more complete understanding of the bidirectional relationship between students' life satisfaction and academic achievement, future research should aim to replicate the current study using different samples of high school students. Because the current study was the first to examine the longitudinal, bidirectional relationship between these variables among high school students, more research is needed in order to determine whether the lack of a significant predictive relationship remains the same among different samples of students. This should also be a goal for future research due to the inconsistent nature of previous research on this relationship, with some studies reporting a significant predictive relationship (e.g., Ng et al., 2016; Suldo et al., 2011) while others (e.g., Marques et al., 2011 and the current study) report a lack of significant relationship. Future research in this area should also aim to include additional measures of academic achievement, include measures of behavioral engagement, in order to gain a stronger and more complete understanding of the relationship between life satisfaction and various academic outcomes. In regard to positive affect, future research should determine whether interventions targeting students' positive affect as a means for improving life satisfaction are more effective for students with higher GPAs and standardized test scores. Such

research would further clarify how positive affect influences student achievement and life satisfaction, particularly among students with above-average school performance. Finally, future research should investigate the longitudinal, bidirectional relationship between students' life satisfaction and academic achievement using data collected at multiple time points, less than and more than one year apart. This will allow researchers to determine if and how this relationship changes over time and may provide support for the best-timed and appropriately-focused inclusion of well-being interventions in schools in order to address barriers to learning and help students succeed.

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Appendices

Appendix A: Demographics Form

Birthdate: _____(month)- _____(day)- _____(year)

PLEASE READ EACH QUESTION AND CIRCLE **ONE** ANSWER PER QUESTION:

1. I am in grade: 9 10 11 12

2. My gender is: Male Female

3. Do you receive free or reduced-price school lunch? Yes No

4. My race/ethnic identity is:
   a. American Indian or Alaska Native
   b. Asian
   c. Black or African American
   d. Hispanic or Latino
   e. Native Hawaiian or Other Pacific Islander
   f. White
   g. Multi-racial (please specify):_____
   h. Other (please specify):_____

5. My biological parents are:
   a. Married
   b. Divorced
   c. Separated
   d. Never married
   e. Never married but living together
   f. Widowed

6. I live with my:
   a. Mother and Father
   b. Mother only
   c. Father only
   d. Mother and Step-father (or partner)
   e. Father and Step-mother (or partner)
   f. Grandparent(s)
   g. Other relative (please specify): _____
   h. Other (please specify): _____

7. My father's highest education level is:
   a. 8th grade or less
   b. Some high school, did not complete
   c. High school diploma/GED
   d. Some college, did not complete
   e. College/university degree
   f. Master's degree
   g. Doctoral level degree (Ph.D, M.D.) or other degree beyond Master's level

8. My mother's highest education level is:
   a. 8th grade or less
   b. Some high school, did not complete
   c. High school diploma/GED
   d. Some college, did not complete
   e. College/university degree
   f. Master's degree
   g. Doctoral level degree (Ph.D, M.D.) or other degree beyond Master's level

Note. This appendix has been modified in font size to comply with margin requirements.

Appendix B: Student's Life Satisfaction Scale
This measure is available in the public domain from:

Huebner, E.S. (1991c). Initial development of the Student's Life Satisfaction Scale. *School Psychology International*, *12*, 231-240.

We would like to know what thoughts about life you've had during the past several weeks. Think about how you spend each day and night and then think about how your life has been during most of this time. Here are some questions that ask you to indicate your satisfaction with life. In answering each statement, circle a number from (**1**) to (**6**) where (**1**) indicates you **strongly disagree** with the statement and (**6**) indicates you **strongly agree** with the statement.

	Strongly Disagree	**Mostly Disagree**	**Mildly Disagree**	**Mildly Agree**	**Mostly Agree**	**Strongly Agree**
1. My life is going well	**1**	**2**	**3**	**4**	**5**	**6**
2. My life is just right	**1**	**2**	**3**	**4**	**5**	**6**
3. I would like to change many things in my life	**1**	**2**	**3**	**4**	**5**	**6**
4. I wish I had a different kind of life	**1**	**2**	**3**	**4**	**5**	**6**
5. I have a good life	**1**	**2**	**3**	**4**	**5**	**6**
6. I have what I want in life	**1**	**2**	**3**	**4**	**5**	**6**
7. My life is better than most kids'	**1**	**2**	**3**	**4**	**5**	**6**

Appendix C: Positive and Negative Affect Schedule - Children
This measure is available in the public domain from:

Laurent, J., Catanzaro, S.J., Joiner, T.E., Rudolph, K.D., Potter, K.I., Lambert, S., Osborne, L., & Gathright, T. (1999). A measure of positive and negative affect for children: Scale development and preliminary validation. *Psychological Assessment, 11* (3), 326-338.

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you have felt this way during the past few weeks.

	Feeling or emotion:	**Very slightly or not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
1.	Interested	1	2	3	4	5
2.	Sad	1	2	3	4	5
3.	Frightened	1	2	3	4	5
4.	Excited	1	2	3	4	5
5.	Ashamed	1	2	3	4	5
6.	Upset	1	2	3	4	5
7.	Happy	1	2	3	4	5
8.	Strong	1	2	3	4	5
9.	Nervous	1	2	3	4	5
10.	Guilty	1	2	3	4	5
11.	Energetic	1	2	3	4	5
12.	Scared	1	2	3	4	5
13.	Calm	1	2	3	4	5
14.	Miserable	1	2	3	4	5
15.	Jittery	1	2	3	4	5
16.	Cheerful	1	2	3	4	5
17.	Active	1	2	3	4	5
18.	Proud	1	2	3	4	5
19.	Afraid	1	2	3	4	5
20.	Joyful	1	2	3	4	5
21.	Lonely	1	2	3	4	5
22.	Mad	1	2	3	4	5
23.	Disgusted	1	2	3	4	5
24.	Delighted	1	2	3	4	5
25.	Blue	1	2	3	4	5
26.	Gloomy	1	2	3	4	5
27.	Lively	1	2	3	4	5

Appendix D: School Attitude Assessment Survey - Revised
This measure is available in the public domain from:

McCoach, D.B. & Siegle, D. (2003). The school attitude assessment survey – revised: A new instrument to identify academically able students who underachieve. *Educational and Psychological Measurement, 63* (3), 414-429.

Please rate how strongly you agree or disagree with the following statements. In answering each question, use a range from (**1**) to (**7**) where (**1**) stands for **strongly <u>dis</u>agree** and (**7**) stands for **strongly agree**. Please circle only one response choice per question.

Statement:	**Strongly Disagree**	**Disagree**	**Slightly Disagree**	**Neither Agree nor Disagree**	**Slightly Agree**	**Agree**	**Strongly Agree**
1. I am glad that I go to this school.	1	2	3	4	5	6	7
2. This is a good school.	1	2	3	4	5	6	7
3. This school is a good match for me.	1	2	3	4	5	6	7
4. I want to get good grades in school.	1	2	3	4	5	6	7
5. Doing well in school is important for my future career goals	1	2	3	4	5	6	7
6. I like this school.	1	2	3	4	5	6	7
7. Doing well in school is one of my goals	1	2	3	4	5	6	7
8. I am proud of this school.	1	2	3	4	5	6	7
9. It's important to get good grades in school	1	2	3	4	5	6	7
10. I want to do my best in school	1	2	3	4	5	6	7
11. It is important for me to do well in school.	1	2	3	4	5	6	7

Note. This appendix has been modified in font size to comply with margin requirements. Attitudes toward School scale is comprised of items 1, 2, 3, 6, and 8. Goal Valuation subscale is comprised of items 4, 5, 7, 9, 10, and 11.

Appendix E: Current Approval to Conduct Additional Analyses

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd. MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX(813) 974-7091

8/12/2016

Shannon Suldo, Ph.D.
Educational and Psychological Studies
4202 East Fowler Ave., EDU 105
Tampa, FL 33620

RE: **Expedited Approval for Continuing Review**
IRB#: CR6_Pro00001693
Title: Predictive Utility of a Dual-Factor Model of Adolescent Psychological Well-Being

Study Approval Period: 9/9/2016 to 9/9/2017

Dear Dr. Suldo:

On 8/12/2016, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within including those outlined below.

Approved Item(s):
Protocol Document(s):
Study Protocol

The IRB determined that your study qualified for expedited review based on federal expedited category number(s):

(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

This study involving child participants falls under the minimal risk category 45 CFR 46.404: Research not involving greater than minimal risk

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with USF HRPP policies and procedures and as approved by the USF IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

Appendix F: Initial IRB Approval

USF
UNIVERSITY OF SOUTH FLORIDA

DIVISION OF RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd. MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-5618

September 8, 2010

Shannon Suldo, PhD
Psychological and Social Foundations
4202 East Fowler Ave., EDU 105

RE: **Expedited Approval** for Initial Review
IRB#: Pro00001693
Title: Predictive Utility of a Dual-Factor Model of Adolescent Psychological Well-Being

Dear Shannon Suldo:

On 9/7/2010 the Institutional Review Board (IRB) reviewed and **APPROVED** the above referenced protocol. Please note that your approval for this study will expire on 9-7-11.

Approved Items:
Protocol Document(s):

Study Protocol	8/10/2010 9:18 AM	0.04

Study involves children and falls under 45 CFR 46.404: Research not involving more than minimal risk.

Consent/Assent Document(s):

Parent Consent.pdf	9/8/2010 10:28 AM	0.01
Student assent.pdf	9/8/2010 10:28 AM	0.01
Teacher consent.pdf	9/8/2010 10:28 AM	0.01

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review

research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

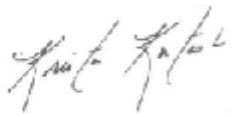
(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Please note, the informed consent/assent documents are valid during the period indicated by the official, IRB-Approval stamp located on the form. Valid consent must be documented on a copy of the most recently IRB-approved consent form.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-9343.

Sincerely,



Krista Kutash, PhD, Chairperson
USF Institutional Review Board

Cc: Various Menzel, CCRP
USF IRB Professional Staff