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## Emotion Regulation And Life Satisfaction Of Early Adolescents In The Face Of Stressful Life Events

Zi Jia Ng  
*University of South Carolina*

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EMOTION REGULATION AND LIFE SATISFACTION OF EARLY ADOLESCENTS  
IN THE FACE OF STRESSFUL LIFE EVENTS

by

Zi Jia Ng

Bachelor of Social Science  
National University of Singapore, 2008

Master of Arts  
University of South Carolina, 2015

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Accepted by:

E. Scott Huebner, Major Professor

Kimberly J. Hills, Committee Member

Alberto Maydeu-Olivares, Committee Member

Robert F. Valois, Committee Member

Cheryl L. Addy, Vice Provost and Dean of the Graduate School

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## DEDICATION

I would like to dedicate this dissertation to my mother Ying Li Yeo and my brother Zi Yen Ng who have always given me unconditional positive regard. I would not be who I am today without the love and support of my mother and brother. In addition, I would like to thank my sister-in-law Julie Ng who has shown care and concern, and my baby niece Lynette Ng who has never failed to cheer me up during those difficult and trying times. I would also like to express my gratitude to my friends, including Kathleen Jocoy, Kendall Moore, Lauryn Young, Kinjal Pandya, Rebeca Castellanos, Robb Roscoe, and more who have shown immense emotional support throughout the process.

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## ABSTRACT

In line with calls to define mental health as more than the mere absence of psychopathology, and based on the restorative model of well-being (Lent, 2004), this dissertation sought to elucidate the relationship between stressful life events and life satisfaction by exploring the mediating role of emotion regulation. Using a full Structural Equation Modeling (SEM) approach, this dissertation first determined the factor structure of the measurement model then evaluated the path analysis of the structural model. The first study examined the factor analytic structure and measurement invariance of the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS). Results supported the one-factor model and strict measurement invariance of the BMSLSS across a one-year interval. The second study examined the factor analytic structure and measurement invariance of the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA). Results supported the two-factor model and strong measurement invariance of the ERQ-CA over a one-year period. The third study examined the mediating effects of emotion regulation on the relationship between stressful life events and adolescent well-being. Results revealed partial mediation effects of cognitive reappraisal and expressive suppression on adolescents' life satisfaction in the context of uncontrollable life events. Given that adaptive emotion regulation may play a key role in individual variation in adjustment to stressful and challenging life experiences, the findings suggest the importance of targeting emotion regulation skills in school-based interventions to produce an upward spiral towards optimal adolescent well-being.

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## LIST OF ABBREVIATIONS

BMSLSS .....	Brief Multidimensional Students' Life Satisfaction Scale
CFA.....	Confirmatory Factor Analysis
ER .....	Emotion Regulation
ERQ-CA.....	Emotion Regulation Questionnaire for Children and Adolescents
LEC .....	Life Events Checklist
MLR.....	Maximum Likelihood Estimation with Robust Standard Errors
SEM .....	Structural Equation Modeling
T1 .....	Time 1
T2 .....	Time 2

## CHAPTER 1

### CONFIRMATORY FACTOR ANALYTIC STRUCTURE AND LONGITUDINAL MEASUREMENT INVARIANCE OF THE EMOTION REGULATION QUESTIONNAIRE FOR CHILDREN AND ADOLESCENTS (ERQ-CA)

#### 1.1 INTRODUCTION

Neuroscientific research has shown that the adolescent brain is notably sensitive to emotional information as a result of elevated emotional reactivity in the limbic system and diminished regulatory control in the neocortex (Ahmed, Bittencourt-Hewitt, & Sebastian, 2015; Eshel, Nelson, Blair, Pine, & Ernst, 2007; Powers & Casey, 2015). Furthermore, adolescence is marked by significant biopsychosocial transitions (e.g., adult expectations of maturity, susceptibility to peer influences, engagement in romantic relationships, adjustment to middle and high school) that bring about a myriad of affectively-laden situations in which emotions must be successfully regulated to ensure adaptive functioning (Silk, Steinberg, & Morris, 2003). Moreover, large-scale epidemiological studies demonstrate that the onset of psychopathology peaks during adolescence (Kessler et al., 2007). Roughly one quarter of adolescents around the world meets the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for a mental disorder annually, and about one third meets the DSM-IV criteria across their lifetime (Merikangas, Nakamura, & Kessler, 2009). However, many adolescents appear to ride the waves of emotions without long-term problems (Kessler et al., 2007). Most of them demonstrate resilience, which suggests that negative outcomes are neither pervasive

nor inevitable (Masten, 2014; Werner, 2013). ER involves individual characteristics that may promote positive adaptation in the midst of stress or adversity (Boyes, Hasking, & Martin, 2015; Flouri & Mavroveli, 2013). Burgeoning evidence suggests that adaptive ER is a cornerstone of mental well-being, academic achievement, and positive adjustment throughout the lifespan (Balzarotti, Biassoni, Villani, Prunas, & Velotti, 2016; Gumora & Arsenio, 2002). On the same note, emotion dysregulation has been proposed to be a critical transdiagnostic factor that manifests differently across multiple adolescent-onset mental disorders, including depressive disorders, anxiety disorders, conduct disorders, eating disorders, and substance use disorders (Beauchaine, 2015; Kret & Ploeger, 2015). Researchers and practitioners should therefore benefit from the assessment and identification of patterns of ER that either place adolescents at risk or buffer them from developing significant socioemotional and behavioral problems.

### 1.1.1 PROCESS MODEL OF EMOTION REGULATION

Gross' (1998) process model of ER provides the prevailing theoretical framework to understand how ER takes place during the emotion-generative process. It proposes that ER can intervene at five points during the unfolding of an emotional response: (a) selection of the situation based on expected outcomes, (b) modification of the situation, (c) orientation of attention toward or away from the situation, (d) change in appraisal of the situation, and (e) modulation of experiential, behavioral, or physiological responses. Imagine, for example, Sheldon who recently transferred to a new middle school due to his father's job relocation. He may down-regulate his anxiety by refusing to go to school (i.e., situation selection), seeking teacher support (i.e., situation modification), diverting his attention to an upcoming camping trip with old friends (i.e., attentional deployment),

thinking of the transfer as an opportunity to improve his social skills (i.e., cognitive change), or practicing progressive muscle relaxation (i.e., response modulation). While originally designed to elucidate the down-regulation of negative emotions, the process model has been applied to the up- regulation of positive emotions (Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Sheldon, for instance, may up-regulate his excitement and anticipation of his new school by exploring attractions in the city (i.e., situation selection), getting involved in preferred extracurricular activities (i.e., situation modification), focusing his attention on the innovative technologies provided by school (i.e., attentional deployment), thinking of the transfer as an opportunity to befriend new people with similar interests (i.e., cognitive change), or treating himself to the best dessert place in town (i.e., response modulation).

The five types of ER strategies can be further classified into two broad categories: (a) antecedent-focused ER (i.e., situation selection, situation modification, attention deployment, cognitive change) and (b) response-focused ER (i.e., response modulation). Antecedent-focused ER takes a proactive approach by manipulating conditions that precede the full activation of an emotion. Response-focused ER, on the other hand, takes a reactive stance by using biological resources to override the activation of an ongoing emotion. Extensive evidence indicate that antecedent-focused ER has more desirable and efficacious outcomes than response-focused ER because the former thwarts maladaptive reactions while the latter engages in damage control (Gross & John, 2003; Webb, Miles, & Sheeran, 2012). Cognitive reappraisal and expressive suppression are two well-researched ER strategies that have been operationalized in the process model. Cognitive reappraisal is an antecedent-focused strategy (i.e., cognitive change) involving the

reinterpretation of the emotional salience of affective situations, such as an adolescent who interprets his mother's unemployment as having more parent-child quality time. By contrast, expressive suppression is a response-focused strategy (i.e., response modulation) involving the conscious inhibition of emotional expression to affective situations, such as an adolescent who smiles and states it is fine when her father informs her that he will be away from home for six months due to military deployment. Cognitive reappraisal generally has a healthier profile of affect (e.g., more frequent experiences of positive emotions, less frequent experiences of negative emotions), interpersonal relationships (e.g., less disruption of social exchange), and well-being (e.g., higher life satisfaction, optimism, and self-esteem) compared to expressive suppression (Butler, Egloff, Wilhelm, Smith, Erickson, & Gross, 2003; Srivastava, Tamir, McGonigal, John, & Gross, 2009).

#### 1.1.2 PURPOSE OF STUDY

ER researchers have neglected adolescence years compared to early childhood and adulthood (Zimmermann & Thompson, 2014). One likely reason for the relative paucity of research (despite its clear clinical significance) may be the limited number and scope of age-appropriate, reliable, and valid ER measures (Zeman, Cassano, Perry-Parrish, & Stegall, 2006). One notable exception is the ERQ-CA, which is a 10-item self-report scale designed to measure the habitual use of cognitive reappraisal and expressive suppression in children and adolescents aged 10 to 18 years (Gullone & Taffe, 2012). Confirmatory factor analyses conducted with school samples of Australian and Chinese children aged between 7 and 12 years have supported its two-factor structure (Gullone & Taffe, 2012; Liu, Chen, & Tu, 2015). Each item on the ERQ-CA is rated on a 5-point

scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating more frequent use of the corresponding ER strategy. Items are written in a manner where the ER strategies do not assume an intrinsically positive or negative character, which means that the ERQ-CA is not solely focused on negative emotions but also include positive emotions. The ERQ-CA demonstrates acceptable to good internal consistency for Cognitive Reappraisal (6 items;  $\alpha = .83$ ) and Expressive Suppression (4 items;  $\alpha = .75$ ) subscales (Gullone & Taffe, 2012). It exhibits good convergent validity with other self-report measures of ER, such as the Difficulties in Emotion Regulation Scale (Eastabrook, Flynn, & Hollenstein, 2014; Lougheed & Hollenstein, 2012). It also shows good convergent and discriminant validity with self-report measures of depression, social anxiety, self-injury, self-esteem, quality of life, neuroticism, and extraversion (Chambers, Gullone, Hased, Knight, Garvin, & Allen, 2015; Lanteigne, Flynn, Eastabrook, & Hollenstein, 2014; Liu, Chen, & Tu, 2015; Tatnell, Kelada, Hasking, & Martin, 2014).

The ERQ-CA has been used with clinical and school samples of United States (U.S.) adolescents (Ben-Eliyahu & Linnenbrink-Garcia, 2015; Queen & Ehrenreich-May, 2014; Tsao, Jacob, Seidman, Lewis, & Zeltzer, 2014). However, no study (to the authors' knowledge) has verified the factor structure of the ERQ-CA using samples from U.S. adolescent population. In addition, there appears to have been no research on the measurement invariance of the ERQ-CA over time. Given that adolescence represents a critical stage of development marked by emotion-related vulnerability, it is of utmost importance to ensure that comparisons made on the latent ER constructs are valid across time (i.e., indicative of a true difference). The present study examines the confirmatory factor analytic (CFA) structure and measurement invariance of the ERQ-CA using two

waves of data spanning a one-year time period. The time frame of one year was employed in this study because ER strategy use becomes more trait-like from childhood to adolescence (Cole, Martin, & Dennis, 2004; Gullone, Hughes, King, & Tonge, 2010). Furthermore, school-based mental health screenings are usually done on an annual or biannual basis. Thus, a one-year reference period was used to observe more robust and enduring effects of ER. This study seeks to address the following research questions:

- 1) What is the test-retest stability of ERQ-CA subscales over time?
- 2) What is the internal consistency of ERQ-CA subscales at each wave?
- 3) Does the internal consistency of ERQ-CA subscales change over time?
- 4) What is the goodness of fit of a two-factor CFA model to ERQ-CA at each wave?
- 5) Does the goodness of fit of a two-factor CFA model remain invariant over time?

## 1.2 METHOD

### 1.2.1 PARTICIPANTS

The sample at Time 1 (T1) consisted of 1216 regular education students from four suburban middle schools within the same school district in the southeastern U.S. Individuals who did not complete any item on the ERQ-CA ( $n = 23$ ) were excluded from the analyses. The remaining 1193 participants (51% male and 50% female) included sixth (45%) and seventh (55%) grade students whose mean age was 12.19 ( $SD = .81$ ) years. Of the sample, 55% were Caucasians, 23% were African Americans, and 22% were of “other” racial heritage (e.g., Hispanic/Latino, Asian, Native Americans). Participation in federal free or subsidized lunch program was used as an indicator of socio-economic status. About 38% of the sample received free or subsidized lunch, indicating lower socio-economic status.

The sample at Time 2 (T2) consisted of 1732 regular education students from the same four middle schools involved in data collection at T1. Individuals who did not complete any item on the ERQ-CA ( $n = 21$ ) were excluded from the analyses. The remaining 1711 participants (52% male and 48% female) included sixth (28%), seventh (35%), and eighth (36%) grade students whose mean age was 12.44 ( $SD = .99$ ) years. Of the sample, 55% were Caucasians, 23% were African Americans, and 22% were of “other” racial heritage. About 42% of the sample received free or subsidized lunch, indicating lower socio-economic status.

The longitudinal sample comprised 822 students, yielding a retention rate of 69%. The attrition rate may be attributed to the reported high student mobility in the school district (i.e., changing schools for reasons other than grade promotion) throughout the course of a school year. The retention sample (49% male and 51% female) included sixth (44%) and seventh (56%) grade students whose mean age was 12.20 ( $SD = .81$ ) years at T1. Of the sample, 61% were Caucasians, 23% were African Americans, and 17% were of “other” racial heritage. About 36% of the retention sample received free or subsidized lunch. Attrition analyses were carried out to examine group differences between students who participated in the study at both time points ( $n = 822$ ) and those who did not ( $n = 371$ ). No significant group differences were found for Cognitive Reappraisal,  $t(1131) = .92, p = .36, 95\% \text{ CI } [-.06, .15]$ , or Expressive Suppression,  $t(1158) = -.69, p = .49, 95\% \text{ CI } [-.14, .07]$ , at T1.

### 1.2.2 MEASURE

The ERQ-CA is a 10-item self-report scale designed to measure the habitual use of ER strategies in children and adolescents aged 10 to 18 years (Gullone & Taffe, 2012).

It is an adapted version of the Emotion Regulation Questionnaire used in adult populations (Gross & John, 2003). The ERQ-CA assesses two types of ER strategies: (1) cognitive reappraisal or reframing of emotional experiences (e.g., *I control my feelings about things by changing the way I think about them*) and (2) expressive suppression or inhibition of emotional arousal (e.g., *when I am feeling happy, I am careful not to show it*).

### 1.2.3 PROCEDURE

The study has been approved by the Institutional Review Boards of the University of South Carolina. As part of an in-house, school-wide monitoring of student well-being, teachers administered self-report measures of ER, along with measures of student well-being and engagement in school (and other measures not used in this study) during the homeroom period to groups of 14 to 29 students on two occasions (Spring 2015 and Spring 2016). Given the length of the survey, it was completed over two sessions (within the week) on both occasions to minimize respondent fatigue while maintaining accuracy of reports. Scripted instructions were read aloud to inform students the purpose of the investigation and the method of completion. All participants were assigned a unique numeric identifier to ensure confidentiality and anonymity.

### 1.2.4 DATA ANALYSIS

Data entry accuracy was verified via single (i.e., the same person entered the data and visually checked the entries against the original paper survey) and double entry (i.e., two different persons entered the same data and compared the percentage agreement between the entries) approaches. About 7% of the samples at T1 and T2 had a small amount of missing data on the ERQ-CA. The amount of missing data on individual items

was at most 2% at both time points. Structural equation modeling with Mplus 7.4 was utilized to estimate the degree of fit of a two-factor CFA model to the data collected at each time point (Muthén & Muthén, 1998-2015). All analyses were performed with maximum likelihood parameter estimates where chi-square test statistics and standard errors were robust to non-normality and non-independence of observation. The full information maximum likelihood estimator was utilized to deal with missing data (Yuan & Bentler, 2000). This is choice MLR in Mplus (Maydeu-Olivares, 2017; Savalei, 2010). The following statistics and indices were utilized to evaluate the overall goodness of fit of the models: mean-adjusted chi-square ( $\chi^2$ ), root mean square error of approximation (RMSEA; Browne & Cudeck, 1993), comparative fit index (CFI; Bentler, 1990), and Tucker–Lewis index (TLI; Tucker & Lewis, 1973). Given that the conventional chi-square is too stringent in testing for an exact fit of the data to the model, the other statistic (i.e., RMSEA) and indices (i.e., CFI, TLI) provide information on approximate fit to the data. Non-significant probability values of RMSEA ( $p < .05$ ) indicate acceptable model fit. In addition, a RMSEA value below .05 indicates close fit, a RMSEA value between .05 and .08 implies reasonable fit, and a RMSEA value above .08 indicates poor fit (Browne & Cudeck, 1993). For both CFI and TLI, only values greater than .95 indicate close or good fit (Hu & Bentler, 1999).

To explore longitudinal measurement invariance, additional models were compared: (1) configural invariance (same pattern of free loadings), (2) weak/metric invariance (common loadings over time), (3) strong/scalar invariance (common loadings and intercepts over time), and (4) strict invariance (common loadings, intercepts, and residual variances over time). To compare the nested models with increasing equality

constraints, the chi-square difference tests were conducted. In addition, differences in the internal consistencies of the subscale scores over time were evaluated as described in Maydeu-Olivares et al. (2010), again using robust methods to non-normality and presence of missing data.

### 1.3 RESULTS

Results showed that the test-retest stability of the Cognitive Appraisal (T1:  $M = 20.50$ ,  $SD = 5.04$ , T2:  $M = 20.15$ ,  $SD = 4.96$ ) and Expressive Suppression (T1:  $M = 11.88$ ,  $SD = 3.33$ , T2:  $M = 11.81$ ,  $SD = 3.36$ ) subscale scores over a one-year interval were .42 and .37 respectively. In addition, the test-retest stability of the Cognitive Appraisal and Expressive Suppression factor scores over a one-year period were .45 and .47 respectively. This reflects the instability of the latent constructs measured by the ERQ-CA (even when measurement error is accounted for), which is inconsistent with the trait-like nature of ER that has been proposed. The internal consistency of the Cognitive Reappraisal subscale was high at both T1,  $\alpha = .84$ ,  $SE = .01$ , 95% CI [.83, .86], and T2,  $\alpha = .86$ ,  $SE = .01$ , 95% CI [.84, .88]. A test of equality of coefficient alpha indicated no significant differences in the internal consistency of the Cognitive Reappraisal subscale over time,  $\alpha_{diff} = -.01$ ,  $SE = .01$ ,  $p = .30$ , 95% CI [-.04, .01]. The internal consistency of the Expressive Suppression subscale was acceptable at both T1,  $\alpha = .64$ ,  $SE = .02$ , 95% CI [.60, .68], and T2,  $\alpha = .67$ ,  $SE = .02$ , 95% CI [.63, .71]. A test of equality of coefficient alpha indicated no significant differences in the internal consistency of the Expressive Suppression subscale over time,  $\alpha_{diff} = -.03$ ,  $SE = .03$ ,  $p = .26$ , 95% CI [-.09, .02]. The correlation between the Cognitive Appraisal and Expressive Suppression

subscales was small at both T1,  $r = .31$ ,  $SE = .05$ , and T2,  $r = .28$ ,  $SE = .05$ . The correlation between the factors appears to be consistently small over a one-year interval.

When fitting the hypothesized two-factor model to the ERQ-CA, we carefully examined the standardized residual covariances and modification indices (Maydeu-Olivares, 2017; McDonald & Ho, 2002; Saris, Satorra & van der Veld, 2009). They indicated a large correlated error between item 1 (i.e., *when I want to feel happier, I think about something different*) and item 3 (i.e., *when I want to feel less bad, I think about something different*) in the Cognitive Reappraisal factor at both T1 (MI = 105.19) and T2 (MI = 149.81), which may be attributed to the similar wording of the two items despite contrasting emotion valence. This correlated error was incorporated into the model in all subsequent analyses. With this additional parameter, the two-factor CFA model still did not fit the data at T1 exactly,  $X^2 = 114.58$ ,  $df = 33$ ,  $p < .01$ , but it can be considered a close fit (RMSEA = .05, CFI = .96, TLI = .95) by current standards (Browne & Cudeck, 1993; Hu & Bentler, 1999). Similarly, the two-factor CFA model at T2 did not have an exact fit,  $X^2 = 121.35$ ,  $df = 33$ ,  $p < .01$ , but it provided a close fit to the data (RMSEA = .04, CFI = .97, TLI = .96). At both T1 and 2, the factor loadings for items 1, 3, 5, 7, 8, and 10 were significant for the Cognitive Reappraisal factor, while the factor loadings for items, 2, 4, 6, and 9 were significant for the Expressive Suppression factor (see Figures 1.1 and 1.2). Results from the single wave analyses suggest a close fit for a two-factor CFA model that is consistent with the antecedent- and response-focused ER in Gross' (1998) process model.

To explore the longitudinal measurement invariance of the ERQ-CA, the configural invariance model was tested (see Figure 1.3) and increasing equality

constraints were applied. The configural invariance model (same pattern of free loadings) did not fit the data exactly,  $X^2 = 300.76$ ,  $df = 152$ ,  $p < .01$ , but it provided a close fit (RMSEA = .03, CFI = .97, TLI = .96). Fit results for the weak/metric invariance model (common loadings over time) were  $X^2 = 306.96$ ,  $df = 160$ ,  $p < .01$ , RMSEA = .03, CFI = .97, TLI = .96. No statistically significant difference was found between the configural invariance and weak/metric invariance models,  $X^2_{dif} = 5.55$ ,  $df = 8$ ,  $p = .70$ . Fit results for the strong/scalar invariance model (common loadings and intercepts over time) were  $X^2 = 316.05$ ,  $df = 168$ ,  $p < .01$ , RMSEA = .03, CFI = .97, TLI = .96. No statistically significant difference was found between the weak/metric and strong/scalar invariance models,  $X^2_{dif} = 7.41$ ,  $df = 8$ ,  $p = .49$ . Fit results for the strict invariance model (common loadings, intercepts, and residual variances over time) were  $X^2 = 339.24$ ,  $df = 178$ ,  $p < .01$ , RMSEA = .03, CFI = .97, TLI = .96. A statistically significant difference was found between the strong/scalar and strict invariance models,  $X^2_{dif} = 22.75$ ,  $df = 10$ ,  $p = .01$ . We thus conclude that the most appropriate model for these data is the strong/scalar invariance model. There were no statistically significant differences in the ERQ-CA factor means, variances, and correlations over a one-year interval.

#### 1.4 DISCUSSION

Given the functional connectivity within the limbic-frontal circuitry, the acquisition of adaptive ER skills may help adolescents become adept at riding the waves of positive and negative emotions observed in this developmental period which has been portrayed as “all gas and no brakes” (Benningfield, Potter, & Bostic, 2015; Gilbert, 2012; Payne, 2012). This study examined the psychometric soundness of the ERQ-CA, a self-report ER measure that has been used with clinical and school samples of adolescents.

The results revealed that the ERQ-CA had low test-retest stability for both Cognitive Reappraisal and Expressive Suppression subscales over a one-year interval, which is consistent with previous findings of longitudinal investigations with a comparable time frame (Gullone, Hughes, King, & Tonge, 2010). The results also showed that the ERQ-CA had high internal consistency for the Cognitive Reappraisal subscale but adequate internal consistency for the Expressive Suppression subscale, which is congruent with findings of earlier studies of U.S. adolescents (Gullone, Hughes, King, & Tonge, 2010; Gullone & Taffe, 2012; Queen & Ehrenreich-May, 2014). Further analysis indicated no significant changes in the internal consistencies of the ERQ-CA subscales over a one-year period.

The two-factor CFA model applied to data collected at each time point showed approximate fit. The RMSEA, CFI, and TFI indices further indicated a close model fit. A small, but statistically significant correlation was obtained for the Cognitive Reappraisal and Expressive Suppression subscales. The results were consistent with the underlying theoretical framework (Gross & John, 2003) and prior empirical findings (Gullone & Taffe, 2012; Liu, Chen, & Tu, 2015). The test of configural invariance established that the factor structure of the ERQ-CA remained invariant over time, indicating that adolescents conceptualized the cognitive reappraisal and expressive suppression constructs in the same way across the one-year interval. The test of weak/metric invariance showed that the relations between specific ERQ-CA items and their respective latent construct remained invariant over time, implying that adolescents responded to the items in the same way across the one-year period. The test of strong/scalar invariance established that the relationship between ERQ-CA observed and latent scores remained

invariant over time, indicating that adolescents who have the same latent scores obtained the same observed scores across the one-year interval. The test of strict invariance showed that the error variances did not remain invariant over time, implying that the level of measurement error for each ERQ-CA item varied across the one-year period. However, strict factorial invariance is a highly constrained model and rarely holds in applied contexts (Van De Schoot, Schmidt, De Beuckelaer, Lek, & Zondervan-Zwijenburg, 2015).

The study demonstrated several noteworthy limitations. First, there was attrition over time. While the attrition and retention groups did not differ on demographic characteristics (e.g., age, gender, race, lunch status), it was possible that the sample differed from the population from which it was drawn on meaningful characteristics that were not assessed. Second, the sample was restricted to students from four suburban middle schools in the southeastern U.S. This imposes limits on the generalizability of findings to the larger population of U.S. adolescents. Additional studies with more heterogeneous samples are necessary to increase the external validity of the results. Third, the study used two waves of data spanning a one-year time period. Future research that aims to extend the study should investigate different time intervals given the possible state-like nature of ER strategy use in adolescents as indicated by the low test-retest stability of both ERQ-CA subscales across a one-year time interval. Despite the limitations, the study provides preliminary evidence of the two-factor CFA structure and measurement invariance of the ERQ-CA over time. The study contributes to the dearth of literature on the measurement equivalence of age-appropriate, reliable, and valid ER measures, particularly for U.S. adolescent populations. Taken together, the study supports

the utility of the ERQ-CA as a valuable instrument to assess adolescents' habitual use of cognitive reappraisal and expressive suppression over time in school and clinical settings where the brevity of measures is an important consideration.

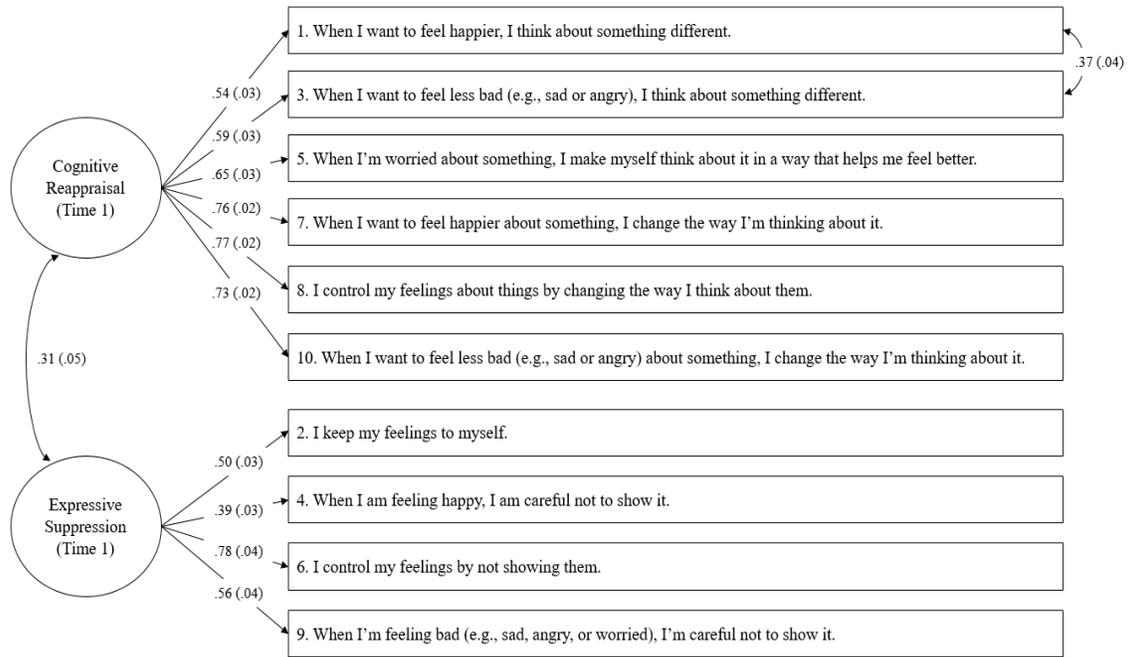


Figure 1.1 CFA Model of ERQ-CA at Time 1

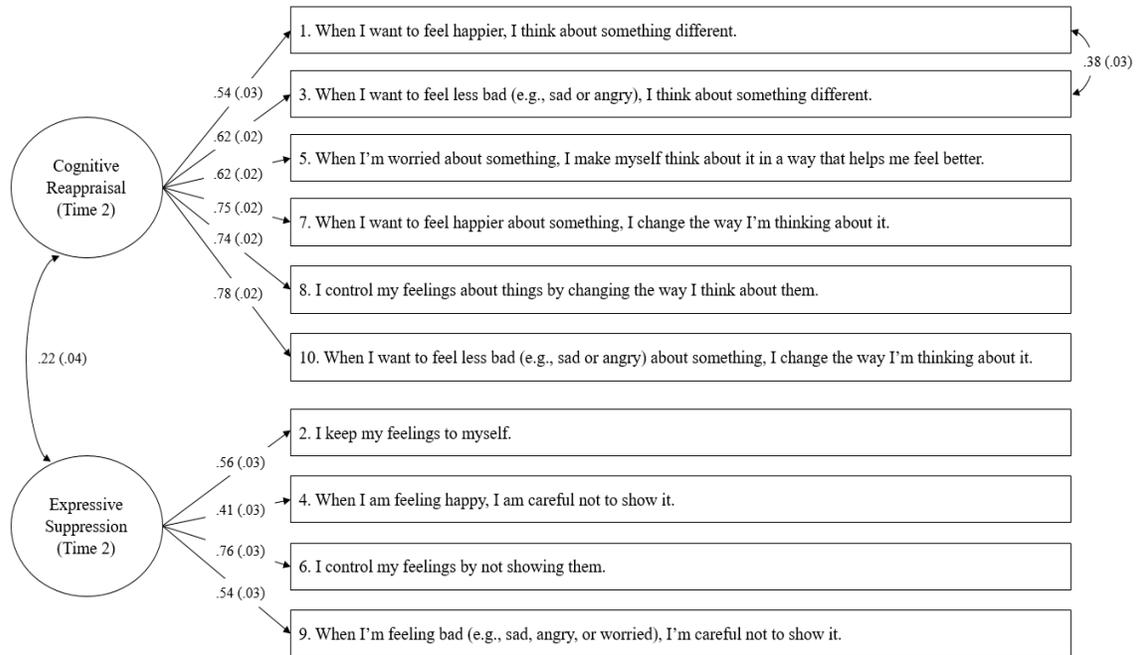


Figure 1.2 CFA Model of ERQ-CA at Time 2

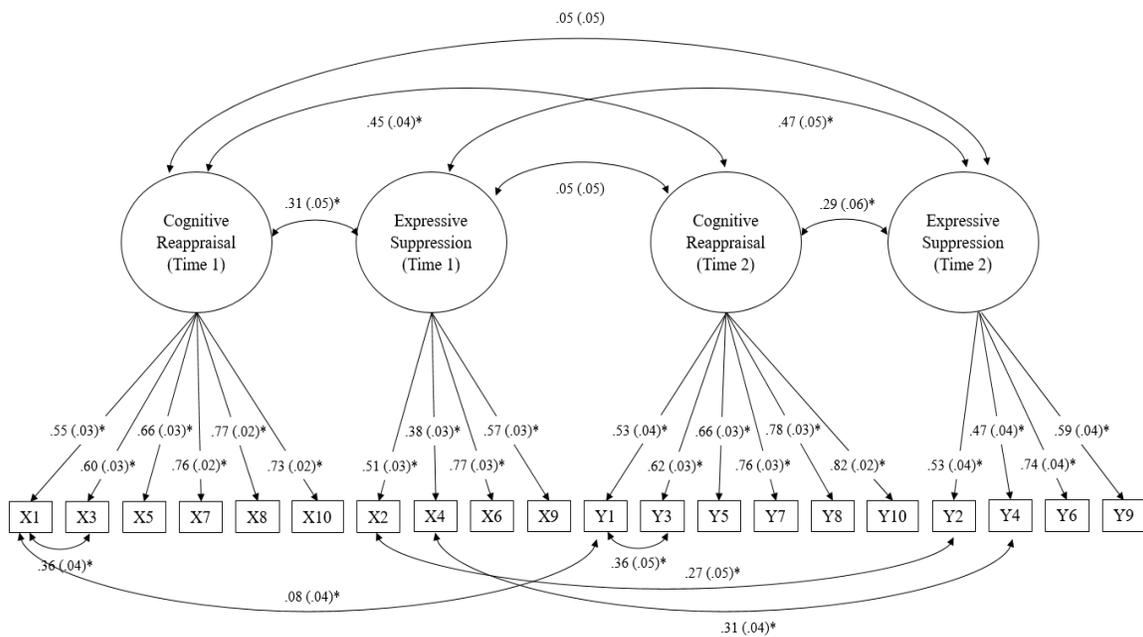


Figure 1.3 Longitudinal CFA Model of ERQ-CA

## CHAPTER 2

### CONFIRMATORY FACTOR ANALYTIC STRUCTURE AND LONGITUDINAL MEASUREMENT INVARIANCE OF THE BRIEF MULTIDIMENSIONAL STUDENTS' LIFE SATISFACTION SCALE (BMSLSS)

#### 2.1 INTRODUCTION

The conceptualization of mental health has been based predominantly on the medical disease model in which it is narrowly defined by the mere absence of psychopathology (Seligman & Csikszentmihalyi, 2000). In more recent years, this restrictive definition has been challenged by proponents of positive psychology who assert that optimal mental health is defined by the presence of subjective well-being above and beyond the absence of psychopathology (Jahoda, 1958; Park, 2004; Keyes, 2006). Subjective well-being is a higher-order multi-dimensional construct, which comprises frequent experiences of positive emotions (e.g., joy, excitement, contentment), infrequent experiences of negative emotions (e.g., anxiety, anger, sadness), and high life satisfaction (Diener, 1984). Such a strength-based approach underscores the importance of an integrated focus on both positive and negative functioning. This not only buffers the development of psychopathology, but also promotes the well-being of all individuals, including nonclinical populations (Proctor, Linley, & Maltby, 2009; Wood & Joseph, 2010).

##### 2.1.1 DUAL FACTOR MODEL OF MENTAL HEALTH

The dual factor model of mental health proposes that psychopathology and subjective well-being are complementary but distinct dimensions of human functioning,

rather than opposing ends of a single wellness continuum (Greenspoon & Saklofske, 2001). It yields four different mental health statuses, including (1) flourishing, (2) vulnerable, (3) symptomatic but content, and (4) troubled. Most of the empirical support for the dual factor model has come from studies of adolescent populations (Antaramian, Huebner, Hills, & Valois, 2010; Kelly, Hills, Huebner, & McQuillin, 2012; Lyons, Huebner, & Hills, 2013; Suldo & Shaffer, 2008; Suldo, Thalji, & Ferron, 2011). The flourishing group (approximately 65%) who report low psychopathology and high subjective well-being is considered to be in a state of optimal mental health. The vulnerable group (about 10%) who report low psychopathology and low subjective well-being is considered to be languishing and at risk for subsequent maladjustment. They are largely unidentified in mental health screening and assessment which are based primarily on the medical disease model (Eklund, Dowdy, Jones, & Furlong, 2011). The symptomatic but content group (approximately 13%) who report high psychopathology and high subjective well-being is presumed to have a positive illusory bias (i.e., inflated self-perceptions; Suldo, Frank, Chappel, Albers, & Bateman, 2014). The troubled group (about 13%) who report high psychopathology and low subjective well-being is considered to be debilitating and representative of clinical populations. Person-centered analyses have shown that adolescents in the flourishing group report better self-concept (e.g., self-esteem), academic performance (e.g., grade point average), student engagement (e.g., valuing of school, class attendance), and interpersonal relationships (e.g., parents, peers) than those in the vulnerable group despite comparable levels of psychopathology (Antaramian, Huebner, Hills, & Valois, 2010; Kelly, Hills, Huebner, & McQuillin, 2012; Lyons, Huebner & Hills, 2013; Suldo, Frank, Chappel, Albers, & Bateman, 2014; Suldo

& Shaffer, 2008; Suldo, Thalji, & Ferron, 2011). In addition, the academic and social functioning of adolescents in the vulnerable group closely parallels those in the troubled group. The dual factor model highlights the incremental utility in the assessment of positive functioning in monitoring and improving the mental health of *all* individuals.

### 2.1.2 PURPOSE OF STUDY

Life satisfaction is defined as the subjective appraisal of one's quality of life as a whole (Diener, 1984). Individuals assess the quality of their lives on the basis of personal benchmarks (Shin & Johnson, 1978). It is also often construed as a global judgment of the degree to which an individual perceives that his or her own aspirations and needs are being met (Diener, Suh, Lucas, & Smith, 1999; Frisch, 2000). Life satisfaction is employed as an indicator of subjective well-being in the present study because it extends beyond momentary affective experiences to include a reflective and evaluative perspective of life in its totality (Veenhoven, 2006). Life satisfaction is of particular relevance due to its concurrent and long-term linkages to adaptive outcomes in adolescence, including higher academic efficacy and performance (Diseth, Danielsen, & Samdal, 2012; Ng, Huebner, & Hills, 2015; Suldo, Riley, & Shaffer, 2006), positive sociometric status (Martin, Huebner, & Valois, 2008; You et al., 2008), reduced problem behavior (Lyons, Otis, Huebner, & Hills, 2014; Sun & Shek, 2013), and increased student engagement (Lewis, Huebner, Malone, & Valois, 2011).

One widely used measure of adolescent life satisfaction is the BMSLSS, which is a 5-item self-report scale designed to assess perceived quality of life across different domains (e.g., family, school) in children and adolescents aged 8 to 18 years (Seligson, Huebner, & Valois, 2002). Confirmatory factor analyses conducted with clinical and

school samples of United States (U.S.), Chinese, and Turkish children and adolescents aged between 9 and 18 years have supported its one-factor structure (Funk, Huebner, & Valois, 2006; McDougall, Wright, Nichols, & Miller, 2013; Siyez & Kaya, 2008; Ye et al., 2014). Each item on the BMSLSS is rated on a 6-point scale from 1 (very dissatisfied) to 6 (very satisfied), with higher scores indicating greater general life satisfaction. The BMSLSS demonstrates acceptable to good internal consistency ( $\alpha = 0.76$  for elementary students;  $\alpha = 0.85$  for middle and high students). It exhibits good convergent validity with other self-report measures of life satisfaction, such as the Multidimensional Students' Life Satisfaction Scale and the Students' Life Satisfaction Scale (Funk, Huebner, & Valois, 2006; Huebner, Seligson, Valois, & Suldo, 2006). It also shows good convergent and discriminant validity with self-report measures of positive and negative affect, mindfulness, substance use, and suicide ideation (Brown, West, Loverich, & Biegel, 2011; Seligson, Huebner, & Valois, 2002; Zullig, Valois, Huebner, Oeltmann, & Drane, 2001; Valois, Zullig, Huebner, & Drane, 2001).

The BMSLSS has been used with clinical, school, and community samples of U.S. adolescents (Abubakar et al., 2016; Kim, Miles-Mason, Kim, & Esquivel, 2013; Huebner, Suldo, Valois, & Drane, 2006; Valois et al., 2015). To date, however, there appears to have been no research on the measurement invariance of the BMSLSS over time. Given that adolescence is a period of tremendous growth and change (Proctor, Linley, & Maltby, 2009), it is of utmost importance to ensure that comparisons made on the latent life satisfaction construct are valid across time (i.e., indicative of a true difference). The present study examines the confirmatory factor analytic (CFA) structure and measurement invariance of the BMSLSS using two waves of data spanning a one-

year time period. A one-year reference period was used to observe more robust and enduring effects of life satisfaction, which has been found to be moderately stable over time (Ehrhardt, Saris, & Veenhoven, 2000; Lucas & Donnellan, 2007). This study seeks to address the following research questions:

- 1) What is the test-retest reliability of BMSLSS over time?
- 2) What is the internal consistency of BMSLSS at each time point?
- 3) Does the internal consistency of BMSLSS change over time?
- 4) What is the goodness of fit of a one-factor CFA model to BMSLSS at each wave?
- 5) Does the goodness of fit of a one-factor CFA model to BMSLSS remain invariant over time?

## 2.2 METHOD

### 2.2.1 PARTICIPANTS

The sample at Time 1 (T1) consisted of 1216 regular education students from four suburban middle schools within the same school district in the southeastern U.S. Individuals who did not complete any item on the BMSLSS ( $n = 35$ ) were excluded from the analyses. The remaining 1181 participants (50% male and 50% female) included sixth (45%) and seventh (55%) grade students whose mean age was 12.20 ( $SD = .81$ ) years. Of the sample, 55% were Caucasians, 23% were African Americans, and 23% were of “other” racial heritage (e.g., Hispanic/Latino, Asian, Native Americans). Participation in federal free or subsidized lunch program was used as an indicator of socio-economic status. About 38% of the sample received free or subsidized lunch, indicating lower socio-economic status.

The sample at Time 2 (T2) consisted of 1732 regular education students from the same four middle schools involved in data collection at T1. Individuals who did not complete any item on the BMSLSS ( $n = 66$ ) were excluded from the analyses. The remaining 1666 participants at Time 2 (51% male and 49% female) included sixth (29%), seventh (35%), and eighth (37%) grade students whose mean age was 12.44 ( $SD = .99$ ) years. Of the sample, 55% were Caucasians, 23% were African Americans, and 22% were of “other” racial heritage. About 42% of the sample received free or subsidized lunch, indicating lower socio-economic status.

The longitudinal sample comprised 796 students, yielding a retention rate of 67%. The attrition rate may be attributed to the reported high student mobility in the school district (i.e., changing schools for reasons other than grade promotion) throughout the course of a school year. The retention sample (49% male and 51% female) included sixth (43%) and seventh (57%) grade students whose mean age was 12.21 ( $SD = .81$ ) years at T1. Of the sample, 60% were Caucasians, 24% were African Americans, and 17% were of “other” racial heritage. About 36% of the retention sample received free or subsidized lunch. Attrition analyses were carried out to examine group differences between students who participated in the study at both time points ( $n = 796$ ) and those who did not ( $n = 385$ ). No significant group difference was found for life satisfaction at T1,  $t(1151) = -.32$ ,  $p = .75$ , 95% CI [-.14, .10].

### 2.2.2 MEASURE

The BMSLSS is a 5-item self-report measure designed to assess perceived quality of life across different domains, such as family, friends, school, self, and living environment, in children and adolescents aged 8 to 18 years (Seligson, Huebner, &

Valois, 2002; Huebner, Seligson, Valois, & Suldo, 2006). It is an abbreviated version of the Multidimensional Students' Life Satisfaction Scale (Huebner, 1994).

### 2.2.3 PROCEDURE

The study has been approved by the Institutional Review Boards of the University of South Carolina. As part of an in-house, school-wide monitoring of student well-being, teachers administered self-report measures of life satisfaction, along with measures of student engagement (and other measures not used in this study) during the homeroom period to groups of 14 to 29 students on two occasions (Spring 2015 and Spring 2016). Given the length of the survey, it was completed over two sessions (within the week) on both occasions to minimize respondent fatigue while maintaining accuracy of reports. Scripted instructions were read aloud to inform students the purpose of the investigation and the method of completion. All participants were assigned a unique numeric identifier to ensure confidentiality and anonymity.

### 2.2.4 DATA ANALYSIS

Data entry accuracy was verified via single (i.e., the same person entered the data and visually checked the entries against the original paper survey) and double entry (i.e., two different persons entered the same data and compared the percentage agreement between the entries) approaches. About 7% of the samples at T1 and T2 had a small amount of missing data on the BMSLSS. The amount of missing data on individual items was at most 2% at both time points. Structural equation modeling with Mplus 7.4 was utilized to estimate the degree of fit of a one-factor CFA model to the data collected at each time point (Muthén & Muthén, 1998-2015). All analyses were performed with maximum likelihood parameter estimates where chi-square test statistics and standard

errors were robust to non-normality and non-independence of observation. The full information maximum likelihood estimator was utilized to deal with missing data (Yuan & Bentler, 2000). This is choice MLR in Mplus (Maydeu-Olivares, 2017; Savalei, 2010). The following statistics and indices were utilized to evaluate the overall goodness of fit of the models: mean-adjusted chi-square ( $\chi^2$ ), root mean square error of approximation (RMSEA; Browne & Cudeck, 1993), comparative fit index (CFI; Bentler, 1990), and Tucker–Lewis index (TLI; Tucker & Lewis, 1973). Given that the conventional chi-square is too stringent in testing for an exact fit of the data to the model, the other statistic (i.e., RMSEA) and indices (i.e., CFI, TLI) provide information on approximate fit to the data. Non-significant probability values of RMSEA ( $p < .05$ ) indicate acceptable model fit. In addition, a RMSEA value below .05 indicates close fit, a RMSEA value between .05 and .08 implies reasonable fit, and a RMSEA value above .08 indicates poor fit (Browne & Cudeck, 1993). For both CFI and TLI, only values greater than .95 indicate close or good fit (Hu & Bentler, 1999).

To explore longitudinal measurement invariance, additional models were compared: (1) configural invariance (same pattern of free loadings), (2) weak/metric invariance (common loadings over time), (3) strong/scalar invariance (common loadings and intercepts over time), and (4) strict invariance (common loadings, intercepts, and residual variances over time). To compare the nested models with increasing equality constraints, the chi-square difference tests were conducted. In addition, differences in the internal reliability of the BMSLSS over time were evaluated as described in Maydeu-Olivares et al. (2010), again using robust methods to non-normality and presence of missing data.

### 2.3 RESULTS

Results showed that the test-retest reliability of the BMSLSS sum score (T1:  $M = 24.32$ ,  $SD = 4.78$ , T2:  $M = 24.12$ ,  $SD = 4.97$ ) over a one-year time interval was .60. In addition, the test-retest reliability of the BMSLSS factor score over a one-year period was .64. This reflects the relative stability of the latent construct measured by the BMSLSS, which is consistent with the trait-like properties of life satisfaction that has been proposed. The internal consistency of the BMSLSS was high at both T1,  $\alpha = .79$ ,  $SE = .01$ , 95% CI [.76, .82], and T2,  $\alpha = .83$ ,  $SE = .01$ , 95% CI [.80, .85]. A test of equality of coefficient alpha indicated a significant improvement in the internal consistency of the BMSLSS over time,  $\alpha_{diff} = -.04$ ,  $SE = .02$ ,  $p = .02$ , 95% CI [-.07, -.01]. When fitting the hypothesized one-factor model to the BMSLSS, we carefully examined the standardized residual covariances and modification indices (Maydeu-Olivares, 2017; McDonald & Ho, 2002; Saris, Satorra & van der Veld, 2009). They did not reveal any large correlated errors among the BMSLSS items at either T1 or 2 ( $MI < 20$ ). The one-factor CFA model did not fit the data at T1 exactly,  $X^2 = 13.54$ ,  $df = 5$ ,  $p = .02$ , but it can be considered a close fit ( $RMSEA = .04$ ,  $CFI = .99$ ,  $TLI = .98$ ) by current standards (Browne & Cudeck, 1993; Hu & Bentler, 1999). Likewise, the one-factor CFA model at T2 did not have an exact fit,  $X^2 = 20.93$ ,  $df = 5$ ,  $p < .01$ , but it provided a close fit to the data ( $RMSEA = .04$ ,  $CFI = .99$ ,  $TLI = .98$ ). At both T1 and 2, the factor loadings for items 1 to 5 were significant for the general Life Satisfaction factor (see Figures 1 and 2). Results from the single wave analyses suggest a close fit for a one-factor CFA model that is consistent with the global but multidimensional structure of life satisfaction (Seligson, Huebner, & Valois, 2002).

To explore the longitudinal measurement invariance of the BMSLSS, the configural invariance model was tested (see Figure 3) and increasing equality constraints were applied. The configural invariance model (same pattern of free loadings) did not fit the data exactly,  $X^2 = 48.05$ ,  $df = 29$ ,  $p = .01$ , but it provided a close fit (RMSEA = .02, CFI = .99, TLI = .99). Fit results for weak/metric invariance model (common loadings over time) were  $X^2 = 49.32$ ,  $df = 33$ ,  $p = .03$ , RMSEA = .02, CFI = .99, TLI = .99. No statistically significant difference was found between the configural invariance and weak/metric invariance models,  $X^2_{dif} = 1.22$ ,  $df = 4$ ,  $p = .87$ . Fit results for the strong/scalar invariance model (common loadings and intercepts over time) were  $X^2 = 54.84$ ,  $df = 37$ ,  $p = .03$ , RMSEA = .02, CFI = .99, TLI = .99. No statistically significant difference was found between the weak/metric and strong/scalar invariance models,  $X^2_{dif} = 5.33$ ,  $df = 4$ ,  $p = .26$ . Fit results for the strict invariance model (common loadings, intercepts, and residual variances over time) were  $X^2 = 65.82$ ,  $df = 42$ ,  $p = .01$ , RMSEA = .02, CFI = .99, TLI = .99. No statistically significant difference was found between the strong/scalar and strict invariance models,  $X^2_{dif} = 10.42$ ,  $df = 5$ ,  $p = .06$ . We thus conclude that the most appropriate model for these data is the strict invariance model. There were no statistically significant differences in the BMSLSS factor means and variances over a one-year interval.

## 2.4 DISCUSSION

Subjective well-being has been overlooked in mental health screening and assessment which are based primarily, if not exclusively, on the medical disease model (Seligman & Csikszentmihalyi, 2000). This study examined the psychometric soundness of the BMSLSS, a self-report measure of life satisfaction that has been widely used with

school and community samples of adolescents. The results revealed that the BMSLSS had good test-retest reliability and internal consistency over a one-year time interval, which is consistent with previous findings of longitudinal investigations with a comparable time frame (Huebner, Antaramian, Hills, Lewis, & Saha, 2011; McDougall, Wright, Nichols, & Miller, 2013). Further analysis indicated no significant change in the internal consistency of the BMSLSS over a one-year time period. The one-factor CFA model applied to data collected at each time point showed approximate fit. The RMSEA, CFI, and TFI indices further indicated a close model fit. The results were consistent with the underlying theoretical framework (Seligson, Huebner, & Valois, 2002) and empirical findings (Abubakar et al., 2016; Funk, Huebner, & Valois, 2006; McDougall, Wright, Nichols, & Miller, 2013; Siyez & Kaya, 2008; Ye et al., 2014). The test of configural invariance established that the factor structure of the BMSLSS remained invariant over time, indicating that adolescents conceptualized the life satisfaction construct in the same way across the one-year interval. The test of weak/metric invariance showed that the relations between specific BMSLSS items and their latent construct remained invariant over time, implying that adolescents responded to the items in the same way across the one-year interval. The test of strong/scalar invariance established that the relationship between BMSLSS observed and latent scores remained invariant over time, indicating that adolescents who have the same latent scores obtained the same observed scores across the one-year interval. The test of strict invariance showed that the error variances of the BMSLSS remained invariant over time, implying that the level of measurement error for each item was constant across the one-year interval.

The study demonstrated several noteworthy limitations. First, there was attrition over time. While the attrition and retention groups did not differ on demographic characteristics (e.g., age, gender, race, lunch status), it was possible that the sample differed from the population from which it was drawn on meaningful characteristics that were not assessed. Second, the sample was restricted to students from four suburban middle schools in the southeastern U.S. This imposes limits on the generalizability of findings to the larger population of U.S. adolescents. Additional studies with more heterogeneous samples are necessary to increase the external validity of the results. Third, the study used only two waves of data spanning a one-year time period. Future research that aims to extend the study should investigate different time intervals. Despite the limitations, this study provides preliminary evidence of the one-factor CFA structure and measurement invariance of the BMSLSS over time. The study contributes to the dearth of literature on the measurement equivalence of age-appropriate, reliable, and valid life satisfaction measures, particularly for U.S. adolescent populations. Taken together, the study supports the utility of the BMSLSS as a valuable instrument to assess adolescent life satisfaction over time in research and clinical settings where the brevity of measures is an important consideration.

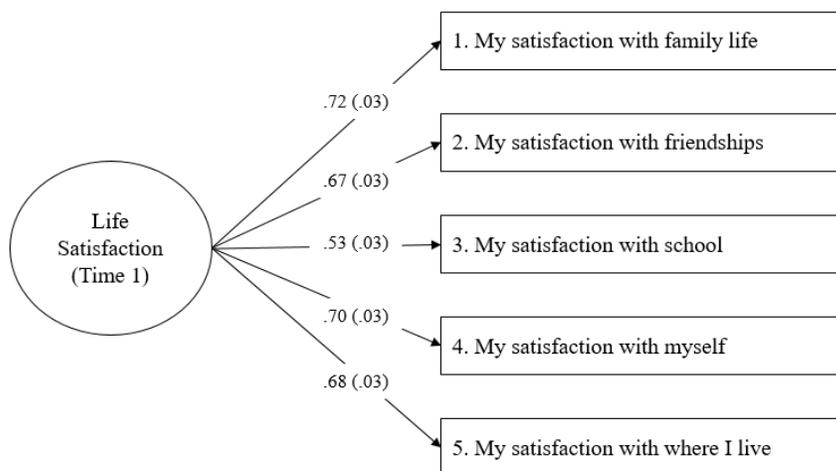


Figure 2.1 CFA Model of BMSLSS at Time 1

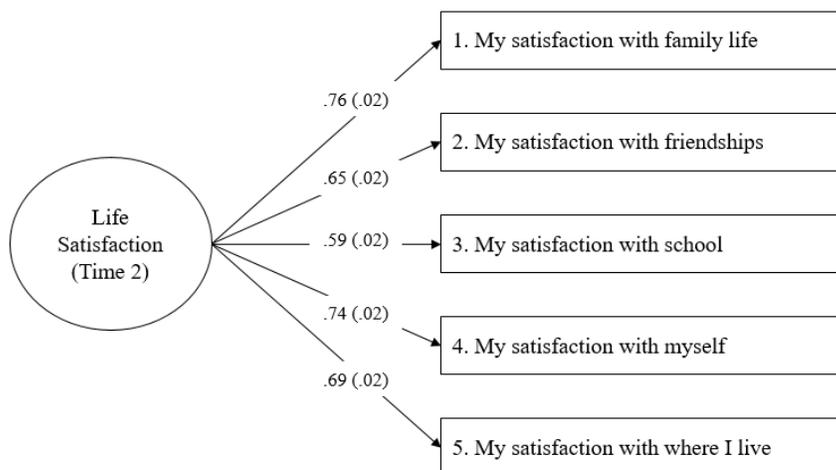


Figure 2.2 CFA Model of BMSLSS at Time 2

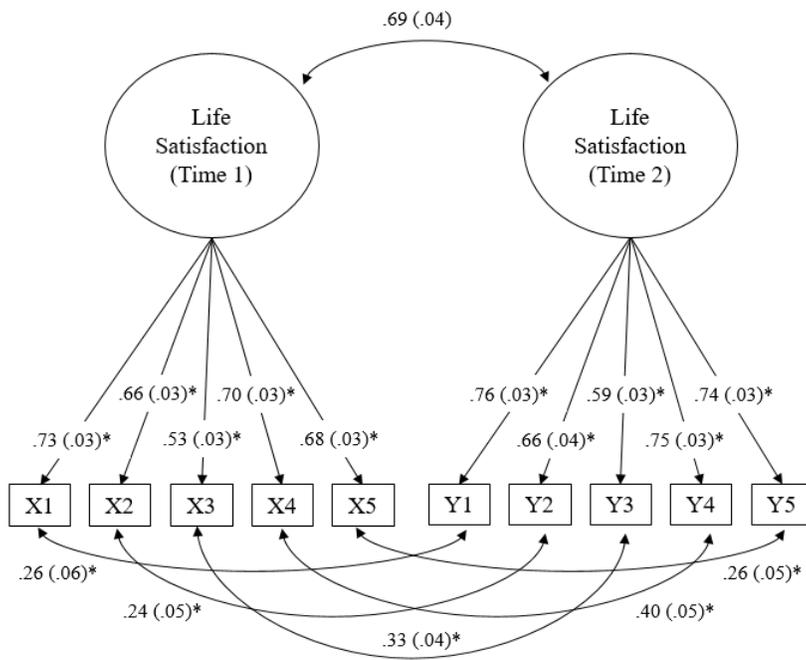


Figure 2.3 Longitudinal CFA Model of BMSLSS

## CHAPTER 3

### MEDIATING EFFECTS OF EMOTION REGULATION IN THE RELATION BETWEEN STRESSFUL LIFE EVENTS AND LIFE SATISFACTION

#### 3.1 INTRODUCTION

The conceptualization of mental health has been based predominantly on the medical disease model, in which it is narrowly defined by the absence of distress and dysfunction (Seligman & Csikszentmihalyi, 2000). A deficit-focused approach to mental health directs attention to the question of “what is wrong with people and how do we fix it?” Emphasis is placed on the identification and remediation of problems and weaknesses (Green, Carrillo, & Betancourt, 2002). In more recent years, this restrictive definition has been challenged by proponents of positive psychology who assert that the absence of distress and dysfunction is a necessary but insufficient requisite for mental health (Jahoda, 1958; Keyes, 2006; Park, 2004). Similar calls have been made by leading public health institutions for an integrated and balanced focus on positive and negative functioning. The World Health Organization (2003) described mental health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Likewise, the Centers for Disease Control and Prevention (2013) construed mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.” A critical implication of

these definitions is that mental health is more than just the mere absence of mental illness. The full spectrum of human functioning ranges from debilitating to languishing to flourishing (Seligman & Csikszentmihalyi, 2000), yet only about 17% of adults in the United States are deemed to be flourishing (Reeves et al., 2011). Therefore, the scope of mental health services should include enhancing the potential of *all* individuals to create a life worth living, not just remedying the problems of those with marked psychopathology (Jimerson, Sharkey, Nyborg, & Furlong, 2004; Kobau et al., 2011; Park, 2004; Proctor, Linley, & Maltby, 2009). However, as aptly put by Gable and Haidt (2005), psychologists are competent at “learning how to bring people up from negative eight to zero but not as good at understanding how people rise from zero to positive eight” (p. 103).

A strength-based approach to mental health looks at the question of “what is right with people and how can we build on that?” Optimal mental health is defined by the presence of subjective well-being and the absence of psychopathology (Greenspoon & Saklofske, 2001). Subjective well-being is a multidimensional construct comprising frequent experiences of positive emotions (e.g., joy, excitement, contentment), infrequent experiences of negative emotions (e.g., anxiety, anger, sadness), and high life satisfaction (Diener, 1984). Longitudinal and experimental studies show that subjective well-being uniquely predicts desirable outcomes across multiple life domains (e.g., work, relationships, physical health) above and beyond psychopathology (De Neve, Diener, Tay, & Xuereb, 2013; Lyubomirsky, King, & Diener, 2005). Such findings highlight the incremental utility of monitoring and enhancing subjective well-being. It not only buffers the development of psychopathology, but also promotes the well-being of all individuals,

including nonclinical populations (Wood & Joseph, 2010), which allows for a more proactive rather than reactive plan of action to addressing psychosocial concerns (Proctor, Linley, & Maltby, 2009). Interest in strength-based practices has rapidly expanded on three grounds: as a vehicle for content and fulfillment, as a remedy against psychopathology, and as a facilitator of resilience from life's curveballs (Alvord & Grados, 2005; Layous, Chancellor, & Lyubomirsky, 2014; Rashid, 2015; Wood & Tarrier, 2010).

The aim of this study was to explore key determinants of a global indicator of subjective well-being, life satisfaction, in early adolescents. More specifically, I examined the potential mediation effects of emotion regulation in the relation between stressful life events and subjective well-being among early adolescents. As adolescence is a period of heightened emotional reactivity (Hare et al., 2008) and tremendous change (Proctor, Linley, & Maltby, 2009), it is critical to ensure that they are surfing the waves of life and not swept away. Life satisfaction is employed as an indicator of subjective well-being as it extends beyond momentary affective experiences to include a reflective and evaluative perspective of life in its totality (Veenhoven, 2006). Life satisfaction is also of particular relevance due to its concurrent and long-term linkages to adaptive outcomes in adolescence, such as higher academic efficacy and performance (Diseth, Danielsen, & Samdal, 2012; Ng, Huebner, & Hills, 2015; Suldo, Riley, & Shaffer, 2006), positive sociometric status (Martin, Huebner, & Valois, 2008; You et al., 2008), reduced problem behavior (Lyons, Otis, Huebner, & Hills, 2014; Sun & Shek, 2013), and increased student engagement (Lewis, Huebner, Malone, & Valois, 2011).

### 3.1.1 SUBJECTIVE WELL-BEING IN THE FACE OF STRESSFUL LIFE EVENTS

Exposure to stressful life events is intimately linked to psychopathology. It precipitates the onset of psychological distress and behavioral dysfunction in adolescents, such as depressive and anxiety symptoms, conduct problems, and substance use (Asselmann, Wittchen, Lieb, Höfler, & Beesdo-Baum, 2016; Beautrais, Joyce, & Mulder, 1997; Kim, Conger, Elder Jr, & Lorenz, 2003; Low et al., 2012). In addition to the immediate impact of stressful life events on adolescent functioning, there are legitimate concerns of long-term repercussions associated with diminished educational outcomes, poor emotional health, and heightened risk-taking behaviors that persist into adulthood (Pine, Cohen, Johnson, & Brook, 2002; Skarbø, Rosenvinge, & Holte, 2004). Less research, however, has examined the relation between stressful life events and subjective well-being in adolescent populations. Chappel, Suldo, and Ogg (2014) found that cumulative major life events were negatively associated with life satisfaction in a sample of middle school students. Similar findings were reported by Nevin and colleagues (2005) in a sample of Irish adolescents. McKnight, Huebner, and Suldo (2002) found an inverse relation between stressful life events and life satisfaction in a sample of middle and high school students, even when extraversion and neuroticism traits were controlled for. Similar results were reported by Ho, Cheung, and Cheung (2008) in a sample of Hong Kong adolescents.

Lent (2004) presents a theoretical framework for understanding how individuals restore their well-being when beset by stressful life events. The restorative model of well-being posits that the process is jointly influenced by innate traits (e.g., affective dispositions, personality attributes), environmental resources (e.g., therapy services,

social support), and acquired skills and attitudes (e.g., coping strategies, self-efficacy). As acquirable variables are amenable to self-control, they form the basis for interventions designed to promote well-being. There are two broad types of coping strategies: (1) problem-focused coping that acts directly on the stressor at hand and (2) emotion-focused coping that manages emotions triggered by the stressor (Compas, Orosan, & Grant, 1993; Lazarus & Folkman, 1984). Extant literature suggests that problem-focused coping is preferable when the stressor is amenable to personal control (e.g., trouble with friends, failing a grade), while emotion-focused coping is more useful under conditions of diminished control (e.g., parental separation, death of a family member; Lent, 2004). The capacity to successfully regulate emotional responses to stressful life events associated with an external locus of control (e.g., parental incarceration, parental divorce, death of a close friend) is more likely to foster positive adaptation to adversity. Based on the restorative model, the present study focused on emotion regulation as a pathway for restoring adolescent well-being when beset by uncontrollable life events that occurred in home or school context. Experiences within the microsystem are especially salient because proximal environments exert a greater influence on individual psychosocial functioning (Bronfenbrenner & Morris, 1998; Komro et al., 2011).

### 3.1.2 ADOLESCENCE AS A CRITICAL PERIOD FOR MENTAL HEALTH

Neuroscientific research reveal that the adolescent brain is particularly sensitive and reactive to emotional stimuli due to the differential functional maturity between prefrontal and limbic regions (Hare et al., 2008; Holtmaat & Svoboda, 2009). The limbic system, which is involved in the bottom-up processing of emotions, matures earlier in life (Gogtay et al., 2004). On the other hand, the neocortex, which is responsible for top-

down executive control, is not fully developed until early adulthood (Casey et al., 2010; Fjell et al., 2012). Functional neuroimaging studies show that adolescents display higher activity in the limbic system (i.e., amygdala, ventral striatum) but lower activity in the neocortex (i.e., orbital frontal, medial prefrontal) as compared to adults when exposed to positive and negative emotional stimuli (Ernst et al., 2005; Eshel, Nelson, Blair, Pine, & Ernst, 2007; Galvan et al., 2006; Monk et al., 2003). The differential functional maturity between prefrontal and limbic regions explains how adolescents may have close to adult levels of logic and reasoning yet tend to be “hijacked” by the immediate emotional impact of affectively laden situations (Ahmed, Bittencourt-Hewitt, & Sebastian, 2015; Powers & Casey, 2015; Steinberg, 2005). Adolescents report more frequent and intense emotions (both positive and negative) in their daily lives than do children or adults (Larson, Moneta, Richards, & Wilson, 2002; Silk, Steinberg, & Morris, 2003). Similarly, parents and teachers observe increased novelty seeking and risk taking in adolescents who tend to make impulsive decisions with little regard to consequences (Dreyfuss et al., 2014; Yurgelun-Todd, 2007).

Adolescents also navigate a host of novel stressors, both normative transitions and non-normative life events, that engender a myriad of affective-laden situations in which emotions must be successfully regulated to ensure adaptive functioning (Silk, Steinberg, & Morris, 2003). Normative transitions refer to typical developmental patterns, including the biological passage of puberty, the cognitive development of executive functioning, and the academic and social progression from middle to high school. By contrast, non-normative life events refer to major events that occur unexpectedly and change one’s circumstances, such as parental unemployment, breakup with boyfriend/girlfriend, and

serious illness/injury. These experiences shape synaptic pathways by influencing which connections are reinforced or pruned during brain development (Casey, Tottenham, Liston, & Durston, 2005; Hollenstein & Loughheed, 2013). The “hard-wiring” converts often-practiced patterns of emotion regulation into habits which can profoundly influence developmental trajectories (Benningfield, Potter, & Bostic, 2015).

The intersection of brain development and environmental experience may mark the beginning of a lifelong struggle with mental illness for some adolescents. Large-scale epidemiological studies show that the onset of psychopathology peaks during adolescence (Kessler et al., 2007; Merikangas et al., 2010). Roughly one quarter of adolescents around the world meets the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for a mental disorder annually, and about one third meets the DSM-IV criteria across their lifetime (Merikangas, Nakamura, & Kessler, 2009). Nevertheless, many adolescents appear to surf the waves of life without long-term problems (Kessler et al., 2007). Most of them demonstrate resilience, which suggests that negative outcomes are neither pervasive nor inevitable (Masten, 2001; Werner, 2013). Emotion regulation may be individual attributes that promote positive adaption in the midst of stress and adversity (Boyes, Hasking, & Martin, 2015; Flouri & Mavroveli, 2013; Troy, Wilhelm, Shallcross, & Mauss, 2010). Accumulating evidence suggests that adaptive emotion regulation is a cornerstone of well-being, academic achievement, and positive adjustment throughout the lifespan (Balzarotti, Biassoni, Villani, Prunas, & Velotti, 2016; Gumora & Arsenio, 2002; Nyklíček, Vingerhoets, & Zeelenberg, 2010).

### 3.1.3 MEDIATING ROLE OF EMOTION REGULATION

Emotion regulation is a component of the larger self-regulatory system by which adaptive control of emotion interacts with and influences cognition and behavior (Calkins & Marcovitch, 2010). It entails the ability to up-regulate (i.e., initiate, sustain, or enhance) and down-regulate (i.e., restrict, inhibit, or minimize) the magnitude or duration of positive and negative emotional arousal (Thompson, 1994; Gross, 1998). Emotion regulation differs from related terms such as emotional self-efficacy (i.e., perceived ability to regulate emotions in productive ways; Caprara et al., 2008), emotional reactivity (i.e., propensity to experience frequent and intense arousal to affective stimuli; Karrass et al., 2006), emotional stability (i.e., low neuroticism or tendency to be calm and imperturbable; Hills & Argyle, 2001), and emotion recognition (i.e., ability to discern and understand emotions in self and others; Yoo, Matsumoto, & LeRoux, 2006). Adaptive emotion regulation allows us to flexibly accommodate to situational demands and effectively communicate individual intentions and goals. It is important to note that it is the quality (or type) rather than the quantity (or amount) of emotion regulation that differentially impacts developmental outcomes (Bridges, Denham, & Ganiban, 2004; Gross, 1998). To illustrate, take George who is upset that his father has been incarcerated. What is the relative adaptive value of brooding (e.g., thinking about how miserable his life is), venting (e.g., engaging in self-injury), suppressing (e.g., bottling up his emotions), acceptance (e.g., realizing that he just has to live with things the way they are), and cognitive restructuring (e.g., thinking about what he can learn from the circumstance)?

The present study focused on cognitive reappraisal and expressive suppression, two of the most common emotion regulation strategies in research and practice. Cognitive reappraisal is an antecedent-focused strategy involving the reinterpretation of the emotional salience of emotion-eliciting situations, such as Jack who construes his father's layoff as having more parent-child quality time. By contrast, expressive suppression is a response-focused strategy involving the conscious inhibition of emotional expression to emotion-eliciting situations, such as Peter who tries to block out thoughts and feelings about money troubles after his father loses his job. Antecedent-focused emotion regulation (i.e., proactive approach) manipulates conditions preceding the full activation of an emotion, while response-focused emotion regulation (i.e., reactive stance) overrides the activation of an ongoing emotion. Extensive evidence suggests that antecedent-focused emotion regulation has more desirable and efficacious outcomes than response-focused emotion regulation because the former circumvents maladaptive emotional responding while the latter engages in damage control (Gross & John, 2003; Webb, Miles, & Sheeran, 2012).

In a meta-analysis of 114 studies that examined the relation between emotion regulation and psychopathology, Aldao and colleagues (2010) found a medium effect size for expressive suppression ( $r = 0.34$ ) and a small effect size for cognitive reappraisal ( $r = -0.14$ ). Furthermore, recent studies indicate that habitual preference for expressive suppression over cognitive reappraisal distinguished adolescents with depressive symptomatology from nonclinical matched controls (Betts, Gullone, & Allen, 2009; Hughes, Gullone, & Watson, 2011; Larsen et al., 2013). Few, if any, studies have examined the relation between emotion regulation and subjective well-being in

adolescent populations. In a cross-cultural study of Norwegian, Australian, and American university students, Haga, Kraft, and Corby (2009) found that greater use of cognitive reappraisal and lower use of expressive suppression were associated with higher life satisfaction across cultures, even when extraversion and neuroticism traits were controlled for. In another cross-cultural study of European American and Hong Kong Chinese college students, Soto and colleagues (2011) found that greater use of expressive suppression was associated with lower life satisfaction and more depressive symptoms in Caucasian students, but the relationship was absent for Chinese students. Contrary findings were obtained by Schraub, Turgut, Clavairoly, and Sonntag (2013) who found that both cognitive reappraisal and expressive suppression buffered the negative impact of academic stress on the affective well-being of German university students, even when gender, age, and dispositional affectivity were controlled for. Ample evidence indicate that cognitive reappraisal generally has a healthier profile of affect (e.g., more frequent experiences of positive emotions, less frequent experiences of negative emotions), interpersonal functioning (e.g., less disruption of social exchange), and well-being (e.g., higher life satisfaction, optimism, and self-esteem) as compared to expressive suppression (Butler, Egloff, Wilhelm, Smith, Erickson, & Gross, 2003; Cutuli, 2014; Srivastava, Tamir, McGonigal, John, & Gross, 2009).

Growing evidence suggests emotion regulation as a mechanism underlying the relation between stressful life events and psychopathology (Arnarson et al., 2016; Herts, McLaughlin, & Hatzenbuehler, 2012; Kaplow, Gipson, Horwitz, Burch, & King, 2014). In a community sample of British adolescents, Flouri and Mavroveli (2013) found that cognitive reappraisal (but not expressive suppression) moderated the relationship

between stressful life events and problem behavior measured one year later, even when age, gender, lunch status, and baseline problem behavior were controlled for. Specifically, stressful life events were not associated with subsequent adolescent problem behavior when there was increased use of cognitive appraisal. In a school sample of Australian adolescents, Boyes, Hasking, and Martin (2015) reported that both cognitive reappraisal and expressive suppression partially mediated the relationship between stressful life events and psychological distress measured one year later, even after adjusting for age, gender, and baseline psychological distress. Specifically, lower use of cognitive reappraisal and greater use of expressive suppression partially accounted for the positive association between stressful life events and subsequent psychological distress. To date, however, no studies have examined the potential mediating role of emotion regulation in the relation between stressful life events and subjective well-being.

#### 3.1.4 PURPOSE OF STUDY

Stressful life events put adolescents at risk for psychopathology (Pine, Cohen, Johnson, & Brook, 2002; Skarabø, Rosenvinge, & Holte, 2004). Few studies, however, have shed light on the relation between stressful life events and subjective well-being. In line with calls to define mental health as more than the mere absence of psychopathology, and based on the restorative model of well-being (Lent, 2004), I sought to explicate the relationship between stressful life events and life satisfaction. Stressful life events are unavoidable, but they do not imply an inexorable road toward decline in mental health (Hollenstein & Loughheed, 2013; Kessler et al., 2007). Acknowledging the effect of stressful life events on psychosocial functioning, existing research has drawn attention to the possibility that much of this effect occurs through emotion regulation (Flouri &

Mavroveli, 2013; Boyes, Hasking, & Martin, 2015). Thus, I investigated the potential mediating role of cognitive reappraisal and expressive suppression in the relationship between uncontrollable life events and life satisfaction among early adolescents. As early adolescence is a period of tremendous change often marked by declines in life satisfaction (Proctor et al., 2009), middle school students were purposefully sampled. Understanding how the use of specific emotion regulation strategies may foster positive adaptation to stress and adversity (i.e., surfing waves of life) or pose a risk to individual adolescents (i.e., being swept away) is of both theoretical and applied importance (Gross & Thompson, 2007). If emotion regulation strategies do mediate the relation between stressful life events and subjective well-being, they may provide promising targets for early intervention efforts with vulnerable adolescents.

Given that much of the current literature is based on cross-sectional studies, it is difficult to test the tenability of cause-effect relations among theoretical variables in the restorative model of well-being. In addition, among the scant longitudinal studies, few controlled for differences in initial levels of the criterion (e.g., baseline life satisfaction) or demographic covariates (e.g., race, socioeconomic status). To address the limitations of extant research, the present study used two waves of data (one year apart) and examined the following research questions:

- 1) Is the relationship between stressful life events (prior Time 1) and life satisfaction (Time 1) mediated by cognitive reappraisal and expressive suppression (Time 1), while controlling for demographic covariates (i.e., cross-sectional mediation at Time 1)?

- 2) Is the relationship between stressful life events (prior Time 2) and life satisfaction (Time 2) mediated by cognitive reappraisal and expressive suppression (Time 2), while controlling for demographic covariates (i.e., cross-sectional mediation at Time 2)?
- 3) Is the relationship between stressful life events (prior Time 1) and life satisfaction (Time 2) mediated by cognitive reappraisal and expressive suppression (Time 1), while controlling for demographic covariates (i.e., longitudinal mediation)?

I hypothesized that frequent use of cognitive reappraisal will buffer the detrimental effects of stressful life events on adolescent life satisfaction, while frequent use of expressive suppression will exacerbate the detrimental effects of stressful life events on adolescent life satisfaction. I also hypothesized that the magnitude of the mediating effects will be larger in the cross-sectional analyses as compared to the longitudinal analyses.

## 3.2 METHOD

### 3.2.1 PARTICIPANTS

The sample at Time 1 (T1) consisted of 1216 regular education students from four suburban middle schools (29% school A, 28% school B, 33% school C, 11% school D) within the same school district in the southeastern United States. Individuals who did not complete any item on the BMSLSS, ERQ-CA, or LEC ( $n = 4$ ) were excluded from the analyses. The participants (51% male and 49% female) included sixth (45%) and seventh (55%) grade students whose mean age was 12.20 ( $SD = .81$ ) years. Of the sample, 55% were Caucasian, 23% were African American, 8% were Hispanic/Latino, 8% were biracial, and 7% were of other races (e.g., Asian, Native American). Participation in

federal free or subsidized lunch program was used as an indicator of socio-economic status. About 38% of the sample received free or subsidized lunch, indicating lower socio-economic status. The sample at Time 2 (T2) consisted of 1732 regular education students from the same four middle schools (16% school A, 30% school B, 44% school C, 11% school D) involved in data collection at T1. The participants at T2 (52% male and 48% female) included sixth (29%), seventh (36%), and eighth (36%) grade students whose mean age was 12.44 ( $SD = .98$ ) years. Of the sample, 55% were Caucasian, 23% were African American, 8% were Hispanic/Latino, 8% were biracial, and 5% were of other races. About 42% of the sample received free or subsidized lunch, indicating lower socio-economic status.

The longitudinal sample comprised 826 students, yielding a retention rate of 68%. The attrition rate may be attributed to the relatively high student mobility in the school district (i.e., changing schools for reasons other than grade promotion) throughout the course of a school year. The retention sample (20% school A, 33% school B, 37% school C, 11% school D) had a mean age of 12.19 ( $SD = .81$ ) years at T1. Of the sample (50% male and 50% female), 61% were Caucasian, 23% were African American, 8% were Hispanic/Latino, 5% were biracial, and 3% were of other races. About 36% of the retention sample received free or subsidized lunch. Attrition analyses were carried out to examine group differences between students who participated in the study at both time points ( $n = 826$ ) and those who did not ( $n = 390$ ). The results showed significant group differences in race,  $\chi^2(6) = 20.29, p = .002$ , school,  $\chi^2(3) = 100.72, p < .001$ , and stressful life events,  $t(1111) = -4.55, p < .001$ . There were significantly higher proportions of Caucasians in the retention sample than the attrition sample. There were significantly

lower proportions of students from school A and higher proportions of students from school B in the retention sample than the attrition sample. Adolescents in the retention sample experienced significantly less stressful life events than those in the attrition sample. No significant group differences were found for gender,  $\chi^2(1) = 2.92, p = .09$ , lunch status,  $\chi^2(1) = 2.23, p = .14$ , age,  $t(1199) = .39, p = .70$ , cognitive reappraisal,  $t(1131) = -.85, p = .40$ , expressive suppression,  $t(1158) = .51, p = .61$ , or life satisfaction,  $t(1151) = .30, p = .76$ .

### 3.2.2 MEASURES

***Brief Multidimensional Student's Life Satisfaction Scale (BMSLSS).*** The BMSLSS is a 5-item self-report scale designed to assess perceived quality of life across different domains, such as family, friends, school, self, and living environment, in children and adolescents aged 8 to 18 years (Seligson, Huebner, & Valois, 2002; Huebner, Seligson, Valois, & Suldo, 2006). It is an abbreviated version of the Multidimensional Students' Life Satisfaction Scale (Huebner, 1994). Items on the BMSLSS are rated on a 6-point scale from 1 (very dissatisfied) to 6 (very satisfied). A composite score is computed by summing all items in the scale, with higher scores indicating greater general life satisfaction. Principal factor analysis has indicated one higher-order factor, while multi-trait multi-method analyses and modest inter-correlations between domains have supported its multidimensional structure.

The BMSLSS has been used with school and community samples of adolescents (Athay, Kelley, & Dew-Reeves, 2012; Ye, Li, Li, Shen, Wen, & Zhang, 2014). It demonstrates adequate internal consistency ( $\alpha = 0.76$  for elementary students;  $\alpha = 0.85$  for middle and high students) and good convergent validity with other self-report

measures of life satisfaction, such as the Multidimensional Students' Life Satisfaction Scale and the Students' Life Satisfaction Scale (Funk III, Huebner, & Valois, 2006; Huebner, Seligson, Valois, & Suldo, 2006). It also shows good convergent and discriminant validity with self-report measures of positive and negative affect, substance use, aggressive behaviors, and suicide ideation (Seligson, Huebner, & Valois, 2002; Zullig, Valois, Huebner, Oeltmann, & Drane, 2001; Valois, Zullig, Huebner, & Drane, 2001; Valois, Zullig, Huebner, & Drane, 2004). In this study, the test-retest reliability of BMSLSS factor score over a one-year interval was .64. Its internal consistency was high at both T1 ( $\alpha = .79$ ) and T2 ( $\alpha = .83$ ).

***Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA).***

The ERQ-CA is a 10-item self-report scale designed to measure the use of cognitive reappraisal (6 items; e.g., *I control my feelings about things by changing the way I think about them*) and expressive suppression (4 items; e.g., *when I am feeling happy, I am careful not to show it*) in children and adolescents aged 10 to 18 years (Gullone & Taffe, 2012). It is an adapted version of the Emotion Regulation Questionnaire used in adult populations (Gross & John, 2003). Confirmatory factor analysis has supported its two-factor structure. Items on the ERQ-CA are rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating more frequent use of the corresponding emotion regulation strategy. Items are written in a manner where the strategies do not assume an intrinsically positive or negative character, which means that the ERQ-CA is not solely focused on negative emotions but also include positive emotions.

The ERQ-CA has been used with clinical and community samples of adolescents (Ben-Eliyahu & Linnenbrink-Garcia, 2015; Gullone, Hughes, King, & Tonge, 2010; Queen & Ehrenreich-May, 2014; Tsao, Jacob, Seidman, Lewis, & Zeltzer, 2014). It demonstrates adequate internal consistency for cognitive reappraisal ( $\alpha = .83$ ) and expressive suppression ( $\alpha = .75$ ) subscales (Gullone & Taffe, 2012). The ERQ-CA exhibits good convergent validity with other self-report measures of emotion regulation, such as the Difficulties in Emotion Regulation Scale (Eastabrook, Flynn, & Hollenstein, 2014; Lougheed & Hollenstein, 2012). It also shows good convergent and discriminant validity with self-report measures of depression, anxiety, self-injury, self-esteem, quality of life, neuroticism, and extraversion (Chambers, Gullone, Hased, Knight, Garvin, & Allen, 2015; Gresham & Gullone, 2012; Lanteigne, Flynn, Eastabrook, & Hollenstein, 2014; Liu, Chen, & Tu, 2015; Tatnell, Kelada, Hasking, & Martin, 2014). In this study, the test-retest stability of Cognitive Appraisal and Expressive Suppression factor scores over a one-year interval were .45 and .47 respectively. The internal consistency of Cognitive Reappraisal subscale was good at both T1 ( $\alpha = .84$ ) and T2 ( $\alpha = .86$ ). The internal consistency of Expressive Suppression subscale was acceptable at both T1 ( $\alpha = .64$ ) and T2 ( $\alpha = .67$ ).

***Life Events Checklist (LEC)***. The LEC is a 46-item self-report scale designed to measure the occurrence of significant life events commonly experienced by children and adolescents aged 10 to 17 years (Brand & Johnson, 1982; Johnson & McCutcheon, 1980). It is a modified version of the Life Event Record (Coddington, 1972). The LEC assesses two types of life events: (1) events associated with an internal locus of control (e.g., *joining a new club, trouble with friends, failing a grade*) and (2) events associated

with an external locus of control (e.g., *parental divorce, economic hardship, death of a close friend*). For the purposes of the present study, only 18 items representing uncontrollable events were used. Adolescents indicated the absence or presence of specific life events within the past year, with higher sum scores indicating greater objective occurrence of stressful life events.

The LEC has been used with clinical, community, and school samples of adolescents (Carothers, Borkowski, & Whitman, 2006; Liu, Frazier, Cataldo, Simon, Spirito, & Prinstein, 2014; Suldo & Huebner, 2004; Tiet et al., 2001). It demonstrates good convergent validity with other measures of life events, such as the Life Events and Difficulties Schedule and the Stressful Life Events Schedule (Duggal et al., 2000; Williamson et al., 2003). It also shows good convergent and discriminant validity with self-report measures of life satisfaction, self-control, non-suicidal self-injury, depression, and conduct problems (Duckworth, Kim, & Tsukayama, 2013; Kimonis, Centifanti, Allen, & Frick, 2014; Liu et al., 2014; Suldo & Huebner, 2004; Tiet et al., 2001). As the LEC consists of discretely occurring items, internal consistency was not calculated (see Dohrenwend, 2006 for a discussion of this issue).

***Demographics.*** Information on the age, gender (male = 0, female = 1), race (dummy coded as two binary variables where Caucasian = [0, 0], African American = [1, 0], and other races = [0, 1]), lunch program (regular = 0, reduced/free = 1), and school (dummy coded as three binary variables where school A = [1, 0, 0], school B = [0, 1, 0], school C = [0, 0, 1], and school D = [0, 0, 0]) of participating students were gathered in the survey.

### 3.2.3 PROCEDURE

The study has been approved by the Institutional Review Boards of the University of South Carolina. As part of a school-wide monitoring of student well-being, teachers administered self-report measures of stressful life events, emotion regulation, and life satisfaction (as well as other measures not used in this study) during the homeroom period to groups of 14 to 29 students on two occasions (Spring 2015 and Spring 2016). Given the length of the survey, it was completed over two sessions (within the week) on both occasions to minimize respondent fatigue while maintaining accuracy of reports. Scripted instructions were read aloud to inform students the purpose of the investigation and the method of completion. All participants were assigned a unique numeric identifier to ensure confidentiality and anonymity.

### 3.2.4 DATA ANALYSIS

Data entry accuracy was verified via single (i.e., the same person entered the data and visually checked the entries against the original paper survey) and double (i.e., two different persons entered the same data and compared the percentage agreement between the entries) entry approaches. About 6% to 9% of the samples at T1 and T2 had a small amount of missing data on the BMSLSS, ERQ-CA, and/or LEC. The amount of missing data on individual items on the BMSLSS, ERQ-CA, and LEC was at most 5% at both time points. The adequacy of the measurement models for the latent variables (i.e., emotion regulation and life satisfaction) have been demonstrated (see chapters 1 and 2 for confirmatory factor analysis and longitudinal measurement invariance of the ERQ-CA and BMSLSS).

Mediation analysis, as described by Baron and Kenny (1986) and MacKinnon (2008), can be carried out with path analysis. The direct effect (path coefficient  $c$ ) is defined as the effect of the predictor (i.e., stressful life events) on the outcome (i.e., life satisfaction) when freely estimating the indirect effect. The indirect/mediated effect (product of path coefficients  $a$  and  $b$ ) is defined as the effect of the predictor (i.e., stressful life events) on the outcome (i.e., life satisfaction) through the mediator(s) (i.e., cognitive reappraisal and expressive suppression). The mediator(s) can either account for some or all of the relation between the predictor and the outcome. Partial mediation occurs when statistically significant indirect and direct effects are observed (i.e., direct effect is reduced in magnitude but is still greater than zero). On the other hand, full mediation occurs when a statistically significant indirect effect is observed but the direct effect becomes non-significant (i.e., direct effect equals zero). Demographic covariates (i.e., age, gender, race, lunch status) were controlled for in all analyses. Statistical analyses of school differences for estimated path coefficients were non-significant and hence excluded from analyses.

Full Structural Equation Modeling (SEM) models, which composed of measurement model (i.e., relates variables to constructs) and structural model (i.e., relates constructs to other constructs), were employed in this study (Iacobucci, 2009). Mplus 7.4 was utilized to estimate the degree of fit of the full SEM models (Muthén & Muthén, 1998-2015). All analyses were performed with robust maximum likelihood (MLR), which produced chi-square test statistics and standard errors that were robust to non-normality and non-independence of observations in the presence of missing data (Yuan & Bentler, 2000; Savalei, 2010). MLR is based on all available data (not only complete

cases) and allows data to be missing at random. The following statistics and indices were used to evaluate the overall goodness of fit of the models: mean-adjusted chi-square ( $\chi^2$ ), root mean square error of approximation (RMSEA; Browne & Cudeck, 1993), comparative fit index (CFI; Bentler, 1990), and Tucker–Lewis index (TLI; Tucker & Lewis, 1973). Given that the conventional chi-square is too stringent in testing for an exact fit of the data to the model, the other statistic (i.e., RMSEA) and indices (i.e., CFI, TLI) provided information on approximate fit to the data. Non-significant values of RMSEA ( $p < .05$ ) indicate acceptable model fit. In addition, RMSEA values below .05 indicate close fit, RMSEA values between .05 and .08 imply reasonable fit, and RMSEA values above .08 indicate poor fit (Browne & Cudeck, 1993). For both CFI and TLI, values greater than .90 imply reasonable fit and values greater than .95 indicate close fit (Hu & Bentler, 1999).

### 3.3 RESULTS

The modification indices indicated a large correlated error between item 1 (i.e., *when I want to feel happier, I think about something different*) and item 3 (i.e., *when I want to feel less bad, I think about something different*) in the cognitive reappraisal factor of the ERQ-CA at both T1 (MI = 115.76) and T2 (MI = 158.40). This may be attributed to the similar wording of the two items despite contrasting emotion valence. The correlated error was taken into account to improve the degree of fit for the measurement model. For the longitudinal SEM model, the modification indices also indicated a large correlated error between cognitive reappraisal and life satisfaction at both T1 (MI = 137.72) and T2 (MI = 52.68). It is well-documented that the use of cognitive reappraisal is strongly associated with individual well-being (Gross & John, 2003; Haga, Kraft, &

Corby, 2009). The correlated error was taken into account to improve the degree of fit for the structural model.

The full SEM model at T1 did not have an exact fit,  $X^2 = 409.09$ ,  $df = 158$ ,  $p < .01$ , but it had an approximate fit,  $RMSEA = .04$ ,  $p > .05$ . Based on the cut-offs recommended by Browne and Cudeck (1993) and Hu and Bentler (1999), the model had a reasonable fit ( $RMSEA = .04$ ,  $CFI = .94$ ,  $TLI = .93$ ). Results showed that adolescents who experienced more stressful life events prior T1 had lower life satisfaction at T1,  $\beta = -.14$ ,  $SE = .04$ ,  $t(158) = -3.97$ ,  $p < .05$ , 95% CI [-.21, -.07], after controlling for demographic covariates (see Table 3.1). A .14 standard deviation unit decrease in life satisfaction at T1 was expected for every one standard deviation increase in stressful life events prior T1 for an adolescent who had average levels of cognitive reappraisal and expressive suppression at T1. Additionally, adolescents who indicated lower use of cognitive reappraisal,  $\beta = .49$ ,  $SE = .04$ ,  $t(158) = 12.88$ ,  $p < .05$ , 95% CI [.42, .57], and greater use of expressive suppression,  $\beta = -.26$ ,  $SE = .05$ ,  $t(158) = -5.87$ ,  $p < .05$ , 95% CI [-.35, -.17], at T1 had lower life satisfaction at T1, after controlling for demographic covariates (see Table 3.1). A .49 standard deviation unit increase in life satisfaction at T1 was expected for every one standard deviation increase in cognitive reappraisal at T1 for an adolescent who did not experience any stressful life event prior T1. By contrast, a .26 standard deviation unit decrease in life satisfaction at T1 was expected for every one standard deviation increase in expressive suppression at T1 for an adolescent who did not experience any stressful life event prior T1. Results also showed that adolescents who experienced more stressful life events prior T1 indicated lower use of cognitive reappraisal,  $\beta = -.10$ ,  $SE = .03$ ,  $t(158) = -3.14$ ,  $p < .05$ , 95% CI [-.16, -.04], and greater

use of expressive suppression,  $\beta = .11$ ,  $SE = .04$ ,  $t(158) = 3.06$ ,  $p < .05$ , 95% CI [.04, .18], at T1, after controlling for demographic covariates (see Table 3.2). A .10 standard deviation unit decrease in cognitive reappraisal and a .11 standard deviation unit increase in expressive suppression at T1 was expected for every one standard deviation increase in stressful life events prior T1. Furthermore, the relationship between stressful life events prior T1 and life satisfaction at T1 was partially mediated by cognitive reappraisal,  $\beta = -.05$ ,  $SE = .02$ ,  $t(158) = -3.07$ ,  $p < .05$ , 95% CI [-.08, -.02], and expressive suppression,  $\beta = -.03$ ,  $SE = .01$ ,  $t(158) = -2.65$ ,  $p < .05$ , 95% CI [-.05, -.01], at T1.

The full SEM model at T2 did not have an exact fit,  $X^2 = 534.69$ ,  $df = 158$ ,  $p < .01$ , but it had an approximate fit,  $RMSEA = .04$ ,  $p > .05$ . Based on the cut-offs recommended by Browne and Cudeck (1993) and Hu and Bentler (1999), the model had a reasonable fit ( $RMSEA = .04$ ,  $CFI = .94$ ,  $TLI = .93$ ). Results showed that adolescents who experienced more stressful life events prior T2 had lower life satisfaction at T2,  $\beta = -.18$ ,  $SE = .03$ ,  $t(158) = -5.86$ ,  $p < .05$ , 95% CI [-.24, -.12], after controlling for demographic covariates (see Table 3.3). A .18 standard deviation unit decrease in life satisfaction at T2 was expected for every one standard deviation increase in stressful life events prior T2 for an adolescent who had average levels of cognitive reappraisal and expressive suppression at T2. Additionally, adolescents who indicated lower use of cognitive reappraisal,  $\beta = .49$ ,  $SE = .03$ ,  $t(158) = 16.68$ ,  $p < .05$ , 95% CI [.44, .55], and greater use of expressive suppression,  $\beta = -.20$ ,  $SE = .04$ ,  $t(158) = -5.83$ ,  $p < .05$ , 95% CI [-.27, -.14], at T2 had lower life satisfaction at T2, after controlling for demographic covariates (see Table 3.3). A .49 standard deviation unit increase in life satisfaction at T2 was expected for every one standard deviation increase in cognitive reappraisal at T2 for

an adolescent who did not experience any stressful life event prior T2. By contrast, a .20 standard deviation unit decrease in life satisfaction at T2 was expected for every one standard deviation increase in expressive suppression at T2 for an adolescent who did not experience any stressful life event prior T2. Results also showed that adolescents who experienced more stressful life events prior T2 indicated lower use of cognitive reappraisal,  $\beta = -.09$ ,  $SE = .03$ ,  $t(158) = -3.08$ ,  $p < .05$ , 95% CI [-.14, -.03], and greater use of expressive suppression,  $\beta = .08$ ,  $SE = .03$ ,  $t(158) = 2.35$ ,  $p < .05$ , 95% CI [.01, .14], at T2, after controlling for demographic covariates (see Table 3.4). A .09 standard deviation unit decrease in cognitive reappraisal and a .08 standard deviation unit increase in expressive suppression at T2 was expected for every one standard deviation increase in stressful life events prior T2. Furthermore, the relationship between stressful life events prior T2 and life satisfaction at T2 was partially mediated by cognitive reappraisal,  $\beta = -.04$ ,  $SE = .01$ ,  $t(158) = -3.03$ ,  $p < .05$ , 95% CI [-.07, -.02], and expressive suppression,  $\beta = -.02$ ,  $SE = .01$ ,  $t(158) = -2.20$ ,  $p < .05$ , 95% CI [-.03, -.002], at T2.

The longitudinal SEM model did not have an exact fit,  $X^2 = 1408.06$ ,  $df = 571$ ,  $p < .01$ , but it had an approximate fit,  $RMSEA = .04$ ,  $p > .05$ . Based on the cut-offs recommended by Browne and Cudeck (1993) and Hu and Bentler (1999), the model was a reasonable fit ( $RMSEA = .04$ ,  $CFI = .90$ ,  $TLI = .89$ ). Results showed that adolescents who experienced more stressful life events prior T1 had lower life satisfaction at T2,  $\beta = -.09$ ,  $SE = .04$ ,  $t(571) = -2.40$ ,  $p < .05$ , 95% CI [-.17, -.02], after controlling for demographic covariates and baseline values of life satisfaction (see Table 3.5). A .09 standard deviation unit decrease in life satisfaction at T2 was expected for every one standard deviation increase in stressful life events prior T1 for an adolescent who had

average levels of cognitive reappraisal and expressive suppression at T1. Additionally, adolescents who indicated lower use of cognitive reappraisal,  $\beta = .41$ ,  $SE = .05$ ,  $t(571) = 8.73$ ,  $p < .05$ , 95% CI [.31, .50], and greater use of expressive suppression,  $\beta = -.17$ ,  $SE = .05$ ,  $t(571) = -3.28$ ,  $p < .05$ , 95% CI [-.28, -.07], at T1 had lower life satisfaction at T2, after controlling for demographic covariates and baseline values of life satisfaction (see Table 3.5). A .41 standard deviation unit increase in life satisfaction at T2 was expected for every one standard deviation increase in cognitive reappraisal at T1 for an adolescent who did not experience any stressful life event prior T1. By contrast, a .17 standard deviation unit decrease in life satisfaction at T2 was expected for every one standard deviation increase in expressive suppression at T1 for an adolescent who did not experience any stressful life event prior T1. Results also showed that adolescents who experienced more stressful life events prior T1 indicated lower use of cognitive reappraisal,  $\beta = -.06$ ,  $SE = .03$ ,  $t(571) = -2.15$ ,  $p < .05$ , 95% CI [-.12, -.01], and greater use of expressive suppression,  $\beta = .11$ ,  $SE = .04$ ,  $t(571) = 2.96$ ,  $p < .05$ , 95% CI [.04, .18], at T1, after controlling for demographic covariates (see Table 3.6). A .06 standard deviation unit decrease in cognitive reappraisal and a .11 standard deviation unit increase in expressive suppression at T1 was expected for every one standard deviation increase in stressful life events prior T1. Furthermore, the relationship between stressful life events prior T1 and life satisfaction at T2 was partially mediated by cognitive reappraisal,  $\beta = -.03$ ,  $SE = .01$ ,  $t(571) = -2.10$ ,  $p < .05$ , 95% CI [-.05, -.002], and expressive suppression,  $\beta = -.02$ ,  $SE = .01$ ,  $t(571) = -2.12$ ,  $p < .05$ , 95% CI [-.04, -.001], at T1.

### 3.4 DISCUSSION

The aim of this study was to examine the mediating effects of emotion regulation on the relation between stressful life events and subjective well-being in a school sample of early adolescents. Specifically, the study explored whether the relationship between uncontrollable life events and life satisfaction may be mediated by the use of cognitive reappraisal and expressive suppression. The results revealed that the direct effect of stressful life events prior T1 on life satisfaction at T2 was significant, after controlling for demographic covariates and baseline values of life satisfaction. The indirect/mediated effects of stressful life events prior T1 on life satisfaction at T2 through cognitive reappraisal and expressive suppression at T1 were also significant, even when demographic covariates and baseline values of life satisfaction were controlled for. Consistent with Lent's (2004) restorative model of well-being, results from the longitudinal SEM analyses suggest that the inverse relationship between stressful life events and life satisfaction was partially mediated by lower use of cognitive reappraisal and greater use of expressive suppression (see Figure 3). Similar findings were found in the single wave SEM analyses. Both the direct and indirect effects were significant at T1 and T2, after controlling for demographic covariates (see Figures 1 and 2). These differ from the findings of Lyons and colleagues (2016) who did not find support for the mediating effects of approach or avoidance coping behaviors on the relation between uncontrollable life events and life satisfaction in a school sample of U.S. adolescents. The divergent findings suggest that coping effectiveness may be dependent on the fit between stressor controllability and coping efforts. As pointed out by Lent (2004), problem-focused coping is preferable when the stressor is amenable to personal control (e.g.,

trouble with friends, failing a grade), while emotion-focused coping is more useful under conditions of diminished control (e.g., parental separation, death of a family member). Future studies could look at the mediating effects of approach and avoidance coping behaviors on the relationship between controllable life events and subjective well-being.

In line with previous research, this study showed that early adolescents who indicated greater use of cognitive reappraisal and lower use of expressive suppression had higher levels of life satisfaction (Haga, Kraft, & Corby, 2009; John & Gross, 2000). Furthermore, the study found that more frequent use of cognitive reappraisal buffered life satisfaction while more frequent use of expressive suppression diminished life satisfaction, irrespective of exposure to stressful life events. This finding is congruent with growing evidence that cognitive reappraisal is an effective means of down-regulating negative emotions and up-regulating positive emotions without appreciable physiological costs, and brings about desirable well-being and interpersonal outcomes (Gross & John, 2003; Mauss, Cook, Cheng, & Gross, 2007; McRae, Ciesielski, & Gross, 2012). Expressive suppression, on the other hand, is relatively ineffective at down-regulating negative emotions in the long run, and has physiological (e.g., increases blood pressure), social (e.g., inhibits relationship formation), and cognitive (e.g., impairs memory functioning) costs (Butler et al., 2003; Ehring, Tuschen-Caffier, Schnulle, Fischer, & Gross, 2010; Srivastava, Tamir, McGonigal, John, & Gross, 2009). Extending beyond the notion of protective factor against psychopathology, the findings of this study demonstrated that adaptive emotion regulation may also serve as an enabling factor for subjective well-being.

However, this study revealed that early adolescents were less likely to use cognitive reappraisal when they experienced more uncontrollable life events. Instead, they were more likely to rely on expressive suppression. These suggest that adolescents who are exposed to more uncontrollable life events may have less capacity to adaptively regulate emotions triggered by the stressor, which in turn is associated with subsequent decline in subjective well-being. They tend to suppress their emotions, which may be due to the lack of opportunities necessary to acquire and master cognitive reappraisal skills. Cognitive reappraisal involves finding positive meaning in stressful life events. When confronted with stressful and challenging life experiences, accepting one's negative emotions and trying to seek out positives may be an optimal strategy for fostering subjective well-being (North, Pai, Hixon, & Holahan, 2011). Take, for instance, Jill who finds contentment in memories after losing her father to cancer. By contrast, expressive suppression involves masking or burying one's true emotions. Individuals may use expressive suppression for self-protection to temporarily blunt the experience of negative emotions (Larsen et al., 2013) or exert control over one's behavior under conditions of diminished control (Niedenthal, Krauth-Gruber, & Ric, 2006). Take, for example, Jane who smiles and states she is fine after learning that her father will be deployed for a year.

Future studies should examine whether the partial mediation relationships will be observed across age (e.g., early vs. late adolescents), gender (e.g., male vs. female adolescents), and culture (e.g., American vs. East Asian adolescents). The socioemotional selectivity theory proposes a shift from response-focused to antecedent-focused emotion regulation as one grows older (Yeung, Wong, & Lok, 2011). The mediating effect of cognitive reappraisal on the relationship between stressful life events and subjective well-

being may thus be stronger in late adolescents and young adults as compared to early adolescents. Cross-cultural research has shown that individualistic cultures value autonomy and encourage open emotional expression, while collectivistic cultures value social harmony and emphasize emotional control and restraint (Matsumoto, Yoo, & Nakagawa, 2008). Given that studies have shown that more frequent use of expressive suppression is not associated with psychopathology in collectivistic cultures (Soto, Perez, Kim, Lee, & Minnick, 2011; Yeung, Wong, & Lok, 2011), the mediating effect of expressive suppression on the relationship between stressful life events and subjective well-being may be weaker in East Asian adolescents as compared to American adolescents. Research on gender differences in emotion regulation indicate that males are more likely to use expressive suppression to cope with emotionally arousing situations, which may be attributed to gender socialization (Zimmermann & Iwanski, 2014). The mediating effect of expressive suppression on the relationship between stressful life events and subjective well-being may thus be stronger in male adolescents as compared to female adolescents.

#### 3.4.1 PRACTICAL IMPLICATIONS

Stressful life events are associated with poor mental health outcomes for adolescents, with repercussions that persist into adulthood (Pine, Cohen, Johnson, & Brook, 2002; Skarbø, Rosenvinge, & Holte, 2004). Nevertheless, individuals differ in their adjustment to stressful life events (Troy, Wilhelm, Shallcross, & Mauss, 2010). Some adolescents surf the waves of life (i.e., resilient) while others are swept away (i.e., debilitating or languishing). As many life stressors are proximal and uncontrollable, identifying variables that are amenable to change and may mediate the relationship

between stressful life experience and mental health is important from an intervention and prevention perspective. This study has identified cognitive reappraisal and expressive suppression as mechanisms that may account for the impact of uncontrollable life events on adolescent subjective well-being. Given that adolescence is a developmental period marked by elevated emotional reactivity and tremendous change (Hare et al., 2008; Proctor, Linley, & Maltby, 2009), scaffolding the development of adaptive emotion regulation may have long-term consequences for their mental health. Adolescents' orientation toward autonomy provides further impetus for increased sophistication of emotion regulation skills, without the socializing influences of adult caregivers who provide guidance on the understanding of emotional experiences as well as the means of managing and communicating these experiences in childhood (Spear & Kulbok, 2004). This suggests that psychoeducation may offer one way by which necessary emotion regulation skills may be acquired such that individual adolescents, particularly those experiencing stressful life events, may learn how to increase the use of cognitive reappraisal and reduce the use of expressive suppression, which in turn may ultimately enhance their subjective well-being. Schools provide an excellent platform for such initiatives as most adolescents spend a considerable amount of their time at school (McLaughlin & Clarke, 2010). Recent studies on school-based intervention programs that combine expressive writing (Horn, Pössel, & Hautzinger, 2011; Travagin, Margola, & Revenson, 2015) or drama class (Goldstein, Tamir, & Winner, 2013; Moneta & Rousseau, 2008) with psychoeducation on emotion regulation have shown promising results in promoting the subjective well-being of adolescents with and without marked psychopathology. Emerging evidence has also documented the effectiveness of school-

based mindfulness training in enhancing adolescents' capacity for emotion regulation by encouraging non-judgmental awareness and acceptance of one's emotions (Meiklejohn et al., 2012).

### 3.4.2 LIMITATIONS AND FUTURE DIRECTIONS

Although the current study yielded important findings, its limitations should be noted. First, the sample was restricted to students from four suburban middle schools 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, while the attrition and retention groups did not differ on mediator and outcome variables (i.e., cognitive reappraisal, expressive suppression, life satisfaction), attrition analyses showed that adolescents in the retention group experienced significantly fewer stressful life events than those in the attrition group. There was also a significantly larger proportion of Caucasians in the retention group than the attrition group. It is possible that the current sample differed from the population from which it was drawn on meaningful characteristics that were not assessed. This possibility imposes limits on the generalizability of findings to the larger population of early adolescents. Third, the results were based on self-reports exclusively, which may increase common method bias. Future research efforts should adopt a multi-method (e.g., parent and teacher reports, semi-structured interviews) approach. Fourth, the current study focused specifically on emotion regulation strategies (i.e., emotion-focused coping) as a mediator variable in Lent (2004)'s restorative model of well-being. Continued research on other mediators

(e.g., personality, sense of self-efficacy) will also provide a more nuanced picture of the relationship between stressful life events and life satisfaction.

Despite the limitations, this study contributes to the dearth of literature on the role of stressful life events in the development of subjective well-being in general and LS in particular among adolescents (Proctor, Linley, & Maltby, 2009). The study advances our understanding of the mechanisms by which stressful life events exert a negative influence on subjective well-being among early adolescents. From a strength-based approach, flourishing development is viewed not as the absence of clinical symptomatology but as the presence of positive attributes that enable adolescents to reach their full potential as productive and engaged adults (Keyes, 2006). This study highlights the partial mediating effects of emotion regulation strategies, specifically cognitive reappraisal and expressive suppression, on adolescents' life satisfaction in the context of uncontrollable life events. The ability to effectively regulate emotions may be an important contributor to individual variation in adjustment to stressful and challenging life experiences (Troy, Wilhelm, Shallcross, & Mauss, 2010). The findings add to the growing support for the broad implementation of school-based preventive interventions that target the emotion regulation skills of children and adolescents, before maladaptive patterns of emotion regulation become ingrained, to produce an upward spiral towards optimal well-being.

Table 3.1

*Descriptive Statistics of Sum Scores*

Variables	Time 1		Time 2	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. Stressful Life Events	4.06	2.91	3.38	2.78
2. Life Satisfaction	4.85	.96	4.81	.99
3. Cognitive Reappraisal	3.41	.84	3.36	.83
4. Expressive Suppression	2.97	.83	2.95	.84

Table 3.2

*Zero-Order Correlations between Sum Scores*

Variables	1.	2.	3.	4.	5.	6.	7.	8.
1. Stressful Life Events (T1)	1.00							
2. Stressful Life Events (T2)	.59	1.00						
3. Cognitive Reappraisal (T1)	-.07	-.01	1.00					
4. Cognitive Reappraisal (T2)	-.07	-.06	.41	1.00				
5. Expressive Suppression (T1)	.13	.14	.20	.04	1.00			
6. Expressive Suppression (T2)	.11	.11	.01	.18	.37	1.00		
7. Life Satisfaction (T1)	-.18	-.16	.38	.30	-.11	-.14	1.00	.
8. Life Satisfaction (T2)	-.17	-.21	.31	.38	-.08	-.16	.59	1.00

Table 3.3

*Path Analysis for the Effects of Stressful Life Events (prior Time 1) and Emotion Regulation (Time 1) on Life Satisfaction (Time 1)*

Variables	Life Satisfaction (T1)			
	$R^2$	$\beta$	$SE$	$t$
Sex (Male)	.30*	.02	.03	.48
Age (T1)		-.08*	.03	-2.69
Lunch (Regular)		-.03	.03	-.99
Race (African American)		-.004	.04	-.10
Race (Others)		-.03	.03	-.79
Stressful Life Events (prior T1)		-.14*	.04	-3.97
Cognitive Reappraisal (T1)		.49*	.04	12.88
Expressive Suppression (T1)		-.26*	.05	-5.87

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

Table 3.4

*Path Analysis for the Effect of Stressful Life Events (prior Time 1) on Cognitive Reappraisal (Time 1) and Expressive Suppression (Time 1)*

Variables	Cognitive Reappraisal				Expressive Suppression			
	$R^2$	$\beta$	$SE$	$t$	$R^2$	$B$	$SE$	$t$
Sex (Male)	.02*	-.05	.03	-1.51	.04*	-.01	.04	-.29
Age (T1)		-.08*	.03	-2.32		.06	.04	1.53
Lunch (Regular)		-.01	.03	-.15		.06	.04	1.71
Race (African American)		.05	.04	1.45		.06	.04	1.55
Race (Others)		-.01	.03	-.25		.11*	.04	3.06
Stressful Life Events		-.10*	.03	-3.14		.11*	.04	3.06

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

Table 3.5

*Path Analysis for the Effects of Stressful Life Events (prior Time 2) and Emotion Regulation (Time 2) on Life Satisfaction (Time 2)*

Variables	Life Satisfaction (T2)			
	$R^2$	$B$	$SE$	$t$
Sex (Male)	.34*	-.01	.02	-.26
Age (T1)		-.09*	.03	-3.68
Lunch (Regular)		-.08*	.03	-2.77
Race (African American)		-.02	.03	-.84
Race (Others)		-.05	.03	-1.87
Stressful Life Events (prior T2)		-.18*	.03	-5.86
Cognitive Reappraisal (T2)		.49*	.03	16.68
Expressive Suppression (T2)		-.20*	.04	-5.83

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

Table 3.6

*Path Analysis for the Effect of Stressful Life Events (prior Time 2) on Cognitive Reappraisal (Time 2) and Expressive Suppression (Time 2)*

Variables	Cognitive Reappraisal				Expressive Suppression			
	$R^2$	$\beta$	$SE$	$t$	$R^2$	$B$	$SE$	$t$
Sex (Male)	.04*	-.003	.03	-.13	.02*	.02	.03	.59
Age (T1)		-.15*	.03	-5.67		.04	.03	1.19
Lunch (Regular)		-.06	.03	-1.93		.09*	.03	2.83
Race (African American)		.05	.03	1.63		-.04	.03	-1.23
Race (Others)		-.002	.03	-.07		.004	.03	.12
Stressful Life Events		-.09*	.03	-3.08		.08*	.03	2.35

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

Table 3.7

*Longitudinal Path Analysis for the Effects of Stressful Life Events (prior Time 1) and Emotion Regulation (Time 1) on Life Satisfaction (Time 2)*

Variables	Life Satisfaction (T2)			
	$R^2$	$\beta$	$SE$	$t$
Sex (Male)	.20*	-.02	.04	-.60
Age (T1)		-.08*	.04	-2.13
Lunch (Regular)		-.10*	.05	-2.16
Race (African American)		-.05	.04	-1.24
Race (Others)		-.01	.05	-.18
Stressful Life Events (prior T1)		-.09*	.04	-2.40
Cognitive Reappraisal (T1)		.41*	.05	8.73
Expressive Suppression (T1)		-.17*	.05	-3.28

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

Table 3.8

*Longitudinal Path Analysis for the Effect of Stressful Life Events (prior Time 1) on Cognitive Reappraisal (Time 1) and Expressive Suppression (Time 1)*

Variables	Cognitive Reappraisal				Expressive Suppression			
	$R^2$	$\beta$	$SE$	$t$	$R^2$	$B$	$SE$	$t$
Sex (Male)	.02*	-.04	.03	-1.35	.04*	-.01	.04	-.40
Age (T1)		-.07*	.03	-2.21		.05	.04	1.46
Lunch (Regular)		.003	.04	.09		.10*	.04	2.33
Race (African American)		.05	.04	1.33		.05	.04	1.28
Race (Others)		-.04	.03	-1.08		.08*	.04	2.09
Stressful Life Events		-.06*	.03	-2.15		.11*	.04	2.96

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

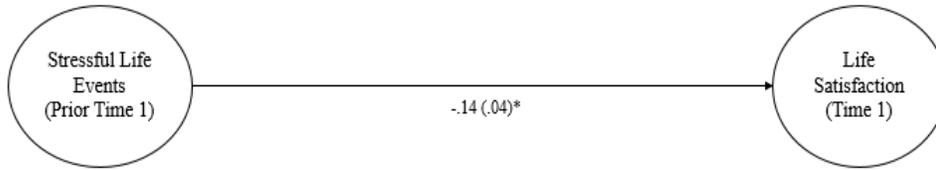


Figure 3.1a Full SEM Model at Time 1 (Direct effect)

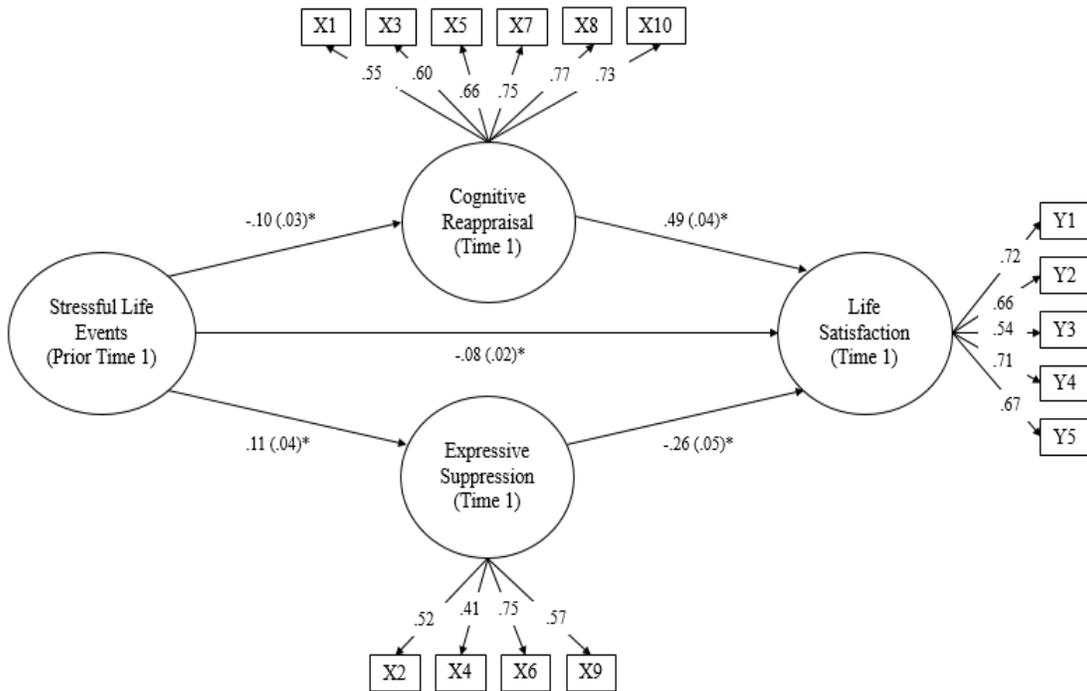


Figure 3.1b Full SEM Model at Time 1 (Indirect effect)

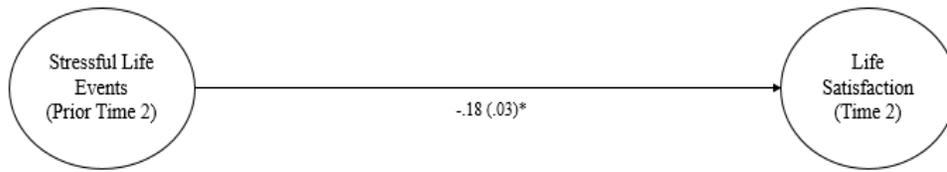


Figure 3.2a Full SEM Model at Time 2 (Direct effect)

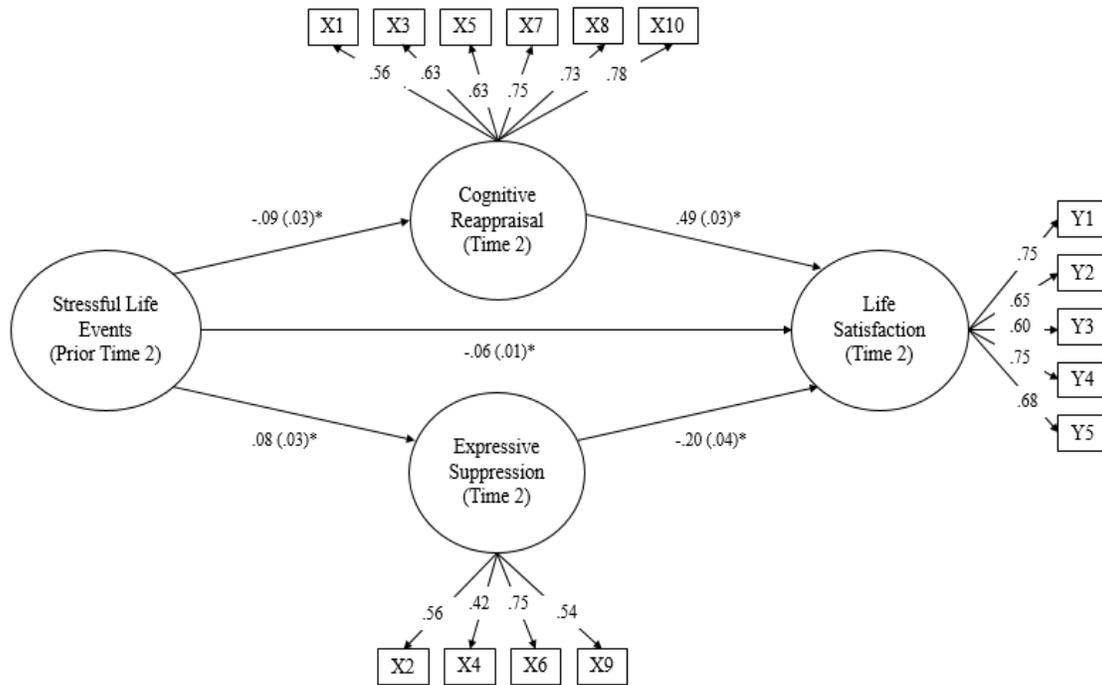


Figure 3.2b Full SEM Model at Time 2 (Indirect effect)

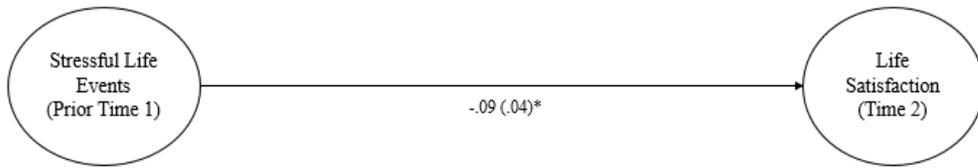


Figure 3.3a Full Longitudinal SEM Model (Direct effect)

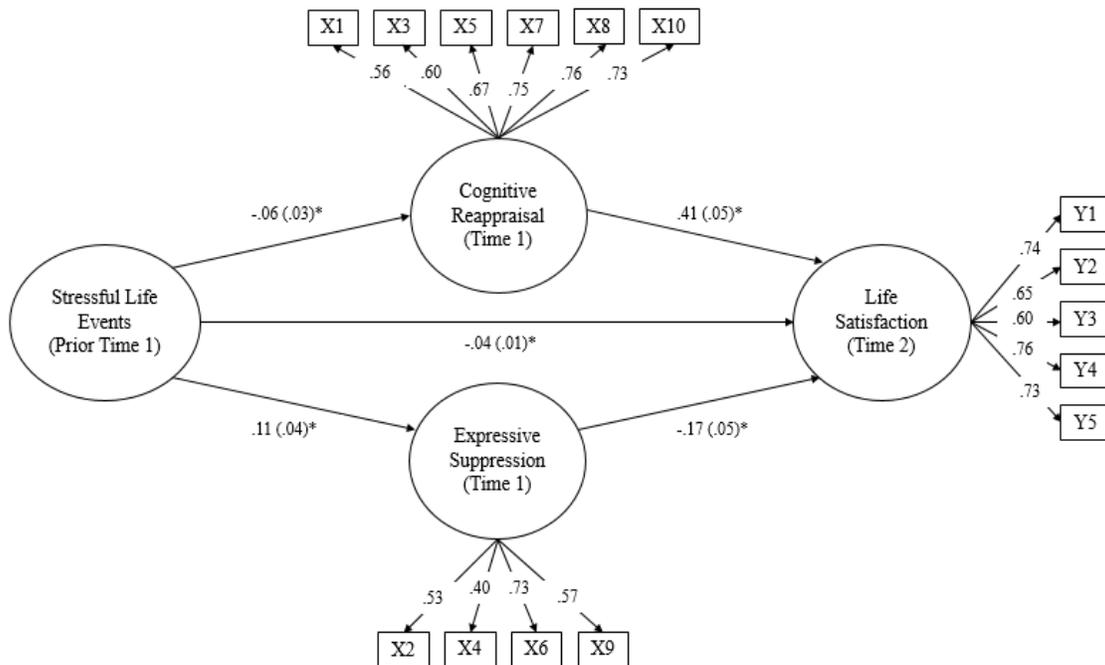


Figure 3.3b Full Longitudinal SEM Model (Indirect effect)

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APPENDIX A  
BRIEF MULTIDIMENSIONAL STUDENTS'  
LIFE SATISFACTION SCALE

Below are sentences that describe your satisfaction with different areas of your life.

Circle **1** if you feel **VERY DISSATISFIED**.

Circle **2** if you feel **DISSATISFIED**.

Circle **3** if you feel **SLIGHTLY DISSATISFIED**.

Circle **4** if you feel **SLIGHTLY SATISFIED**.

Circle **5** if you feel **SATISFIED**.

Circle **6** if you feel **VERY SATISFIED**.

Very Dissatisfied  
Dissatisfied  
Slightly Dissatisfied  
Slightly Satisfied  
Satisfied  
Very Satisfied

I would describe my satisfaction with family life as:	1	2	3	4	5	6
I would describe my satisfaction with friendships as:	1	2	3	4	5	6
I would describe my satisfaction with school as:	1	2	3	4	5	6
I would describe my satisfaction with myself as:	1	2	3	4	5	6
I would describe my satisfaction with where I live as:	1	2	3	4	5	6

APPENDIX B  
EMOTION REGULATION QUESTIONNAIRE FOR  
CHILDREN AND ADOLESCENTS

Below are sentences that describe how students cope with their feelings and emotions.

Circle **1** if you **STRONGLY DISAGREE** with the sentence.

Circle **2** if you **DISAGREE** with the sentence.

Circle **3** if you are **HALF AND HALF** on the sentence.

Circle **4** if you **AGREE** with the sentence.

Circle **5** if you **STRONGLY AGREE** with the sentence.

Strongly Disagree  
Disagree  
Half and Half  
Agree  
Strongly Agree

When I want to feel happier, I think about something different.	1	2	3	4	5
I keep my feelings to myself.	1	2	3	4	5
When I want to feel less bad (e.g., sad or angry), I think about something different.	1	2	3	4	5
When I am feeling happy, I am careful not to show it.	1	2	3	4	5
When I'm worried about something, I make myself think about it in a way that helps me feel better.	1	2	3	4	5
I control my feelings by not showing them.	1	2	3	4	5
When I want to feel happier about something, I change the way I'm thinking about it.	1	2	3	4	5
I control my feelings about things by changing the way I think about them.	1	2	3	4	5
When I'm feeling bad (e.g., sad, angry, or worried), I'm careful not to show it.	1	2	3	4	5
When I want to feel less bad (e.g., sad or angry) about something, I change the way I'm thinking about it.	1	2	3	4	5

## APPENDIX C

### LIFE EVENTS CHECKLIST

This is a list of things that sometimes happen to people.

If it **did not happen** to you in the past year (12 months), circle **No**.

If it **did happen** to you in the past year and was a **good** event, circle **Good**.

If it **did happen** to you in the past year and was a **bad** event, circle **Bad**.

	No, it did not happen	Yes, it was <b>good</b>	Yes, it was <b>bad</b>
Moved to a new home	1	2	3
New brother or sister	1	2	3
Changed to a new school	1	2	3
Family member seriously ill or injured	1	2	3
Parents divorced	1	2	3
Parents arguing more	1	2	3
Mother or father lost a job	1	2	3
Death of a family member	1	2	3
Parents separated	1	2	3
Death of a close friend	1	2	3
Mother or father away from home more	1	2	3
Brother or sister left home	1	2	3
Close friends seriously ill or injured	1	2	3
Mother or father got into trouble with law	1	2	3
Mother or father got a new job	1	2	3
New stepmother or stepfather	1	2	3
Mother or father went to jail	1	2	3
Change in how much money your parents have	1	2	3