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Life Satisfaction and Academic Performance in Early Adolescents: Evidence for Reciprocal Relationships

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LIFE SATISFACTION AND ACADEMIC PERFORMANCE IN EARLY ADOLESCENTS:
EVIDENCE FOR RECIPROCAL RELATIONSHIPS

by

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ABSTRACT

Student well-being remains a relatively neglected topic despite its intimate link to positive school outcomes. As academic achievement is the yardstick of student success and school accountability, school-based mental health research and practice have focused primarily on the assessment and treatment of learning and behavioral problems. This short-term longitudinal study sought to establish the role of student subjective well-being in academic achievement. Based on the engine model of well-being (Jayawickreme, Forgeard, & Seligman, 2012), the study focused on life satisfaction as a process variable and academic performance as an outcome variable. Using two waves (five months apart) of data, the study examined the reciprocal relation between life satisfaction and academic achievement, and how it may be shaped by positive and negative affective experiences in school, in a sample of 722 middle school students. Results revealed positive reciprocal causal relations between students' life satisfaction and grade point averages, even when demographic covariates, positive and negative affect, and baseline values were controlled for. This study provides empirical support that student subjective well-being does not undermine academic achievement (or vice versa), but rather it is synergistic with better learning. Furthermore, results showed that the relations between students' life satisfaction and grade point averages were moderated by negative, but not positive, affective experiences in school. These findings suggest that student subjective well-being should occupy a more prominent niche in the school agenda.

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LIST OF ABBREVIATIONS

GPA..Grade Point Average

LS...Life Satisfaction

NA...Negative Affect

PA .... Positive Affect

PANAS-C ....Positive and Negative Affect Schedule for Children

PTH..Psychopathology

SLSS .... Students' Life Satisfaction Scale

SWB..Subjective Well-Being

T1 ....Time 1

T2 ....Time 2

CHAPTER 1

INTRODUCTION

Subjective well-being (SWB), considered synonymous with happiness, has been linked to desirable outcomes across multiple life domains, including career success (Judge, Thoresen, Bono, & Patton, 2001; Russel, 2008), marital harmony (Stanley, Ragan, Rhoades, & Markman, 2012), and longevity (Chida & Steptoe, 2008; Collins, Glei, & Goldman, 2009). Longitudinal research shows that SWB is an antecedent rather than a mere consequence of such positive outcomes (Lyubomirsky, King, & Diener, 2005). While the work has advanced our understanding of the benefits associated with SWB, less attention has been devoted to its contribution to school outcomes, particularly academic achievement (Chafouleas & Bray, 2004; Proctor, Linley, & Maltby, 2009). The No Child Left Behind (NCLB) Act was a landmark legislation that ushered in a new era of data-based transparency and accountability in the United States education system (Bush, 2001). A hallmark of NCLB is the annual statewide assessment of third through eighth graders, a well-intentioned endeavor to ensure the academic proficiency and graduation rates of all students (Dee & Jacob, 2011). Subsequent education reforms include the Common Core State Standards (CCSS), which specify performance benchmarks in English language arts and mathematics for K-12 students, and the Race to the Top (RTT), a competitive grant program at both the state and district levels. As academic performance is inextricably intertwined with resource allocation in these major federal policies, schools are under

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enormous pressure to demonstrate that they are providing every student with optimal education through high academic achievement scores on state accountability tests. Since child psychopathology (PTH) hampers efforts to meet academic goals, school-based mental health research and practice have largely focused on the assessment and treatment of learning (e.g., dyslexia, dyscalculia) and behavioral (e.g., depression, aggression) problems among troubled students (Terjesen, Jacofsky, Froh, & DiGiuseppe, 2004). Working under the assumption of unidimensionality in mental health, which presupposes that a decline in PTH is simultaneously accompanied by a rise in SWB, schools have done little to enhance and optimize the well-being of students (Noddings, 2002; Terjesen, Jacofsky, Froh, & Digiuseppe, 2004).

1.1 SUBJECTIVE WELL-BEING IN SCHOOLS

Positive psychology asserts the importance of assessing how well an individual is doing in the absence or early stages of PTH (Chafouleas & Bray, 2004). As Jahoda (1958) so aptly put it, "The absence of disease may constitute a necessary, but not sufficient, criterion for mental health" (p. 15). Mental health is more than just the absence of PTH. The dual factor model of mental health contends that PTH and SWB are complementary but distinct components of human functioning, rather than opposing ends of a single wellness continuum (Greenspoon & Saklofske, 2001). Specifically, it identifies four different mental health statuses: flourishing (low PTH and high SWB), vulnerable (low PTH and low SWB), symptomatic but content (high PTH and high SWB), and troubled (high PTH and low SWB). Most of the empirical support for the dual factor model come from studies of student populations. Research findings indicate that vulnerable students have lower self-esteem, diminished motivation for learning, lower grade point average

(GPA), and less engagement in school compared to flourishing students (Antaramian, Huebner, Hills & Valois, 2010; Suldo, Thalji, & Ferron, 2011). Larson (2000) further opined that student disaffection and disengagement "are not signs of psychopathology, at least not in most cases, but rather signs of a deficiency in positive development" (p. 170).

Schools should not only attempt to remedy deficits of troubled students, but also work on optimizing the SWB of *all* students for it entails greater benefits in the long term (Huppert, 2009; Terjesen, Jacofsky, Froh, & DiGiuseppe, 2004). The benefits of SWB in school-based mental health services are twofold. First, the inclusion of positive indicators of SWB paints a more holistic and comprehensive picture of student functioning for educators and mental health professionals alike (Ben-Arieh, 2008; Huebner & Hills, 2011). This increases the sensitivity of screening procedures for identifying vulnerable students (with low SWB) who often slip through the cracks of traditional mental health systems because they do not meet clinical levels of PTH (Greenspoon & Saklofske, 2001; Suldo, Thalji, & Ferron, 2011). Second, positive interventions focus on the development of personal strengths and resources for every student, not just troubled students (Huebner, Hills, Siddall, & Gilman, 2014). They serve the dual purpose of enhancing SWB and buffering against PTH (Seligman & Csikszentmihalyi, 2000; Gable & Haidt, 2005), which expands the scope and direction of school interventions to include a proactive rather than reactive approach to addressing psychosocial and educational concerns (Meyers & Meyers, 2003; Proctor, Linley, & Maltby, 2009). Such preventative efforts provide critical opportunities to intervene earlier, more effectually, and less intrusively within school settings (Greenberg et al., 2003). A strength-based approach to mental health also serves

to increase and sustain students' motivation and efforts for positive behavior change (Huebner & Hills, 2011).

1.2 SUBJECTIVE WELL-BEING IN EARLY ADOLESCENCE

Early adolescence is a pivotal developmental period for mental health, with half of all lifetime cases of mental disorders emerging by age 14 (Belfer, 2008). It marks the beginning of the identity formation process, which is characterized by a need for autonomy and independence from parental control as well as a need for acceptance and approval from peers (Steinberg, 2004; McLaughlin & Clarke, 2010). It also encompasses the biological transition of puberty, the cognitive transition from concrete to formal operational stage, and the academic and social transition from elementary to middle school (Shoshani & Slone, 2013). Roeser, Eccles, and Sameroff (2000) describe the salience of early adolescence: "Nowhere in the life span other than in infancy is the interplay of individual and collective factors in the composition of human life more pronounced than in the early adolescent years" (p. 443). The Carnegie Council on Adolescent Development (1989) reiterates that:

> Young adolescents face significant turning points. For youths 10 to 15 years old, early adolescence offers opportunities to choose a path toward a productive and fulfilling life. For many others, it represents their last best chance to avoid a diminished future. (p. 8)

Given that early adolescence is considered an important phase of the developmental trajectory, it is an opportune time for adaptive change to occur and to build a strong foundation for positive well-being over the life course (Park, 2003; Salmela-Aro & Tynkkynen, 2010).

Schools provide an excellent platform for well-being initiatives as most adolescents spend considerable amount of their time at school (American Academy of Pediatrics, 2004; McLaughlin & Clarke, 2010). Linley and his colleagues (2006) place great emphasis on the role schools play in adolescents' well-being: "School psychology can serve as a point of connection between positive psychology's promotion of optimal human development and schools as the a priori institutions that can serve as the vehicles for this development" (p. 10). Adolescents can acquire skills of well-being that will help them build enabling conditions of life (e.g., formation of positive relationships, access to resources) in addition to minimizing disabling conditions (e.g., academic pressures, engagement in risky behaviors) of life (McCabe, Bray, Kehle, Theodore, & Gelbar, 2011). Research has shown that incorporation of positive psychology in school practices reduces student referrals for both academic and behavioral problems (Terjesen, Jacofsky, Froh, & Digiuseppe, 2004). While schools are instrumental in the promotion of student well-being, it is vital to understand the reciprocal relationship that schools have on positive youth development. Enhancing the SWB of individual students can improve the climate of the school as a whole, and subsequently foster further personal growth among students (Chafouleas & Bray, 2004; Linley, Joseph, Harrington, & Wood, 2006). Unfortunately, student well-being is often confined to the periphery of the school agenda. If, however, the role of SWB in academic achievement can be established, it may provide impetus for change in schools. So, do students learn best when they are happy as propounded by Noddings (2002)? Or does the pursuit of academic success come at the cost of happiness? The question of whether SWB is an important determinant of academic success (and vice versa) remains to

be justified given the nascent stage of the literature in this field (Suldo, Riley, & Shaffer, 2006).

1.3 ENGINE MODEL OF WELL-BEING

The engine model of well-being provides an overarching framework to understand how SWB engenders a multiplicity of desirable outcomes (Jayawickreme, Forgeard, & Seligman, 2012). The model attempts to reconcile and integrate divergent theories of SWB with three classes of variables: (a) inputs, (b) processes, and (c) outcomes. Input variables refer to endogenous traits (e.g., curiosity, optimism, prudence) and exogenous resources (e.g., income, education, healthcare) that affect wellbeing. Process variables are internal states (e.g., cognitive processes, self-control, emotions) that shape personal choices. Outcome variables include voluntary behaviors (e.g., accomplishments, engagement, relationships) that contribute to positive well-being. Based on the engine model, the present study focuses on global life satisfaction (LS), a process variable, and academic achievement, an outcome variable, as a pathway for optimizing SWB. LS, defined as the appraisal of one's quality of life as a whole, has been described as the cognitive component of SWB (Diener, 1984). Individuals assess the quality of their lives on the basis of their own personal benchmarks (Shin & Johnson, 1978). Frisch (2000) describes LS as a global judgment of the degree to which an individual perceives that his or her aspirations and needs are being met. Similarly, Diener, Suh, Lucas, and Smith (1999) construe LS as a subjective evaluation of one's progression towards important life goals.

Although the engine model posits that the chain of causality runs from inputs through processes to outcomes, it notes that outcomes may have considerable causal influence on both inputs and processes (Jayawickreme, Forgeard, & Seligman, 2012). Most

of the extant research assumes that LS is an antecedent of academic achievement. The possibility that LS may be a consequence of academic performance is often ignored. However, prior research highlights the protective nature of high academic achievement in the mental health outcomes of adolescent students (Carlton et al., 2006; Herman, Lambert, Reinke, & Ialongo, 2008; Stewart & Suldo, 2011). Furthermore, in a qualitative study of high school students, Suldo and her colleagues (2014) found that academic achievement was the most salient determinant of LS within the school domain. This suggests that the contribution of academic performance to students' LS merits consideration. Acknowledging the presence of feedback effects in the engine model, this study seeks to examine the reciprocal relationship between LS and academic achievement. We hypothesize that LS will have a positive impact on subsequent academic performance and vice versa.

The engine model also points out that differential inputs and processes may have a joint effect on outcomes. If LS is the cognitive component of SWB, then positive (PA) and negative (NA) affect are the emotional component (Diener, 1984). While ample empirical evidence shows that LS, PA, and NA may have distinct nomological networks (Lucas, Diener, & Suh, 1996; Busseri & Sadava, 2011), correlations among the variables are often moderate but significant (Huebner & Dew, 1996; Kuppens, Realo, & Diener, 2008). This means that LS, PA, and NA are separable but not completely orthogonal (Fujita & Diener, 2005; Kim-Prieto, Diener, Tamir, Scollon, & Diener, 2005). As Veenhoven (2006) points out, LS extends beyond momentary affective experiences to include a reflective and evaluative perspective of life in its totality. The majority of the extant studies on LS and school outcomes fail to address PA and NA as potential confounds. The true relationship

between LS and school outcomes may be masked or partially confounded by the presence (or high levels) of PA and/or absence (or low levels) of NA. Recognizing the presence of interaction effects in the engine model, this study examines the reciprocal relationship between LS and academic achievement, while controlling for demographic covariates (inputs), positive and negative affect (processes), and baseline differences in academic performance.

1.4 LIFE SATISFACTION AND ACADEMIC ACHIEVEMENT

The research to date suggests LS displays substantial linkages with several key school outcomes (Huebner, Hills, Siddall, & Gilman, 2014). Recent research shows that high levels of LS are associated with high academic efficacy (Suldo, Riley, & Shaffer, 2006; Diseth, Danielsen, & Samdal, 2012), positive sociometric status (Martin, Huebner, & Valois, 2008; You, Furlong, Felix, Sharkey, Tanigawa, & Green, 2008), reduced externalizing and internalizing classroom behaviors (Sun & Shek, 2013; Lyons, Otis, Huebner, & Hills, 2014), and increased student engagement in school (Lewis, Huebner, Malone & Valois, 2011). Such findings underscore the vital contribution of LS to positive educational trajectories. Though LS is strongly related to school behavior and perceived academic competence, only a handful of studies have looked at its relationship with actual academic performance.

Findings on the relations between LS and academic achievement are somewhat mixed. The majority of the studies reported positive but modest (and not necessarily significant) associations between LS and academic grades. Chow (2005) found a positive relationship between LS and self-reported GPA in a sample of Canadian university students. Rode and his colleagues (2005) reported that LS was positively correlated to self-

reported GPA of college students, even when cognitive aptitude and demographic covariates were controlled for. Similarly, in a sample of middle and high school students, Gilman and Huebner (2006) found that adolescents with high or average levels of LS had higher self-reported GPA than those with low levels of LS. In a 4-wave longitudinal study, Salmela-Aro and Tynkkynen (2010) tracked the LS of Finnish ninth graders over a school year, and found that high academic achievement was associated with a high LS trajectory. Finnish adolescents with high-stable LS across the period of study had higher self-reported GPA than those with high-decreasing or low-increasing LS. In another longitudinal study, Quinn and Duckworth (2007) explored the direction of causality between SWB and academic achievement, and found a positive reciprocal relationship in a sample of fifth graders. Student SWB (calculated as the composite of LS, PA, and NA) positively predicted school-recorded GPA after a 1-year period, and vice versa, even when cognitive aptitude, age, and baseline values were controlled for. On the contrary, Ayyash-Abdo and Sánchez-Ruiz (2012) found a null relationship between LS and GPA in a sample of Lebanese college students, when PA and NA were controlled. Similar results were reported by Bradley and Corwyn (2004) in a socio-culturally diverse sample of adolescents. Most of the extant studies are cross-sectional in nature, which precludes causal inferences. And amongst the scant longitudinal studies, few controlled for demographic characteristics (e.g., age, sex, socioeconomic status) or baseline differences. This limitation is compounded by a reliance on self-reports of GPA, which may not be the most reliable or objective measure of academic performance. More research is needed to elucidate the nature and directionality of the relationship between LS and academic achievement.

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This study further explores the bidirectional link between LS and academic achievement by considering the possible moderating roles of PA and NA. Empirical evidence shows that students' affective experiences in school have the potential to enhance or interfere with academic progress (Raver, 2002; Lewis, Haviland-Jones, & Barrett, 2008; Pekrun, Elliot, & Maier, 2009). For example, stress-induced anger and frustration (e.g., academic pressure, peer victimization) exacerbates student disaffection and disinterest, including an avoidance of or a resistance to learning (Skinner, Furrer, Marchand, & Kindermann, 2008). Joy of learning, on the other hand, inspires students to invest effort and time in scholastic tasks (Wolk, 2008). Pride in one's work also spurs students to perform tasks to the best of their abilities (Villavicencio & Bernardo, 2013). Given that LS, PA, and NA are complementary but distinct components of SWB (Diener, 1984; Huebner & Dew, 1996), the direct associations between LS and academic performance may be weak and inconsistent because of individual differences in experiences of PA and NA in school. To date, there appears to be no research on the possible effects of PA and NA as moderators of the relationship between LS and academic performance. Nonetheless, we hypothesize that the positive association of LS with academic performance will be stronger in the presence (or high levels) of PA or the absence (or low levels) of NA.

1.5 PURPOSE OF STUDY

Despite the growing body of research on LS, its impact on academic outcomes is understudied and remains to be clarified (Suldo, Riley, & Shaffer, 2006). Although the engine model of well-being postulates that LS (process variable) should predict academic achievement (outcome variable), the reciprocal nature of the model also suggests that academic performance may influence LS. Much of the current literature is based on cross-

sectional studies, which makes it difficult to determine whether LS is an antecedent and/or consequence of academic achievement (Quinn & Duckworth, 2007). Furthermore, few longitudinal studies controlled for differences in initial levels of the criterion (i.e., baseline LS or GPA). Moreover, the majority of the studies relied on self-reports, rather than school records of GPA, which are susceptible to impression management and self-deceptive enhancement (Nickerson, Diener, & Schwarz, 2011). These limitations are also compounded by a negligence of PA and NA as potential confounds. The present longitudinal study seeks to illuminate the relation between LS and academic achievement, and how it may be shaped by positive and negative affective experiences in school, while addressing the limitations of extant research.

Since early adolescence is a period of tremendous growth and change often marked by declines in LS and adjustment to school (Dotterer, McHale, & Crouter, 2009; Proctor, Linley, & Maltby, 2009), middle school students are purposefully sampled. Using two waves (five months apart) of data collected within the same academic year, this study addressed the following research questions:

1. Does LS predict early adolescents' GPA after a 5-month period, while controlling for demographic covariates and baseline GPA, PA, and NA?

2. Does GPA predict early adolescents' LS after a 5-month period, while controlling for demographic covariates and baseline LS, PA, and NA?

3. Do PA and NA moderate the relationship between early adolescents' LS and subsequent GPA, while controlling for demographic covariates and baseline PA, NA, and GPA?

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4. Do PA and NA moderate the relationship between early adolescents'
   GPA and subsequent LS, while controlling for demographic covariates
   and baseline PA, NA, and LS?

A relatively short time frame (i.e., five months) was employed in the study because it appears to be the most effective method of capturing the nuances of LS in an early adolescent sample. Though LS is moderately stable over time, it exhibits appreciable fluctuations to life events and circumstances (Ehrhardt, Saris, & Veenhoven, 2000; Lucas & Donnellan, 2007). However, research suggests that LS returns to baseline levels within a span of several months following most events (Diener, Lucas, & Scollon, 2006). Thus, a 5-month period is likely to allow adolescents time to accommodate to school events and experiences, such as poor report card grades, with any remaining changes in LS reflecting more robust and enduring effects.

CHAPTER 2

METHOD

2.1 PARTICIPANTS

The initial sample at Time 1 consisted of 821 regular education students from a large suburban middle school in the southeastern United States. Students who were absent on the day of data collection at Time 2 (n = 99) were also excluded from the study as they failed to complete the same measures at two different time points. The final sample comprised 722 students, yielding a retention rate of 88% and a response rate of 70% of the total school population. The participants (47% male and 53% female) included seventh (52%) and eighth (48%) grade students (see Table 1). The mean age was 12.42 (SD = .66) years at Time 1 and 12.83 years (SD = .73) at Time 2. Of the sample, 62% were Caucasians, 31% were African Americans, and 7% were other or mixed racial heritage. Participation in federal free or subsidized lunch program was used as an indicator of socioeconomic status. 20% of the students received free or subsidized lunch, with considerably more receiving a free (14%) rather than a reduced price (6%) lunch.

Attrition analyses were carried out to examine group differences between students who participated in the study at both time points (n = 722) and those who did not (n = 99) with regards to GPA, LS, PA, and NA at Time 1. The results showed that students who provided data at both time points (M = 3.10, SD = .76) had significantly higher GPA than those who did not (M = 2.74, SD = .81), t(819) = -4.40, p < .05. Students who provided

data at Time 2 (M = 4.47, SD = 1.01) also had significantly higher LS than those who did not (M = 4.17, SD = 1.10), t(819) = -2.72, p < .05. No significant group differences were found for PA, t(819) = -1.02, p > .05, and NA, t(819) = 1.34, p > .05.

Table 2.1 Demographic statistics (N = 722)

Variables	n (%)
Grade	
Seventh	373 (52)
Eighth	349 (48)
Gender	
Male	336 (47)
Female	386 (53)
Lunch	
Regular	578 (80)
Reduced	44 (6)
Free	100 (14)
Race	
Caucasian	449 (62)
African American	223 (31)
Other	50 (7)

2.2 MEASURES

2.2.1 STUDENTS' LIFE SATISFACTION SCALE

The SLSS is a 7-item self-report scale that assesses children and adolescents' perceived quality of life as a whole (Huebner, 1991). It measures global LS and does not tap into specific domains of life, such as satisfaction with school or family. Exploratory and confirmatory factor analyses have supported its unidimensional structure (Huebner, 1991, 1995). The SLSS has been used with diverse samples of students from third through 12th grade (Park & Huebner, 2005; Lewis, Huebner, Malone, & Valois, 2011). Students indicated the extent to which they concur with each item (e.g., *my life is going well*, *my life is better than most kids*) on a six-point Likert scale (1 = strongly disagree to 6 = strongly agree). SLSS scores were computed by reverse coding two negatively phrased items, then summing all items in the scale. Higher scores were reflective of greater LS. Psychometric properties of the SLSS include high internal consistency (α = .82), robust test-retest reliability (r = .64 for a 1-month interval), and good convergent validity with other self-report LS measures (e.g., Happiness and Satisfaction scale of the Piers-Harris) and parental ratings of children's life satisfaction (Huebner, 1991; Gilman & Huebner, 1997). In the current study, the test-retest reliability of the SLSS was .63 and the internal consistency was .83 at Time 1 and .86 at Time 2 (see Table 2).

2.2.2 POSITIVE AND NEGATIVE AFFECT SCHEDULE FOR CHILDREN

The PANAS-C is a 27-item self-report scale that assesses the frequency of positive (e.g., *joyful*, *interested*) and negative (e.g., *sad*, *frightened*) affective experiences in children and adolescents (Laurent et al., 1999). Principal axis factor analyses have supported its two-factor structure, with an intercorrelation of -.36 between the PA and NA

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scales (Laurent et al., 1999). The PANAS-C is widely used in both clinical and school settings (Reschly, Huebner, Appleton & Antaramian, 2008; Hughes & Kendall, 2009). Students indicated the extent to which they felt various PA and NA during the past few weeks on a five-point Likert scale (1 = very little or not at all to 5 = extremely or all of the time). Minor adaptations were made to the instructions to tap into affective experiences within the school context (i.e., indicate to what extent you have felt this way during the past few weeks in school). PA and NA scores were computed by summing individual items in each scale. Higher scores were indicative of more frequent positive or negative affective experiences in school. Psychometric properties of the standard PANAS-C include high internal consistency (α = .89 for PA and α = .92 for NA), and good convergent and discriminant validity with measures of depression (e.g., Children's Depression Inventory) and anxiety (Laurent et al., 1999). In the current study, the test-retest reliability of PA (12 items) and NA (15 items) scales were .57 and .47 respectively (see Table 2). The internal consistencies of both scales were .90 at both time points.

2.2.3 SCHOOL-RECORD GPA AND DEMOGRAPHICS

GPA was used as a comprehensive indicator of academic achievement. The cumulative GPA of participating students at the end of the first 9-week (i.e., Time 1) and the third 9-week (i.e., Time 2) grading periods of the academic year were obtained from school records. Information on the age, sex (male = 0, female = 1), race (dummy coded as two binary variables representing Caucasian, African American, and others), and school lunch program (dummy coded as two binary variables representing regular, reduced and free lunch) of participating students were also gathered from school records.

Table 2.2 Descriptive statistics

Variables	Time 1			Time 2		
	α	*M*	*SD*	*α*	*M*	*SD*
1. GPA		3.10	.76		2.99	.77
2. Life Satisfaction	.83	4.46	1.01	.86	4.60	1.02
3. Positive Affect	.90	3.88	.80	.90	3.87	.82
4. Negative Affect	.90	1.88	.74	.90	1.81	.69

2.3 PROCEDURE

The study is based on an anonymous, archival database which was previously approved by the Institutional Review Boards of the local school district and the University of South Carolina. As part of a school climate and student well-being monitoring program, teachers administered self-report measures of SWB (and other measures not used in this study) during the homeroom period to groups of 15-28 students on two occasions during the school year (October 2008 and March 2009). Scripted instructions were read to inform the students how to complete the survey measures. . The SLSS was completed before the PANAS-C as previous research has found that presenting domain-specific questions (e.g., experiences in school) first may influence subsequent global perceptions of LS (Diener & Fujita, 1995; Diener, Inglehart & Tay, 2013). All participants were assigned a unique numeric identifier to ensure confidentiality and anonymity.

2.4 DATA ANALYSIS

The accuracy of data entry was established via an examination of the ranges of the scores. Some participants had a small amount of missing data, accounting for 19% of the final sample. The amount of missing data on individual items was at most 3%. Missing data was handled in R 3.0.3 using multiple imputation which predicts missing values for any variable using existing values from other variables (Imai, King, & Lau, 2008). The predicted values replace the missing values, resulting in a full imputed dataset. This procedure was performed 40 times, hence generating 40 imputed datasets. Once multiple imputation was conducted, individual item scores were standardized. Composite scores were computed by summing individual items in each scale. Composite scores were further standardized to facilitate interpretation of model parameters. GPA was also standardized to reduce non-essential multicollinearity between lower (e.g., GPA) and higher-order (e.g., GPA by NA) predictor variables when examining the moderating effects of PA and NA on the bidirectional link between LS and academic achievement. The imputed datasets were screened for violations of model assumptions (e.g., homoscedasticity, normality), but none were detected.

To investigate the reciprocal relations between LS and academic achievement as well as the moderation effects of PA and NA, four multiple regression analyses were conducted on each imputed dataset. This procedure produced multiple results, which were integrated into four overall analyses. To evaluate the effects of LS on the subsequent academic performance of students, the first multiple regression analysis was conducted with LS at Time 1 as the predictor and GPA at Time 2 as the criterion. To evaluate the effects of academic achievement on the subsequent LS of students, the second multiple

regression analysis was conducted with GPA at Time 1 as the predictor and LS at Time 2 as the criterion. To evaluate the moderation effects of PA and NA on the relationship between LS and subsequent academic achievement, two interaction terms were created: (1) LS by PA (both at Time 1) and (2) LS by NA (both at Time 1). The third multiple regression analysis was conducted with the two interaction terms as the predictors and GPA at Time 2 as the criterion. To evaluate the moderation effects of PA and NA on the relationship between academic achievement and subsequent LS, another two interaction terms were created: (1) GPA by PA (both at Time 1) and (2) GPA by NA (both at Time 1). The fourth multiple regression analysis was conducted with the two interaction terms as the predictors and LS at Time 2 as the criterion. Demographic covariates (i.e., age, sex, race, and lunch program), PA, NA, and baseline values of the predictor variables were controlled for in all analyses.

CHAPTER 3

RESULTS

The results revealed statistically significant cross-sectional correlations between global LS and GPA at Time 1, $r = .18$, $p < .05$, and Time 2, $r = .23$, $p < .05$. Similarly, the cross-sectional correlations among global LS and PA at Time 1, $r = .40$, $p < .05$, and Time 2, $r = .44$, $p < .05$, as well as NA at Time 1, $r = -.43$, $p < .05$, and Time 2, $r = -.50$, $p < .05$, were all significant. The longitudinal correlation between global LS at Time 1 and GPA at Time 2 was significant, $r = .19$, $p < .05$. Likewise, the longitudinal correlation between GPA at Time 1 and global LS at Time 2 was significant, $r = .18$, $p < .05$.

Table 3.1 Zero-order correlations between variables

Variables	1.	2.	3.	4.	5.	6.	7.	8.
1. GPA (T1)	1.00							
2. Life satisfaction (T1)	.18*	1.00						
3. Positive Affect (T1)	.04*	.40*	1.00					
4. Negative Affect (T1)	-.13*	-.43*	-.28*	1.00				
5. GPA (T2)	.83*	.19*	.03*	-.13*	1.00			
6. Life satisfaction (T2)	.18*	.63*	.33*	-.40*	.23*	1.00		
7. Positive Affect (T2)	.11*	.39*	.57*	-.21*	.11*	.44*	1.00	.
8. Negative Affect (T2)	-.08*	-.39*	-.22*	.47*	-.10*	-.50*	-.27*	.1.00

To address the first research question, the effect of LS on the subsequent academic performance of students was examined using multiple regression analysis (see Table 4). The results showed that LS at Time 1 significantly predicted GPA at Time 2, $\beta = .06$, $SE = .03$, $t(711) = 2.32$, $p < .05$, 95% CI [.01, .11]. Students with higher levels of global LS at Time 1 had higher GPA at Time 2, even after controlling for demographic covariates and baseline (i.e., Time 1) levels of GPA, PA, and NA. Specifically, a .06 SD increase in GPA was expected for every 1 SD increase in global LS. Interestingly, neither NA at Time 1, $\beta = -.01$, $SE = .02$, $t(711) = -.26$, $p > .05$, 95% CI [-.05, .04], nor PA at Time 1, $\beta = -.03$, $SE = .02$, $t(711) = -1.14$, $p > .05$, 95% CI [-.07, .02], predicted GPA at Time 2 when demographic covariates and baseline levels of LS and GPA were controlled for. This suggests that LS is a better predictor of academic performance than momentary affective experiences in school.

To address the second research question, the effect of academic achievement on the subsequent global LS of students was examined using multiple regression analysis (see Table 5). The results showed that GPA at Time 1 significantly predicted LS at Time 2, $\beta = .09$, $SE = .03$, $t(711) = 2.81$, $p < .05$, 95% CI [.03, .15]. Students with higher GPA at Time 1 perceived greater global LS at Time 2, even after controlling for demographic covariates and baseline levels of LS, PA, and NA. Specifically, a .11 SD increase in LS was expected for every 1 SD increase in GPA. In addition, NA at Time 1 significantly predicted LS at Time 2 when demographic covariates and baseline levels of LS and GPA were controlled for, $\beta = -.14$, $SE = .03$, $t(711) = -4.41$, $p < .05$, 95% CI [-.20, -.08], and so did PA at Time 1, $\beta = .09$, $SE = .03$, $t(711) = 2.80$, $p < .05$, 95% CI [.03, .15].

Table 3.2 Multiple regression analysis for life satisfaction at time 1 as a predictor of academic achievement at time 2

		GPA (T2)		
Variables	R^2	β	*SE*	*t*
Constant	.69	-.07	.11	-.58
Sex		.04	.04	.86
Race (African American)		-.002	.09	-.02
Race (Caucasian)		-.01	.09	-.09
Lunch (Regular)		.06	.09	.71
Lunch (Free)		.01	.10	.07
Age (T1)		.03	.02	1.31
Negative Affect (T1)		-.01	.02	-.26
Positive Affect (T1)		-.03	.02	-1.14
GPA (T1)		.81*	.02	35.70
Life Satisfaction (T1)		.06*	.03	2.32

Note. * *p* < .05.

Table 3.3 Multiple regression analysis for academic achievement at time 1 as a predictor of life satisfaction at time 2

Variables	R^2	Life Satisfaction (T2)		
		B	SE	t
Constant	.43	-.05	.15	-.29
Sex		-.12*	.06	-2.02
Race (African American)		.09	.12	.78
Race (Caucasian)		.03	.12	.28
Lunch (Regular)		.06	.12	.49
Lunch (Free)		.09	.14	.68
Age (T1)		.02	.03	.74
Negative Affect (T1)		-.14*	.03	-4.41
Positive Affect (T1)		.09*	.03	2.80
Life Satisfaction (T1)		.52*	.03	15.20
GPA (T1)		.09*	.03	2.81

*Note. * $p < .05$.*

To address the third research question, the moderation effects of PA and NA on the relationship between LS and subsequent academic achievement were examined using multiple regression analysis (see Table 6). As mentioned earlier, the results showed that the main effects of PA and NA at Time 1 on GPA at Time 2 were not significant when demographic covariates and baseline levels of LS and GPA were controlled for. The LS by PA interaction term was also not significant when demographic covariates and baseline

levels of PA, NA, LS and GPA were controlled for, β = -.01, SE = .02, t(709) = -.49, p > .05, 95% CI [-.05, .03]. Likewise, the LS by NA interaction term was not significant when demographic covariates and baseline levels of PA, NA, LS and GPA were controlled for, β = .002, SE = .02, t(709) = .13, p > .05, 95% CI [-.04, .04]. The absence of joint effects indicates that the strength of LS on academic achievement does not depend on the level of PA or NA.

To address the fourth research question, the moderation effects of PA and NA on the relation between academic achievement and subsequent LS were examined using multiple regression analysis (see Table 7). As mentioned earlier, the results showed that the main effects of PA and NA at Time 1 on LS at Time 2 were significant when demographic covariates and baseline levels of LS and GPA were controlled for. The GPA by PA interaction term was not significant when demographic covariates and baseline levels of PA, NA, LS and GPA were controlled for, β = -.004, SE = .03, t(709) = -.14, p > .05, 95% CI [-.06, .06]. However, the GPA by NA interaction term was significant, even when demographic covariates and baseline levels of PA, NA, LS and GPA were controlled for, β = -.06, SE = .03, t(709) = -2.03, p < .05, 95% CI [-.11, -.001]. This suggests the strength of academic achievement on LS depends on the level of NA, but not PA. The relation between academic achievement and subsequent LS was stronger among students who experience infrequent NA at school.

Table 3.4 Multiple regression analysis for positive and negative affect as moderators of the relationship between life satisfaction at time 1 and academic achievement at time 2

Variables	R^2	B	SE	T
		GPA (T2)		
Constant	.69	-.06	.11	-.53
Sex		.04	.04	.85
Race (African American)		-.001	.09	-.01
Race (Caucasian)		-.01	.09	-.09
Lunch (Regular)		.06	.09	.71
Lunch (Free)		.01	.10	.06
Age (T1)		.03	.02	1.35
Negative Affect (T1)		-.004	.02	-.17
Positive Affect (T1)		-.03	.02	-1.23
GPA (T1)		.81*	.02	35.61
Life Satisfaction (T1)		.06*	.03	2.22
Life Satisfaction (T1) x Negative Affect (T1)		.002	.02	.13
Life Satisfaction (T1) x Positive Affect (T1)		-.01	.02	-.49

Note. * $p < .05$.

Table 3.5 Multiple regression analysis for positive and negative affect as moderators of the relationship between academic achievement at time 1 and life satisfaction at time 2

Variables		Life Satisfaction (T2)		
	R^2	B	SE	T
Constant	.44	-.05	.15	-.35
Sex		-.13*	.06	-2.14
Race (African American)		.10	.12	.80
Race (Caucasian)		.03	.12	.25
Lunch (Regular)		.07	.12	.55
Lunch (Free)		.10	.14	.72
Age (T1)		.02	.03	.68
Negative Affect (T1)		-.16	.03	-4.80
Positive Affect (T1)		.09	.03	2.76
Life Satisfaction (T1)		.51*	.03	14.93
GPA (T1)		.09*	.03	2.91
GPA (T1) x Negative Affect (T1)		-.06*	.03	-2.03
GPA (T1) x Positive Affect (T1)		-.004	.03	-.14

Note. $* p < .05.$

CHAPTER 4

DISCUSSION

The primary purpose of this study was to examine the bidirectional relations between LS and academic achievement in a non-clinical sample of early adolescent students, a developmental period often characterized by disaffection and disengagement in school (Larson, 2000; Proctor, Linley, & Maltby, 2009). The results (see Figure 1) demonstrated that academic achievement exerted a positive effect on subsequent LS, after controlling for demographic variables and baseline levels of LS, PA, and NA. As hypothesized, LS also exerted a positive, albeit smaller, effect on subsequent academic achievement, after controlling for demographic variables and baseline levels of GPA, PA, and NA. The results are consistent with the previous findings of Quinn and Duckworth (2007). The small effect sizes may be attributed to the considerable stability of GPA and LS over the 5-month interval, which may have made it more difficult to find changes over time. Nevertheless, the modest cross-lagged effects remain statistically significant even after demographic covariates, potential confounds (i.e., PA, NA), and baseline values were controlled for in the study. The positive reciprocal causality between LS and GPA cannot be attributed to initial differences in academic performance, presence (or high levels) of PA, or absence (or low levels) of NA. Furthermore, the expected .06 SD increase in GPA for every 1 *SD* increase in LS is a meaningful difference given the small range of GPA and short time frame. This magnitude may increase over longer time periods or during

challenging transitions (e.g., elementary to middle school). More research is needed to elucidate the linkages between SWB and academic performance during critical periods of child and youth development.
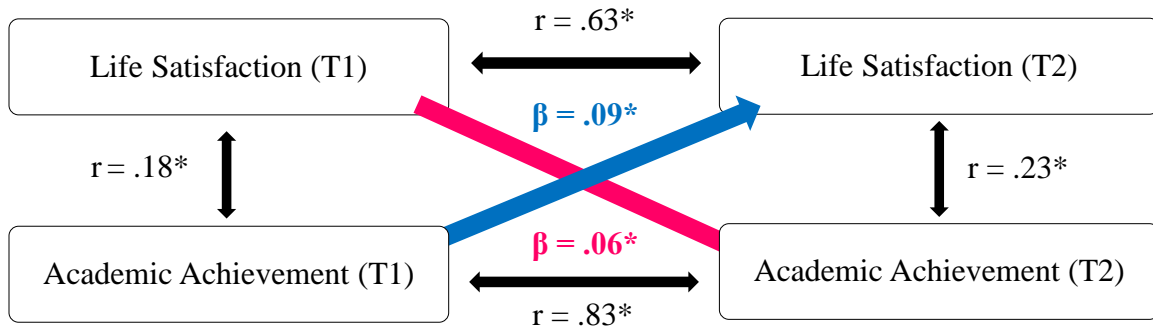

Figure 4.1 Cross-lagged model

The results also showed that the relations between LS and academic achievement were moderated by NA, but not PA. Individual differences in negative affective experiences in school moderated the association between GPA and subsequent LS, but not the association between LS and subsequent GPA. Specifically, NA attenuated the effects of academic achievement on LS (see Figure 2). The relationship between academic performance and subsequent LS was weaker among students who experienced frequent NA in school (green line) but stronger among students who experienced infrequent NA at school (red line). This finding suggests that interventions which aim to increase LS in students should also take into consideration the adverse impact of negative affective experiences in school.
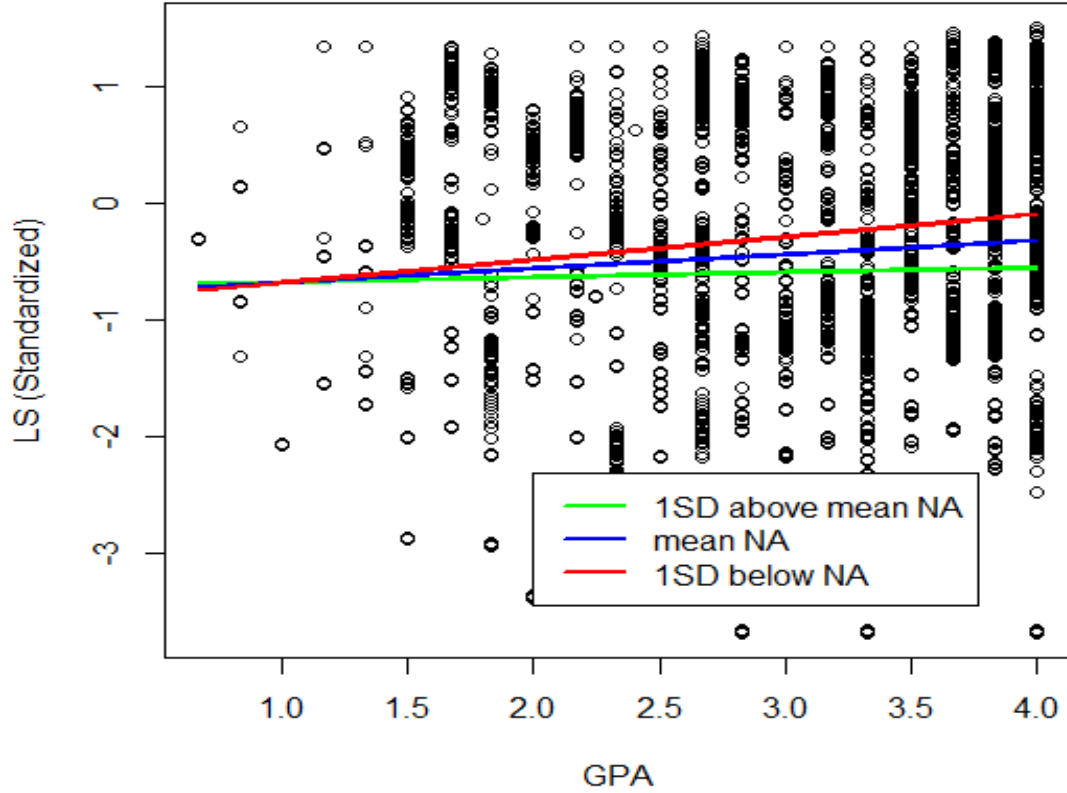
Figure 4.2 Moderation effects of negative affect on the relationship between academic achievement at time 1 and life satisfaction at time 2

As academic achievement is considered the major yardstick of student success and school accountability, school-based mental health services have primarily focused on remedying the learning and behavioral problems of troubled students. Consequently, student SWB is often undervalued by schools. Indeed, most students themselves do not associate SWB with academics (Robbins, 2006; Gabriele, 2008). The present study, however, demonstrates that LS and academic achievement are mutually reinforcing. In congruence with the engine model of well-being, the findings suggest that high levels of LS may be both an antecedent and a consequence of academic achievement. High levels of LS appear to exert a positive causal influence on academic outcomes, which in turn

boost future LS. Continuation of the cycle may bring about appreciable increases in both academic performance and student well-being over time. Simply put, students perform well in school in part because they are generally satisfied with their lives, and getting good grades contributes to their overall satisfaction.

One possible explanation for the linkage between LS and academic achievement is that high levels of LS may buffer stress and anxiety in the face of challenges and adversity, which leads to more productive efforts, better classroom behavior, and improved academic performance (Rutter, 1987; Suldo & Huebner, 2004). Alternatively, low levels of LS may be a risk factor for academic failure among early adolescent students. Recent research shows that LS is positively associated with general self-esteem (Gilman & Huebner, 2006; Civitci, 2010; Moksnes & Espnes, 2013), academic self-efficacy (Suldo, Riley, & Shaffer, 2006; Diseth, Danielsen, & Samdal, 2012), and school engagement (Lewis, Huebner, Malone & Valois, 2011) among student populations. Furthermore, accumulating evidence indicates that LS is positively linked to problem-focused coping and support-seeking behaviors (Deniz, 2006; MacCann, Lipnevich, Burrus, & Roberts, 2012; Saha, Huebner, Hills, Malone, & Valois, 2014) in student samples. Students with higher levels of LS appear to have greater tenacity in their goal pursuits than those with lower levels of LS, which in turn engenders favorable academic outcomes. More research is warranted to illuminate the underlying mechanisms by which SWB influences academic outcomes (and vice versa). Culture, for instance, may also have differential influence on the relations between LS and academic performance for Asian and Western students given the Confucian and Socratic approaches to learning (Tweed & Lehman, 2002).

4.1 PRACTICAL IMPLICATIONS

Well-being initiatives should be developed and implemented in schools on three grounds: as a vehicle for contentment and fulfilment, as a remedy for psychopathology, and as a facilitator of learning and academic achievement. This study provides empirical evidence that greater LS is synergistic with better academic performance, the fundamental goal of education and the benchmark of school success. In accordance with Noddings' (2003) contention that "happiness and education are properly, intimated related" (p. 1), students appear to learn best when they are happy. This conclusion is further corroborated by a randomized controlled study of positive psychology curriculum in a sample of ninth graders. Seligman and his colleagues (2009) found that identifying and applying character strengths (e.g., curiosity, perseverance, and leadership) to daily life increased student engagement and improved academic performance over time, particularly for students in non-honors classes. While most efforts to improve academic performance are centered on study skills and pedagogy, this study lends credence to the importance of student SWB in improving academic achievement. It is noteworthy that schools can teach both the skills of well-being and the tools of achievement without compromising either. SWB does not undermine academic achievement (or vice versa), but rather it is synergistic with better learning. In addition, positive psychology interventions are not expensive or time consuming to implement (McCabe, Bray, Kehle, Theodore, & Gelbar, 2011). For example, in a randomized controlled exploratory study, McCabe-Fitch (2009) found that writing a letter of gratitude and thinking about three positive occurrences each day for a week increased the SWB of middle school students. Likewise, in a randomized controlled experiment, Froh, Sefick, and Emmons (2008) demonstrated that making a daily gratitude

list for two weeks increased optimism and life satisfaction in middle school students. Such interventions are often economical to sustain and easy to execute.

4.2 LIMITATIONS AND FUTURE DIRECTIONS

Although the present study yielded important findings, its limitations should be noted. First, the sample was restricted to students from one suburban middle school in the southeastern United States. The ability to generalize beyond the sample to schools of different demographic and cultural characteristics may be limited. Additional studies with more heterogeneous samples are necessary to increase the external validity of the results. Second, the attrition analyses showed that students who provided data at Time 2 had to some extent higher LS and GPA than those who did not. Third, the results were based on self-reports exclusively, which may increase common method effects. Future studies could include alternative forms of SWB measures, such as classroom observations and parent reports, to complement self-reports of LS (Diener, Inglehart, & Tay, 2013; Fogarty, Davies, MacCann, & Roberts, 2014). Future research could also undertake qualitative inquiry (e.g., interviews, focus groups) to explore in depth the phenomenology of LS among students (Suldo, Frank, Chappel, Albers, & Bateman, 2014). Fourth, academic achievement was narrowly operationalized as GPA. Future research that aims to extend the study should investigate a broader range of indicators for academic performance or student learning than just GPA. Potential indicators include classroom participation, student engagement, and teacher reports. Fifth, the study focused specifically on life satisfaction as a process variable and academic performance as an outcome variable in the engine model of well-being. Continued research on the inputs (e.g., personality, school climate) and processes

(e.g., self-regulation, social support) of SWB in children and adolescents will provide the building blocks for positive interventions in schools.

Despite the limitations, this study provides preliminary evidence of the synergistic effects of LS and academic achievement in middle school students. The study adds to the growing body of literature on SWB variables (e.g., hope, gratitude, self-efficacy) and academic outcomes (see Furlong, Gilman, & Huebner, 2014 for a review). Taken together, the findings support the impetus for student SWB to occupy a more prominent niche in the school agenda. Student SWB appears to matter to a range of school outcomes, particularly during the pivotal period of early adolescence. While it may be easy to downplay or overlook the importance of student well-being, this study puts forth the notion that the SWB of early adolescents should command increasing attention in relation to academic performance. Integrating tools of achievement with skills of well-being likely holds great promise for high-quality educational experiences that will prepare children and adolescents for all of the challenges and opportunities that lie ahead. The challenge to school administrators and educational policymakers is to develop and implement individual, group, and systems level interventions that foster SWB to produce an upward spiral towards academic success and optimal student well-being, as befits the appellation "Positive Education" (Seligman, Ernst, Gillham, Reivich, & Linkins, 2009).

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