

Developmental Changes in Emotion Regulation during Adolescence: Influences of  
Socioeconomic Status, Parent Stress, and Family Emotional Climate

Toria Herd,

Proposal submitted to the faculty of Virginia Polytechnic Institute and State University in partial  
fulfillment of the requirements for the degree of

Master of Science

in

Developmental Psychology

Jungmeen Kim-Spoon, Ph.D., Chair

Brooks King-Casas, Ph.D.

Martha Ann Bell, Ph.D.

October 8, 2018

Blacksburg, Virginia

Keywords: adolescence, emotion regulation, socioeconomic status, perceived stress, family  
emotional climate

Copyright, 2018, Toria Herd

# Developmental Changes in Emotion Regulation during Adolescence: Influences of Socioeconomic Status, Parent Stress, and Family Emotional Climate

Toria Herd

Although prior research suggests that ER development typically exhibits a positive growth trajectory across adolescence as prefrontal brain regions continue to mature, individual differences in the rate of development have yet to be fully elucidated. The present study illustrates developmental processes in which family context (i.e., socioeconomic status, parent perceived stress, and family emotional climate) influences developmental trajectories of emotion regulation using both growth curve and latent change score analyses. The sample included 167 adolescents (53% males) who were first recruited at age 13 or 14 years and assessed annually four times. Our results support the mediating role of family emotional climate in the association between socioeconomic status and changes in emotion regulation, but not parent perceived stress. Our findings emphasize the constraints placed on ER development as a result of low SES and highlight the need for intervention efforts at proximal levels, such as the family emotional climate, for adolescents who face such distal risk factors.

Developmental Changes in Emotion Regulation during Adolescence: Influences of  
Socioeconomic Status, Parent Stress, and Family Emotional Climate

Toria Herd

Given continued brain development across the period of adolescence and maturation in specific brain regions related to emotion regulation (the ability to change the experience or expression of an emotion), we expected that emotion regulation abilities would also continue to develop during this period. We were also interested in understanding what family contextual factors may be influencing how emotion regulation develops. For example, we expected that family economic and social position (including education level, income, aid, and satisfaction with finances), parent stress, and the family emotional climate (the degree of both positive and negative emotionality expressed within the family unit through parenting practices and the quality of the parent child relationship) would affect how emotion regulation unfolds in adolescents. That is, we predicted that families demonstrating a higher socioeconomic status, less parental stress, and better parenting practices would create safe and supportive contexts to learn and practice emotion regulation skills, resulting in adolescents with more adaptive emotion regulation abilities. We tested our hypotheses using longitudinal analyses from 167 adolescent participants and their parents. Our results demonstrate that parent stress is not directly related to emotion regulation development, but that socioeconomic status is related to emotion regulation development through family emotional climate. Such results suggest that for adolescents who may be at risk for developing poor emotion regulation abilities, their family can be taught skills related to improving parenting and the quality of the relationship between parent and adolescent in order to lessen the possibility of that outcome.

## Acknowledgements

This work was supported by a grant awarded to JK-S and BK-C from the National Institute on Drug Abuse (DA036017). We thank Alexis Briant, Jacob Elder, Katherine Faris, Julee Farley, Anna Hochgraf, Christopher Holmes, Kristin Peviani, and Jeanette Walters for their help with data collection. We are also grateful to the adolescents and parents who participated in our study.

# Contents

List of Figures	vi
List of Tables	vii
List of Abbreviations	viii
1. Introduction	1
2. Method	12
3. Data Analytic Plan	17
4. Result	19
5. Supplemental Analyses	24
6. Discussion	27
7. References	38
Appendices	58
Appendix A Demographic Interview	59
Appendix B Home Environment Scale	62
Appendix C Perceived Stress Scale	63
Appendix D Difficulties in Emotion Regulation Scale	64
Appendix E Parental Monitoring (Parent Report)	65
Appendix F Parental Monitoring (Adolescent Report)	70
Appendix G Parent-Child Relationship (Parent Report)	75
Appendix H Parent-Child Relationship (Adolescent Report)	76
Appendix I Inventory of Parent and Peer Attachment	78
Appendix J Emotion Regulation Checklist	81

## List of Figures

Figure 1. Proposed longitudinal mediation model examining the effects of SES on developmental trajectories of emotion regulation via parent stress and family emotional climate.

Figure 2. Standardized estimates of the cross-sectional mediation model examining the effects of SES on initial levels of emotion regulation via parent stress and family emotional climate.

Figure 3. Standardized estimates of the rescaled longitudinal mediation model examining the effects of SES on emotion regulation at T4 via parent stress and family emotional climate.

Figure 4. Full Latent Change Score Model of Socioeconomic Status Effects on Family Emotional Climate and Emotion Regulation.

Figure 5. Latent Change Score Model of Socioeconomic Status Effects on Family Emotional Climate and Emotion Regulation.

## List of Tables

Table 1. Descriptive Statistics and Correlations for Study Variables

Table 2. Fit Indices for Nested Sequence of Emotion Regulation Growth Curve Model

## List of Abbreviations

ER	Emotion Regulation
PSS	Perceived Stress Scale
DERS	Difficulties in Emotion Regulation Scale
PMS	Parental Monitoring Scale
PCR	Parent-Child Relationship Scale
IPPA	Inventory of Parent and Peer Attachment
CFA	Confirmatory Factor Analysis
SEM	Structural Equation Modeling
$\chi^2$	Chi Square
df	Degrees of Freedom
RMSEA	Root Mean Square Error of Approximation
CFI	Confirmatory Fit Index
FIML	Full Information Maximum Likelihood
<i>M</i>	Mean
<i>SE</i>	Standard Error



## 1. Introduction

The developmental period of adolescence has been characterized by increasing risks to both physical and emotional wellbeing (Dahl, 2004). Extant literature has identified emotion regulation (ER) as an important predictor of adjustment outcomes and a critical mechanism to explore for intervention work in adolescent maladjustment (Farley & Kim-Spoon, 2014; Gumora & Arsenio, 2002; Morris et al., 2010; Silk, Steinberg, & Morris, 2003). Given that emotion socialization and ER development often occur within social contexts, it is important to examine the social agents as well as relevant environmental mechanisms that may influence the acquisition of adaptive or maladaptive ER (Cole, Martin & Dennis, 2004). Although peer relations become more important in this developmental period, parents continue to be the primary attachment figures for many adolescents (Lieberman, Doyle, & Markiewicz, 1999; Nickerson & Nagle, 2005). Furthermore, the development of ER seems to be particularly malleable within the family context throughout development, relative to other social contexts (Morris, Silk, Steinberg, Myers, & Robinson., 2007). Therefore, elucidating how the family emotional climate, reflected by parents' ER, parenting practices, and the parent-adolescent attachment relationship, is related to ER development may be particularly relevant for preventive intervention efforts for negative outcomes of emotional dysregulation (e.g., psychopathology). However, from a multilevel systems perspective, additional environmental factors (i.e., SES and parent stress) are important to examine in this association given their influence on the family emotional climate. The examination of such contextual factors adds to our understanding of ER development and provides meaningful insight into distal constraints (i.e., SES, parent stress) that may interrupt intervention efforts in more proximal factors (i.e., family emotional climate). Finally, given the increased novel social and emotional contexts in adolescence (McRae et al.,

2012; Steinberg, 2005), understanding the process of ER development within this developmental period may be especially informative for such intervention work.

### **Emotion Regulation**

As a construct, ER has garnered significant attention in recent years as a crucial component of children and adolescents' successful development. That is, the literature suggests that it is an important process, central to understanding both typical and atypical development (Cole, et al., 2004). ER refers to internal and external processes used to modify the experience and expression of an emotion in order to pursue a goal (Thompson, 1994). It is a complex, dynamic process, involving cognition, behavior, and physiological processes, that develops from early life through adulthood (Gestsdottir & Lerner, 2008). Internal processes recruited for ER include cognitive control, attention shifting, and physiological responses. In contrast, external processes of ER include the socialization and coaching of ER via parents, teachers, peers and others (Gross & Thompson, 2007). The primary objective of the integration of these processes is the regulation of emotions in socially and contextually appropriate ways (Morris et al., 2007).

Developmental literature on ER acknowledges that from infancy through adolescence, the integration of temperamental, neurobiological, and social factors provides a foundation for the development of ER (Gross & Thompson, 2007). For example, in infancy, consistent and nurturing caregiving which provides opportunities for co-regulation lays the foundation for ER development. As a better understanding of emotions is acquired and increased cognitive development occurs across childhood and adolescence, strategies for ER become increasingly complex (Cole et al., 2004). In particular, the critical transition period into adolescence introduces novel social and emotional situations (i.e., introduction of romantic feelings, more frequent and intense conflict with parents, increases in sensation seeking and risk-taking) that

require advanced cognitive control abilities for more adaptive ER (McRae et al., 2012; Steinberg, 2005).

Although prior research suggests that ER development typically exhibits a positive growth trajectory (John & Gross, 2004; McRae et al., 2012), individual differences in the rate of development have yet to be fully explored. It may be that environmental factors, such as the family emotional climate, combined with within-person factors, influence variation across individuals in ER development. Given the active and formidable role of the social context in the socialization of emotion which is profoundly related to ER development (Cole et al., 2004), consideration of key emotion socialization agents in children and adolescents' lives are crucial to understanding individual differences in ER. The role ER plays in developmental outcomes provides strong rationale for elucidating the factors that may explain individual differences in ER abilities. The inability to appropriately regulate emotions in an adaptive way has been linked to an array of maladjustment outcomes, such as clinical diagnoses (Ehrenreich et al., 2009), internalizing and externalizing psychopathology (Morris et al., 2010; Silk et al., 2003), poor academic outcomes (Gumora & Arsenio, 2002), and poor relationship quality (Farley & Kim-Spoon, 2014).

Furthermore, the prevalence of many of the aforementioned maladjustment outcomes during adolescence (Dahl, 2004) warrants the examination of developmental trajectories in this period. Adolescence is often characterized by greater fluctuations in emotions relative to earlier developmental periods (Maciejewski, van Lier, Branje, Meeus, & Koot, 2015) and the introduction of new and increased intensity in emotions (i.e., romantic love, hopelessness; Morris et al., 2007). Further, the maturation of particular brain regions thought to be associated with ER (i.e. the prefrontal cortex) throughout adolescence enables adolescents to employ more refined

and adaptive regulatory strategies (McRae et al., 2012; Steinberg, 2005). Therefore, neurocognitive maturation, coupled with the unique, and often novel contexts associated with adolescence, highlight this period as especially relevant for disentangling developmental processes responsible for shaping individual differences in ER via dynamic interactions between individual and environment.

### **Environmental Factors Related to Emotion Regulation Development**

In the current literature, most theoretical models view ER as an individual trait that links the individual to his or her environment and is embedded in multiple contexts and relationships. Considering this multilevel system perspective that includes biological, psychological, social, and cultural levels (Bronfenbrenner, 2001), ER models emphasize the importance of exploring environmental factors that may impact trajectories of ER development (Morris et al., 2007). More specifically, extant research has identified the social context as an important contributing factor to the development of ER, suggesting that adaptive and effective ER depends greatly on positive social interactions (Fosco & Grych, 2012; Morris et al., 2007; Thompson, 1994; Thompson & Meyer, 2007). ER development is also meaningfully influenced by the family environment (Morris et al., 2007). Therefore, the present study focuses on familial environmental factors that are related to ER development, from the broadest level of family socioeconomic status through more proximal levels of parent stress and family emotional climate.

### **Socioeconomic Status**

Socioeconomic status (SES) has broad implications for family functioning. Low-SES families often lack resources and structures that aid in quality parenting, including social support networks, physical resources, and stimulating environments (Wadsworth, Evans, Grant, Carter, & Duffy, 2016). Indeed, research has found that lower SES increases one's exposure to negative

emotions via stressful life events, often resulting in the use of less adaptive ER strategies (i.e., rumination). Further, the lack of resources and support that often accompany lower SES presents a challenge in managing negative emotions, making these individuals even more vulnerable to emotion dysregulation (Gallo & Matthews, 2003; Morris et al., 2007). Moreover, current literature reports associations between low SES and structural and functional changes in the brain, particularly ER circuitry. Research by Evans and colleagues demonstrated that both explicit ER (i.e., reappraisal) and implicit ER (i.e., shifting attention) in adults were disrupted by childhood poverty (Kim et al., 2013; Liberzon et al., 2015). More specifically, childhood poverty was related to reduced activity in the dorsolateral and ventrolateral prefrontal cortices and increased activity in the amygdala while performing an ER task. Functional connectivity analyses further revealed difficulties in suppression of amygdala activity by the ventrolateral prefrontal cortex during ER, indicating neural deficits that make ER challenging (Kim et al., 2013). Taken together, these studies indicate that low SES is related to the development of ER and its underlying neural circuitry.

In addition to the direct association between SES and ER, evidence suggests that more proximal factors related to the family environment may mediate this association (i.e., parent behavior and family emotional climate; see Conger & Donnellan, 2007 and Grant et al., 2003 for reviews). Indeed, there is converging evidence suggesting that lower SES disrupts parenting via the stress and chaos often associated with it. For example, lower SES mothers tend to be more controlling, disapproving, punitive, and intrusive than higher SES mothers (Boe et al., 2014; Grant et al., 2003; Kotchick & Forehand, 2002; Mills-Koonce et al., 2016) and, often, exhibit less parental monitoring (Borstein & Bradley, 2003; Farley & Kim-Spoon, 2017; Veland, Bru, & Idsoe, 2015).

### **Parental Perceived Stress**

In contemplation of the mechanism whereby SES affects parenting behavior, there is evidence that financial strain impairs parents' psychological functioning, via stress which directly contributes to impaired parenting (Conger & Donnellan, 2007; Wadsworth et al., 2016). Several studies demonstrate a link from financial stress to parental depressive symptoms, and in turn, to disrupted parenting and parent-child relationship quality (Conger & Donnellan, 2007; Grant et al., 2003; Gutman, McLoyd, & Tokoyawa, 2005; Ponnet, Leeuwen, & Wouters, 2014). For example, the link between financial stress and adolescent behavior was mediated sequentially by parent stress and parenting (Ponnet et al., 2014). Similarly, low income-to-need ratio was related to a more negative parent-child relationship via financial strain and then parent psychological stress (Gutman et al., 2005).

In support of the family stress model of economic hardship (Conger & Donnellan, 2007), which suggests that financial stress increases parents' risk for experiencing emotional distress that impairs optimal parenting (e.g., decreased affection and monitoring, and increased conflict and harsh parenting), we expect that SES will have an indirect impact on adolescent ER development, via parental stress and then family emotional climate, which are more proximal factors related to adolescent development. Although prior research has demonstrated a path from financial strain to adolescent adjustment outcomes through parent stress and parenting variables, to our knowledge, this is the first study to examine the link between SES and adolescent ER development via the family emotional climate.

### **Family Emotional Climate**

Navigation of novel situations in adolescence related to puberty, increased autonomy, identity formation, and reorganization of relationships (including the introduction of sexuality

and intimacy) create the need for more complex strategies of ER (McRae et al., 2012; Morris et al., 2007; Steinberg, 2005). While adolescents may increasingly turn to peers for support during this period, for many adolescents, parents still serve as the primary attachment relationship (Nickerson & Nagle, 2005). Thus, it is just as imperative to examine the role of the family context (i.e. parenting practices and parent-child relationship) during adolescence as it is throughout childhood.

Morris and colleagues (2007) proposed the tripartite model of familial influences on ER that describes the bidirectional relationship between family context and children's ER development. First, children learn displays of emotion and strategies of ER through *observation and modeling*. Specifically, parents' own ER abilities serve as one of the first mechanisms by which children observe what emotional displays are considered acceptable and in what contexts certain emotions are considered appropriate (Morris et al., 2007). For parents to be adequate emotion socialization agents for their children, they must exhibit appropriate emotional displays and regulation strategies themselves. Parents who display a wide range of emotions implicitly teach their children that emotions are complex and several different emotions may be appropriate across many different situations (Bariola, Gullone & Hughes, 2011). Moreover, children often engage in social referencing behaviors (i.e., looking to others for how to feel and respond) during novel situations. If parents do not model appropriate, adaptive ER strategies, children are more likely to develop poor ER abilities. For example, children with depressed mothers exhibit a restricted set of ER strategies, which tend to be less successful than strategies used by children whose mothers are not depressed (Feng et al., 2007; Silk, Shaw, Skuban, Oland, & Kovacs, 2006;). Maternal depression may also predict stability in ER across time, contrary to increases in ER abilities across time for children whose mothers are not depressed (Blandon, Calkins, Keane,

& O'Brien, 2008). Such findings emphasize that mothers with depression may demonstrate more maladaptive strategies of ER, and as a result, their children do not learn adaptive strategies that are typically acquired given their increased cognitive abilities throughout development.

Studies examining a direct link between parent ER and adolescent ER are lacking. Yet, one available study suggests that parents' emotion dysregulation is related to more negative interactions with their adolescent during emotionally charged exchanges via parents' invalidation of adolescents' emotions. As such, parents constrain adolescents' opportunities to learn, acquire, and practice adaptive strategies (Buckholdt, Parra, & Jobe-Shields, 2014). Indeed, Buckholdt and colleagues (2014) found support for the intergenerational transmission of ER, whereby parent dysregulation of emotions was significantly associated with adolescent dysregulation of emotions. Specifically, parents who lack adaptive ER strategies may not know how to promote their adolescents' ER or may avoid conversations with their adolescents in which they can teach ER skills. In this way, their adolescents are deprived of opportunities and supportive contexts for learning these skills (Buckholdt et al., 2014).

Secondly, Morris and colleagues (2007) proposed that specific *parenting practices* also affect ER development, including emotion-coaching, teaching, and acceptance and encouragement of emotions. In adolescence, additional parenting practices such as acceptance, warmth, control, and monitoring also facilitate emotion socialization (Morris et al., 2007). An environment characterized by clear limits and supportive parenting provides a safe context for emotional expression and regulation. For example, Finkenauer et al. (2005) examined the association between parenting and adolescent psychosocial problems via self-control (conceptualized as the ability to regulate behavior, thoughts, and emotions). In this study, parental acceptance was related to better self-control, whereas parental psychological control was



related to worse self-control. Similarly, Moilanen and Manuel (2017) reported that greater parental acceptance predicted better self-regulation, whereas greater parental psychological control predicted worse self-regulation. Finally, Farley and Kim-Spoon (2017) reported a longitudinal mediation model between family SES and adolescent self-regulation suggesting that higher SES was related to better parental monitoring (measured by parental knowledge) at Time 1, which in turn predicted adolescent behavioral self-control at Time 2 (one year later). Though these studies examine broader measures of self-regulation, the literature depicts a close link between ER and self-regulation (i.e., self-control; Nigg, 2017). Thus, current literature demonstrates that parenting practices may predict children and adolescents' self-regulation behaviors and provides support for a similar relationship with ER.

Indeed, studies that examine ER per se suggest that negative parenting is associated with emotion dysregulation. For example, parents' invalidation of emotions was related to their adolescents' ER difficulties (Buckholdt et al., 2014). Further, high levels of maternal psychological control significantly predicted emotional dysregulation among adolescents which in turn was related to increased anxiety (Luebbe, Bump, Fussner & Rulon, 2014). Similarly, greater parent psychological control was predictive of difficulties with ER among adolescents (Walton & Flouri, 2010). Taken together, these studies suggest that positive parenting, characterized by high parental warmth, acceptance, and monitoring, may provide a context in which parents' teaching and adolescents' learning of ER strategies is encouraged and effective. In contrast, negative parenting practices, characterized by high levels of psychological control, negative emotionality, and invalidation of emotions, may lead to emotional dysregulation.

Finally, Morris and colleagues (2007) posited that one's *emotional climate* during childhood has significant implications for ER development. More specifically, emotional climate

is derived from the emotional stability and the degree of emotionality (positive and negative) communicated in the family unit. Morris et al. (2007) identifies parent-child attachment, parenting styles, family expressivity, emotional expression, and marital relations as components of the family emotional climate; extant literature often operationalizes emotional climate in this way. Considering that the degree and valence of emotionality in adolescence often stems from the parent-child relationship (Finkenauer, 2005; Moilanen & Manuel, 2017), in the current study, we will focus on parent-child attachment as a reflection of overall family emotional climate. Early in development, parents promote the development of foundational ER abilities by serving as attachment figures, important sources of co-regulation, and role models for appropriate regulation (Cole et al., 2004). Indeed, research has demonstrated an association between secure attachment in infancy and self-regulation in childhood (Bernier, Carlson, Deshenes, and Matte-Gagne, 2012; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Thorell, Rydell, and Bohlin, 2012). However, research examining this association in adolescence is relatively limited. One available study demonstrated that insecure attachment is related to decreased effortful control, a temperament construct closely tied to ER (Heylen et al., 2017). In another study, adolescents who rated their parental attachment relationship as more secure and indicated low hostility in the parent child relationship exhibited better ER, as evidenced by their ego resiliency (Kobak & Sceery, 1988). Taken together, these studies suggest that responsive emotional caregiving, as indicated by the attachment relationship, is associated with better ER abilities across development.

### **Present Study**

The purpose of the proposed study is to delineate the underlying mechanisms in the pathway between SES and trajectories of ER development. We will examine whether parent

perceived stress and family emotional climate (as reflected by parent ER, parenting practices, and attachment) may explain the link between family SES and individual differences in ER development in adolescence. The proposed study extends the current literature in several noteworthy ways. First, it will add to the limited research examining individual differences in developmental trajectories of ER in adolescence using growth curve modeling. Second, while theoretical work and empirical studies have identified independent effects of distinct aspects of family emotional climate (i.e., attachment, parenting practices, parent modeling of emotion-regulation) to be influential in the development of ER (Morris et al., 2007; Moilanen & Manual, 2017), to our knowledge, no study has empirically tested the joint influence of these family emotional climate factors on ER. Finally, consistent with the call by Moilanen and Rambo-Hernandez (2017), it will examine associations among family environmental factors (including SES, parent stress, parenting, and family emotional climate) and adolescent ER using longitudinal data from four time points across adolescence (ages 13 through 17 years).

The specific aims of this study are to:

1. Examine the effects of family SES on developmental trajectories of ER from Time 1 through Time 4.
2. Examine parent perceived stress at Time 1 as a mediator in the relationship between SES at Time 1 and family emotional climate (e.g., parent ER, parent-child relationship, parental monitoring, and attachment) at Time 1.
3. Examine family emotional climate (e.g., parent ER, parent-child relationship, parental monitoring, and attachment) at Time 1 as a mediator in the relationship between parent stress at Time 1 and developmental trajectories of ER from Time 1 through Time 4.

## Hypotheses

Consistent with the study aims, we propose the following hypotheses:

1. Higher levels of SES at Time 1 will predict higher intercept and increasing slope in ER from Time 1 to Time 4.
2. The relationship between SES at Time 1 and ER will be mediated via parent stress at Time 1 and family emotional climate (e.g., parent ER, parent-child relationship, parental monitoring, and attachment) at Time 1 consecutively, such that, higher SES will predict lower parent stress which will predict a more positive family emotional climate which in turn will predict higher intercept and increasing slope in ER from Time 1 to Time 4.

## 2. Method

### Participants

The community sample includes 167 adolescents (53% males, 47% females) and their primary caregivers (82% biological mothers, 13% biological fathers, 2% grandmothers, 1% foster, 2% other) from southwestern Virginia. Adolescents were 13 or 14 years of age at Time 1 ( $M = 14.13$ ,  $SD = 0.54$ ), 14 or 15 years of age at Time 2 ( $M = 15.05$ ,  $SD = 0.54$ ), 15 or 16 years of age at Time 3, ( $M = 16.07$ ,  $SD = 0.56$ ) and 16 or 17 at Time 4 ( $M = 17.66$ ,  $SD = 7.76$ ). Eighty percent of adolescents identified as Caucasian, 13% African-American, and 7% other. Eighty-eight percent of caregivers identified as Caucasian, 10% African American, and 2% other. Caregivers were between 31 and 61 years of age ( $M = 41.98$ ,  $SD = 6.58$ ) at Time 1. Mean family income was \$25,000 - \$34,999 per year at Time 1 and Time 2, and \$35,000 - \$49,999 per year at Time 3 and Time 4. At Time 1, 157 families participated. At Time 2, 10 families were added for a final sample of 167 parent-adolescent dyads. However, 24 families did not participate at all possible time points for reasons including: ineligibility for tasks ( $n = 2$ ), declined participation

( $n = 17$ ), and lost contact ( $n = 5$ ) during the follow-up assessments. We performed attrition analyses using general linear model (GLM) univariate procedure to determine whether there were systematic predictors of missing data. Results indicated that rate of participation (indexed by proportion of years participated to years invited to participate) was not significantly predicted by age, income, parent education, sex, or race ( $p = .14 - .86$ ) or study variables at Time 1 ( $p = .09 - .66$ ).

### **Procedures**

The current longitudinal study used four time points of data (approximately one year apart). Adolescent participants and their primary caregivers were recruited via email and internet announcements, flyers, or snowball sampling (word-of-mouth). Data collection was administered at university offices where participants were interviewed by trained research assistants and compensated monetarily for their time. All procedures were approved by the institutional review board of the university and written informed consent or assent was received from all participants.

### **Measures**

**Demographic interview.** In a verbal interview, participants reported sex, age, and race, as well as a variety of questions related to SES at time 1 (see Appendix A).

**Socioeconomic Status.** The SES composite score was calculated by averaging primary caregiver's and spouses' number of years of education, income to need ratio, receipt of public aid, household chaos, and a subjective SES composite. Subjective SES was calculated by averaging three questions asking about financial satisfaction, how well off the family is, and worry about finances.

*Parental Education.* Primary caregivers reported the highest number of years of education they completed as well as the highest number of years of education completed by their

spouse (with a capped score of 17) at Time 1. A composite parental education score was calculated using an average of the primary caregiver's and spouses' highest number of years of education completed. In families where only one caregiver is present, the primary caregiver's number of years of education alone was used. Higher scores were indicative of higher SES (see Appendix A).

*Income to Need Ratio.* Income to need ratio was calculated by dividing total household income by the poverty threshold for a family of that size (Ursache & Noble, 2016). We used the poverty threshold via the U.S. census bureau information from 2013.

*Aid.* Parent participants reported whether or not they received any financial assistance from the government at Time 1 (Yes/No; see Appendix A).

*Financial satisfaction.* Parent participants reported on how satisfied they were with their overall finances, current income, and material possessions at Time 1 using a response range from "1 – very satisfied" to "4 – very unsatisfied". Responses were reverse scored such that higher scores were indicative of higher SES (see Appendix A).

*How Well off the Family is.* Parent participants reported on how well off their family is at Time 1 using a response range from "1 – very poor" to "5 – upper middle class". Higher scores were indicative of higher SES (see Appendix A).

*Worry.* Parent participants reported on how often they worry about their family's financial situation at Time 1 using a response range from "1 – very often" to "4 – never". Higher scores were indicative of higher SES (see Appendix A).

*Household Chaos.* Household chaos was measured via self-report at Time 1 using the Home Environment Scale (CHAOS; Coldwell, Pike, & Dunn, 2006). Parents responded to six items about their home environment at Time 1 on a 5-point-Likert scale from "1 = Definitely

Untrue” to “5 = Definitely True”. Sample items include, “We are usually able to stay on top of things” and “You can’t hear yourself think in our home.” Mean scores were calculated such that higher scores were indicative of higher household chaos (see Appendix B).

**Perceived Stress.** Perceived stress was measured via self-report at Time 1 on the 10-item Perceived Stress Scale (PSS; Cohen & Williamson, 1988). Parents were asked to respond on a 5-point Likert scale from “0 = Never” to “4 = Very Often” about thoughts and feelings they have experienced within the past month. Sample items include, “In the last month, how often have you felt nervous and ‘stressed’?” and “In the last month, how often have you felt that you were on top of things?” (reverse scored). Mean scores were calculated such that higher scores were indicative of higher perceived stress ( $\alpha = .89 - .90$ ; see Appendix C).

**Family Emotional Climate.** A family emotional climate factor score was created based on four measures that capture this construct according to the tripartite model proposed by Morris et al. (2007): observation/modeling, parenting, and climate.

*2.3.4.1 Observation/modeling: Parent Emotion Regulation.* Parents’ Emotion Regulation was examined by self-report at Time 1 on the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). Parent participants were asked to respond on a 5-point Likert scale from “1 = Almost Never” to “5 = Almost Always” about the regulation of emotions in times of distress. Mean scores were calculated across 6 items from the Difficulties Controlling Impulsive Behaviors when Distressed subscale, such that higher scores were indicative of more difficulties in emotion regulation. The scale demonstrates good reliability within the current sample ( $\alpha = .82 - .85$ ; see Appendix D).

*Parenting: Parental Monitoring.* The Parental Monitoring Scale (PMS; Stattin & Kerr, 2000) was used at Time 1 to measure different aspects of parental monitoring such as parental

knowledge (9 items), child disclosure (5 items), parent solicitation (5 items), and parental control (6 items). Both adolescents and their parents answered a total of 25 items along a 5-point scale that varies from question to question. Sample questions include, “Do your parents normally know where you go and what you do after school?”, “How often do your parents talk with your friends when they come over to your house?”, and “Does your child keep a lot of secrets from you about what he/she does during his/her free time?”. Mean scores were calculated across the 25 items from participants at each time point, such that higher scores were indicative of higher parental monitoring. A composite score was calculated by averaging the two reporters. The scale demonstrates good reliability within the current sample (parent report:  $\alpha = .84 - .88$ ; adolescent report:  $\alpha = .90 - .91$ ; see Appendices E and F).

*Parenting: Parent-Child Relationship.* The Parent-Child Relationship Scale (PCR; Hetherington & Clingempeel, 1992) was used at Time 1 to assess the degree of negativity in the parent-adolescent relationship. Both adolescents and their parents responded to the 9 items on a 5-point Likert scale, from 1 (extremely) to 5(not at all). Adolescent participants answered each item separately for their mother and father. Sample items included “How much do you yell at this child after you’ve had a bad day?” and “How much does your mother/father criticize you?”. Mean scores were calculated, such that higher scores indicate high parent-adolescent negativity. A composite score was calculated by averaging the two reporters. The scale demonstrates good reliability within the current sample (parent report:  $\alpha = .83 - .69 - .73$ ; adolescent report:  $\alpha = .72 - .80$ ; see Appendices G and H).

*Emotional Climate: Attachment.* The short version of the Inventory of Parent and Peer Attachment was utilized at Time 1 to determine the degree of adolescents’ perceived relationship quality with their parents (IPPA; Raja, McGee, & Stanton, 1992). Adolescents responded



separately for their mother and father, using a five-point Likert scale from “1 = Almost Never or Never True” to “5 = Almost Always or Always True.” Mean scores were calculated for each relationship to create an overall attachment score, such that higher scores were indicative of better relationship quality. Sample items include “I tell my mother/father about my problems and troubles” ( $\alpha = .82 - .88$ ; see Appendix I).

**Emotion Regulation.** The Emotion Regulation Checklist was measured at Times 1, 2, 3, and 4, to capture adaptive ER abilities, including socially appropriate emotional displays, empathy, and emotional self-awareness (Shields & Cicchetti, 1997). Adolescents self-reported and parents reported on their adolescent on a four-point Likert scale from “1 = Rarely/Never” to “4 = Almost Always” on how they respond to different situations. Sample items include “I can say when I am feeling sad, angry or mad, fearful or afraid” and “I show concern and understanding when others are upset or distressed”. Mean scores were calculated across 8 items that reflected the emotion regulation subscale, such that higher mean scores indicated better emotion regulation.  $\alpha = .49 - .63$ ; see Appendix J).

### 3. Data Analytic Plan

For all variables, descriptive statistics were used to assess for normal distributions and outliers. Skewness and kurtosis were also examined, and levels less than 3 and 10, respectively, were considered acceptable (Kline, 2011). Outliers ( $N = 20$ ) were identified as values deviating more than 3.29 *SD* (Tabachnick & Fidell, 2001) from the mean and were winsorized to retain statistical power and attenuate bias resulting from elimination (Ghosh & Vogt, 2012).

Multivariate general linear modeling analyses indicated that demographic covariates, including age, sex, and race, at Time 1 were not significant predictors of ER at Time 4 ( $ps > .70$ ) and were therefore not included as covariates in our analyses.

Confirmatory factor analysis (CFA) was used to validate family emotional climate as a construct in this sample. The CFA model was fully saturated with three indicators of family emotional climate: parent emotion regulation (DERS), parenting (composite of PMS and PCR), and attachment (IPPA). First, all scales were recoded such that higher scores were indicative of a more positive family emotional climate. Next, the variables that were measured by both parent and adolescent report were averaged across parent and adolescent report: PMS and PCR. Finally, a parenting composite was created by averaging the combined parent and adolescent report composites of PMS and PCR. Following construct validation through CFA, a grand composite of family emotional climate was calculated by averaging across parent emotion regulation (DERS), parenting (composite of PMS and PCR), and attachment (IPPA) scores and used in the analyses.

Models were tested using Structural Equation Modeling (SEM) in *Mplus* statistical software version 8 (Muthén & Muthén, 1998-2018). Model fit was assessed by  $\chi^2$  value, degrees of freedom, corresponding *p*-value, Root Mean Square Error of Approximation (RMSEA), and Confirmatory Fit Index (CFI). RMSEA values less than .08 and CFI values greater than .90 were considered an acceptable fit (Browne & Cudeck, 1993; Bentler, 1990). Full information maximum likelihood (FIML) estimation procedure (Arbuckle, 1996) was used to address missing data given its superiority to those obtained with listwise deletion or other ad hoc methods (Schafer & Graham, 2002).

For the outcome variable (ER), a univariate unconditional growth curve model was specified to assess change over time. Linear and nonlinear models were tested to fit the baseline model for the observed data patterns across the four time points. Modification indices were also examined to improve model fit. The first latent factor was the intercept, with all factor loadings

fixed to one. The second latent factor was the slope, indicating growth of the function and change over time. The latent growth curve factors were allowed to covary. Nested model comparisons were used to determine the shape of the trajectories. In the no growth model, non-significant change in the slope was assumed. In the linear growth model, a linear pattern of change was assumed and factor loadings for the latent slope factor were fixed to 0, 1, and 2. Finally, the latent growth model allowed the data to estimate the shape of growth by fixing the first and last time points (to 0 and 1, respectively) and freely estimating the second and third. The  $\chi^2$  difference test was used to compare these nested models and the most parsimonious model with acceptable fits was chosen as the best-fitting model.

Next, as can be seen in Figure 1, the mediation model included paths from (a) SES at Time 1 to parent stress at Time 1, (b) SES at Time 1 to the growth curve intercept and slope of ER, (c) parent stress at Time 1 to family emotional climate at Time 1, (d) parent stress at Time 1 to the growth curve intercept and slope of ER, (e) family emotional climate at Time 1 to the growth curve intercept and slope of ER. The current model included SES, parent stress, and family emotional climate at Time 1 given (1) the hypothesized stability of these constructs across time, (2) the statistical necessity in order to predict the growth trajectory of the outcome from Time 1 to Time 4, and (3) our research question regarding how these constructs at baseline influence the trajectory of ER across the developmental period of adolescence.

#### **4. Results**

Correlations and descriptive statistics for all study variables are presented in Table 1. We explored the correlations between adolescent and parent report of ER. The correlations between adolescents' report and parents' reports were small to moderate ( $r = 0.16 - 0.34$ ) and the size of the correlation decreased across the four time points. Thus, we used adolescents' report, given

that they may be more accurate reporters of their own behavior at this age across different contexts than their parents are (Ladd, 2005), rather than combined parent-child report for ER.

### **Family Emotional Climate Construct Validation**

The measurement model for the family emotional climate construct (represented by parent emotion regulation, parenting, and attachment) at Time 1 indicated excellent fits ( $\chi^2 = 1.39$ ,  $df = 1$ ,  $p = 0.24$ , RMSEA = 0.05, CFI = 1.00). In this model, the parenting indicator had a negative residual variance (-.61) that was fixed to 0. All freely estimated standardized parameter estimates were statistically significant (ranging from .30 to 1.00, all  $p < .001$ ). Additionally, the factor determinacy scores indicated high correlations (= 1.00).

The measurement model for the family emotional climate construct at Time 2 was a fully saturated model ( $\chi^2 = 0.00$ ,  $df = 0$ ,  $p = 0.00$ , RMSEA = 0.00, CFI = 1.00). All freely estimated standardized parameter estimates were statistically significant (ranging from .20 to .94, all  $p < .03$ ). Additionally, the factor determinacy scores indicated high correlations (= 1.00).

The measurement model for the family emotional climate construct at Time 3 indicated reasonable fits ( $\chi^2 = 2.12$ ,  $df = 1$ ,  $p = 0.15$ , RMSEA = 0.09, CFI = .98). In this model, the parenting indicator had a negative residual variance (-2.14) that was fixed to 0. All freely estimated standardized parameter estimates were statistically significant (ranging from .24 to 1.00, all  $p < .003$ ). Additionally, the factor determinacy scores indicated high correlations (= 1.00).

### **Baseline Emotion Regulation Growth Curve Models**

Three separate models were fit in order to determine the shape of the trajectories of ER (see Table 2). The no growth model provided the best fit to the data ( $\chi^2 = 14.26$ ,  $df = 11$ ,  $p = 0.23$ , RMSEA = 0.04, CFI = .98) compared to the linear and latent growth models, indicating

that both the mean and the variance of the slope factor were not significantly different from zero. Significant variance of the intercept ( $\sigma^2 = 0.08$ ,  $SE = 0.01$ ,  $p < .001$ ) indicated that there were significant individual differences in initial levels of ER and the mean of the intercept was significantly different from zero ( $M = 0.08$ ,  $SE = 0.01$ ,  $p < .001$ ).

### **Mediation Growth Curve Model**

The mediation growth curve model tested the effect of SES at Time 1 on the no growth model of ER (the intercept) via parent perceived stress at Time 1 and then family emotional climate at Time 1. Model fits were excellent ( $\chi^2 = 22.92$ ,  $df = 21$ ,  $p = 0.34$ , RMSEA = 0.02, CFI = .99; see Figure 2 for standardized coefficients). Higher levels of SES at Time 1 were associated with lower levels of parent perceived stress at Time 1 ( $b = -0.34$ ,  $SE = 0.07$ ,  $p < .001$ ). In turn, lower levels of parent perceived stress at Time 1 were related to a more positive family emotional climate at Time 1 ( $b = -0.35$ ,  $SE = 0.07$ ,  $p < .001$ ) which then predicted higher initial levels of ER ( $b = 0.16$ ,  $SE = 0.04$ ,  $p < .001$ ). The indirect effect of SES on ER through parent perceived stress and then family emotional climate was also significant ( $b = 0.05$ ,  $SE = 0.02$ , 95% CI [.006, .043],  $b^* = .07$ ).

Since the no growth model of ER fit best, we were only able to predict the intercept and not the slope; thus, the model became cross-sectional. To test a longitudinal model, we then centered the growth curve model around the last time point of ER rather than the initial time point (intercept was scaled as -3, -2, -1, 0). Model fits were excellent ( $\chi^2 = 20.96$ ,  $df = 18$ ,  $p = 0.28$ , RMSEA = 0.03, CFI = 0.99; see Figure 3 for standardized coefficients). Higher levels of SES at Time 1 were associated with lower levels of parent perceived stress at Time 1 ( $b = -0.34$ ,  $SE = 0.06$ ,  $p < .001$ ). In turn, lower levels of parent perceived stress at Time 1 were related to a more positive family emotional climate at Time 1 ( $b = -0.35$ ,  $SE = 0.07$ ,  $p < .001$ ) which then

predicted higher initial levels of ER at Time 4 ( $b = 0.17$ ,  $SE = 0.04$ ,  $p < .001$ ). The indirect effect of SES on ER through parent perceived stress and then family emotional climate was also significant ( $b = 0.02$ ,  $SE = 0.009$ , 95% CI [.007, .044],  $b^* = .04$ ).

### **Consecutive Mediators Latent Change Score Model**

Given our initial interest in changes in ER across time, we then proceeded to model latent change scores (McArdle, 2009) in which the change in ER was estimated and predicted by baseline SES and repeated measures of parent perceived stress and family emotional climate. A significant benefit of latent change score modeling is the ability to evaluate dynamic longitudinal changes within repeated measures (McArdle, 2009). In such models, latent changes are modeled in two ways: a linear slope which assumes constant or natural change, and the change scores themselves which take into account change on the same variable from the previous time point, denoted as proportional change.

As shown in Figure 4, we examined time-lagged mediation effects. Initially, model fits were poor ( $\chi^2 = 118.92$ ,  $df = 34$ ,  $p = 0.00$ , RMSEA = 0.12, CFI = 0.87). The modification indices suggested adding correlations between family emotional climate at Time 1 and family emotional climate at Time 3, between perceived stress at Time 1 and perceived stress at Time 3, as well as between family emotional climate and ER at each time point. Estimating additional parameters according to these modification indices resulted in a model with excellent fits ( $\chi^2 = 47.71$ ,  $df = 29$ ,  $p = 0.02$ , RMSEA = 0.06, CFI = 0.97; see Figure 4 for unstandardized estimates, standard errors, and p-values). The mean ( $b = 3.13$ ,  $SE = 0.03$ ,  $p < .001$ ) and variance ( $b = 0.05$ ,  $SE = 0.02$ ,  $p = .01$ ) of the intercept were significant. The mean ( $b = 3.05$ ,  $SE = 1.14$ ,  $p = .01$ ) of the slope was significant but the variance ( $b = 0.07$ ,  $SE = 0.05$ ,  $p = .16$ ) was not. Results suggested that higher levels of SES at Time 1 were associated with lower levels of perceived stress at Time

1 and Time 3. However, the effect from SES at Time 1 to perceived stress at Time 2 was not significant. The paths from perceived stress at Time 1 to family emotional climate at Time 2 and perceived stress at Time 2 to family emotional climate at Time 3 were also not significant. Additionally, the relative contributions of perceived stress and SES, while accounting for autoregressive effects of family emotional climate, were not significant. The direct effects from family emotional climate at Time 1 to the change in ER from Time 1 to Time 2, family emotional climate at Time 2 to the change in ER from Time 2 to Time 3, and family emotional climate at Time 3 to the change in ER from Time 3 to Time 4 were significant, such that a more positive family emotional climate was associated with annual increases in ER across time. Direct effects from SES at Time 1 to changes in ER across time were not significant, except for the cross-sectional association indicating that higher levels of SES at Time 1 were related to better ER at Time 1.

The indirect effects from SES at Time 1 to the change in ER from Time 2 to Time 3 through perceived stress at Time 1 and family emotional climate at Time 2 ( $b = -0.002$ ,  $SE = 0.005$ , 95% CI [-.012, .006],  $b^* = -.01$ ), and from SES at Time 1 to the change in ER from Time 3 to Time 4 through perceived stress at Time 2 and family emotional climate at Time 3 ( $b = -0.001$ ,  $SE = 0.001$ , 95% CI [-.005, .001],  $b^* = -.004$ ) were not significant.

### **Single Mediator Latent Change Score Model**

Although statistically significant correlations were observed between SES, parent perceived stress, family emotional climate, and ER, parent perceived stress was not a significant mediator within the Consecutive Mediators Latent Change Score Model presented in Figure 4. Therefore, parent perceived stress was removed for model parsimony. The resulting model fits were excellent ( $\chi^2 = 12.56$ ,  $df = 13$ ,  $p = 0.48$ , RMSEA = 0.00, CFI = 1.00; see Figure 5 for

unstandardized estimates, standard errors, and p-values). The mean ( $b = 3.13$ ,  $SE = 0.03$ ,  $p < .001$ ) and variance ( $b = 0.05$ ,  $SE = 0.02$ ,  $p < .01$ ) of the intercept were significant. The mean ( $b = 2.43$ ,  $SE = 0.96$ ,  $p = .01$ ) of the slope was significant but the variance ( $b = 0.04$ ,  $SE = 0.03$ ,  $p = .16$ ) was not. Direct effects again demonstrated no significant paths between SES at Time 1 and changes in ER, excluding the cross-sectional association. The association between SES at Time 1 and family emotional climate at Time 2 was also not significant. However higher SES at Time 1 predicted a more positive family emotional climate at Time 1 and Time 3. Family emotional climate at Time 1, 2, and 3 predicted changes in ER, indicating that a more positive family emotional climate is related to increases in ER across time.

We then tested the significance of indirect effects. The indirect effect of SES at Time 1 on the change in ER from Time 1 to Time 2 through family emotional climate at Time 1 was significant ( $b = 0.05$ ,  $SE = 0.02$ , 95% CI [.007, .097],  $b^* = .22$ ). The indirect effect of SES at Time 1 on the change in ER from Time 2 to Time 3 through family emotional climate at Time 2 (after controlling for family emotional climate at Time 1) was not significant ( $b = 0.004$ ,  $SE = 0.01$ , 95% CI [-.013, .030],  $b^* = .04$ ). The indirect effect of SES at Time 1 on the change in ER from Time 3 to Time 4 through family emotional climate at Time 3 (after controlling for family emotional climate at Time 2) was significant ( $b = 0.02$ ,  $SE = 0.01$ , 95% CI [.003, .058],  $b^* = .22$ ).

## **5. Supplemental Analyses**

### **Single Mediator Latent Change Score Model using Distinct Factors of Family**

#### **Emotional Climate**

To better understand the effect of individual factors of the family emotional climate on ER (parenting practices, difficulties in parent ER, and attachment), we then tested the Single



Mediator Latent Change Score Model using each indicator of the family emotional climate separately rather than the composite score.

### Parenting Practices

The model fits were excellent ( $\chi^2 = 21.61$ ,  $df = 14$ ,  $p = 0.08$ , RMSEA = 0.06, CFI = 0.98). The mean ( $b = 3.14$ ,  $SE = 0.03$ ,  $p < .01$ ) and variance ( $b = 0.05$ ,  $SE = 0.01$ ,  $p < .01$ ) of the intercept were significant as well as the mean ( $b = 4.34$ ,  $SE = 0.81$ ,  $p < .01$ ) and variance ( $b = 0.13$ ,  $SE = 0.05$ ,  $p = .01$ ) of the slope. The proportional effects were constrained to be equal and were also significant ( $b = -1.39$ ,  $SE = 0.26$ ,  $p < .01$ ). Results suggested that the direct effects from SES at Time 1 to changes in ER from Time 1 to Time 2 ( $b = 0.09$ ,  $SE = 0.06$ ,  $p = .12$ ,  $b^* = 0.53$ ) and changes in ER from Time 3 to Time 4 ( $b = 0.12$ ,  $SE = 0.06$ ,  $p = .07$ ,  $b^* = 0.75$ ) were not significant. However, higher SES at Time 1 was associated with increases in ER from Time 3 to Time 4 ( $b = 0.13$ ,  $SE = 0.06$ ,  $p = .03$ ,  $b^* = 0.89$ ). Further, the effects from SES at Time 1 to parenting practices at Time 2 ( $b = 0.07$ ,  $SE = 0.07$ ,  $p = .30$ ,  $b^* = 0.06$ ) and Time 3 ( $b = -0.00$ ,  $SE = 0.06$ ,  $p = .98$ ,  $b^* = -0.00$ ) were not significant, though the cross-sectional path from SES at Time 1 to parenting practices at Time 1 ( $b = 0.24$ ,  $SE = 0.08$ ,  $p < .01$ ,  $b^* = 0.23$ ) was significant. However, better parenting practices at Times 1, 2, and 3 (i.e., better parental monitoring and lower levels of negativity) predicted increases in ER between each time point ( $b = 0.09$ ,  $SE = 0.04$ ,  $p = .02$ ,  $b^* = 0.56$  for Time 1;  $b = 0.16$ ,  $SE = 0.04$ ,  $p < .01$ ,  $b^* = 1.30$  for Time 2;  $b = 0.15$ ,  $SE = 0.04$ ,  $p < .01$ ,  $b^* = 1.08$  for Time 3) respectively. Yet, of the three tested indirect effects, only the effect of SES at Time 1 on the change in ER from Time 1 to Time 2 through parenting practices at Time 1 was significant ( $b = 0.02$ ,  $SE = 0.01$ , 95% CI [.001, .057],  $b^* = .13$ ). The indirect effect of SES at Time 1 on the change in ER from Time 2 to Time 3 through parenting practices at Time 2 was not significant ( $b = 0.01$ ,  $SE = 0.01$ , 95% CI [-.005, .043],  $b^* = .08$ ), nor

was the indirect effect of SES at Time 1 on the change in ER from Time 3 to Time 4 through parenting practices at Time 4 ( $b = 0.00$ ,  $SE = 0.01$ , 95% CI [-.027, .017],  $b^* = -.00$ ).

### **Difficulties in Parent ER**

Although the model fits were excellent, ( $\chi^2 = 13.90$ ,  $df = 16$ ,  $p = 0.61$ , RMSEA = 0.00, CFI = 1.00), the proportional effects were constrained to be equal but were not significant ( $b = 0.09$ ,  $SE = 0.71$ ,  $p = .90$ ), indicating that previous levels of difficulties in ER were not predictive of levels at the next time point. Additionally, while the mean ( $b = 3.12$ ,  $SE = 0.03$ ,  $p < .01$ ) and variance ( $b = 0.07$ ,  $SE = 0.02$ ,  $p < .01$ ) of the intercept were significant, lack of significance in the mean ( $b = -0.28$ ,  $SE = 2.22$ ,  $p = .90$ ) and variance ( $b = 0.01$ ,  $SE = 0.01$ ,  $p = .52$ ) of the slope suggested that there was no tendency for natural growth or change. Thus, we could not test the effects of our predictors (SES and parent difficulties in ER) in this model given the lack of change in the latent ER change factors.

### **Attachment**

The model fits were excellent ( $\chi^2 = 18.37$ ,  $df = 14$ ,  $p = 0.19$ , RMSEA = 0.04, CFI = 0.99). The mean ( $b = 3.15$ ,  $SE = 0.03$ ,  $p < .01$ ) and variance ( $b = 0.05$ ,  $SE = 0.01$ ,  $p < .01$ ) of the intercept were significant as well as the mean ( $b = 4.78$ ,  $SE = 0.70$ ,  $p < .01$ ) and variance ( $b = 0.14$ ,  $SE = 0.04$ ,  $p < .01$ ) of the slope. The proportional effects were constrained to be equal and were also significant ( $b = -1.53$ ,  $SE = 0.22$ ,  $p < .01$ ). Results suggested that the direct effects from SES at Time 1 to changes in ER from Time 1 to Time 2 ( $b = 0.10$ ,  $SE = 0.06$ ,  $p = .11$ ,  $b^* = 0.42$ ) and changes in ER from Time 2 to Time 3 ( $b = 0.10$ ,  $SE = 0.06$ ,  $p = .10$ ,  $b^* = 0.49$ ) were not significant. However, higher SES was significantly associated with increases in ER from Time 3 to Time 4 ( $b = 0.13$ ,  $SE = 0.06$ ,  $p = .03$ ,  $b^* = 0.58$ ). Further, the effects from SES at Time 1 to attachment at Time 2 ( $b = 0.07$ ,  $SE = 0.08$ ,  $p = .42$ ,  $b^* = 0.05$ ) and Time 3 ( $b = -0.03$ ,  $SE =$

0.08,  $p = .75$ ,  $b^* = -0.02$ ) were not significant, although the cross-sectional path from SES at Time 1 to attachment at Time 1 ( $b = 0.34$ ,  $SE = 0.10$ ,  $p = .00$ ,  $b^* = 0.25$ ) was significant. However, greater perceived attachment in parent-child relationship at Times 1, 2, and 3 predicted increases in ER between each time point ( $b = 0.09$ ,  $SE = 0.03$ ,  $p = .01$ ,  $b^* = 0.53$  for Time 1;  $b = 0.18$ ,  $SE = 0.03$ ,  $p = .00$ ,  $b^* = 1.21$  for Time 2;  $b = 0.21$ ,  $SE = 0.03$ ,  $p = .00$ ,  $b^* = 1.22$  for Time 3). Yet, of the three tested indirect effects, only the effect of SES at Time 1 on the change in ER from Time 1 to Time 2 through attachment at Time 1 was significant ( $b = 0.03$ ,  $SE = 0.02$ , 95% CI [.002, .072],  $b^* = .13$ ). The indirect effect of SES at Time 1 on the change in ER from Time 2 to Time 3 through attachment at Time 2 was not significant ( $b = 0.01$ ,  $SE = 0.01$ , 95% CI [-.012, .043],  $b^* = .06$ ), nor was the indirect effect of SES at Time 1 on the change in ER from Time 3 to Time 4 through attachment at Time 4 ( $b = -0.00$ ,  $SE = 0.02$ , 95% CI [-.038, .022],  $b^* = -.02$ ).

## 6. Discussion

Extant literature has demonstrated that ER abilities continue to develop across adolescence at both the behavioral and neurological levels (McRae et al., 2012). However, literature examining contextual factors that contribute to developmental trajectories of ER is limited. Given the importance of family environmental factors on ER development (Morris et al., 2007), the current study sought to investigate the influence of family contextual factors on intraindividual differences in ER development by examining longitudinal effects of family SES on ER development via parent perceived stress and family emotional climate. Our results support the mediating role of family emotional climate in the association between SES and changes in ER, but not parent perceived stress. Importantly, our findings highlight the influence of the family context on ER development during adolescence by illustrating how proximal factors that

facilitate intraindividual changes in ER development, such as a positive family emotional climate, may be disrupted by more distal factors, such as low SES.

Our first hypothesis was that higher SES would predict a higher intercept and increasing slope in ER across adolescence. That is, we expected that higher levels of SES would be associated with higher baseline levels and increasing growth in ER across time. However, in our Mediation Growth Curve Model, SES was not directly associated with initial levels of ER after taking into account other mediating variables. In the current literature, there is evidence for the impact of SES on ER and its underlying neural circuitry (Crandall, Magnusson, & Novilla, 2017; Kim et al., 2013). Yet, much of this literature focuses on mediating mechanisms, including stressful life events and deficits in prefrontal cortex functioning (Evans & Kim, 2013; Gallo & Matthews, 2003). Taken together, extant literature and current findings seem to highlight that the association between SES and ER is primarily accounted for by more proximal predictors (i.e., parent perceived stress, family emotional climate) of ER that mediate the effects of SES.

Ultimately, we were unable to test the full growth curve model due to a lack of growth or change in ER across time. To be sure, studies examining individual differences in growth trajectories of self-regulation during adolescence are limited. Nonetheless, this result was unexpected given extant literature that describes ongoing brain maturation in areas related to ER abilities throughout adolescence (Steinberg, 2005). One study investigated the development of self-regulation during the transition from childhood to early adolescence. Results demonstrated that, as a whole, individuals increased in effortful control (a temperament construct related to ER) and decreased in impulsivity, suggesting that children demonstrate better self-regulation across time. There were also significant individual differences in these patterns (King et al., 2012). Similarly, a sample of adolescents demonstrated a modest increase in self-regulation (the

ability to regulate emotions, cognitions, and behaviors) across 13-17 years of age with significant variation in the rate of growth (Crandall et al., 2017). Thus, our null findings may be attributed to our measure and sample. Perhaps our operationalization of ER (i.e., emotion regulation abilities) was not conducive to evaluating growth trajectories. Specifically, the present study assessed ER by self-report on the ERC which captures a broader representation of ER including socially appropriate emotional displays, empathy, and self-awareness (Shields & Cicchetti, 1997). In the aforementioned studies, significant development was found in constructs which are reflective of self-regulatory capabilities broader than ER. For example, Crandall et al (2017) operationalized self-regulation as regulation of emotions, cognitions, and behavior, whereas King et al. (2013) examined effortful control and impulsivity. It may be that the development of ER, measured by ER abilities, is stable by early adolescence, whereas other components of self-regulation (i.e., cognitive control, behavioral control, temperamental effortful control) may still increase across adolescence. Finally, our sample is a community sample with typically developing adolescents. Due to their relatively high, stable mean score on the ERC across time ( $M = 3.1 - 3.2$ , range = 1 - 4), the non-significant growth may have been reflective of trait-like ER. That is, the adolescents in our sample had high initial levels of ER and thus, had limited room to grow over time. Future research may consider the use of a more age appropriate measure of ER that is sensitive to potential nuances in ER development during the adolescent period. In particular, additional means of capturing ER, especially its neurobiological correlates, will be beneficial for broadening our understanding of ER as a complex, dynamic process. For example, given the growth shown in brain development related to cognitive control (e.g., Ordaz, Foran, Velanova, & Luna, 2013), future research may consider using a measure that captures a rapidly developing cognitive representation of ER during adolescence.

Our second hypothesis was that the association between SES and ER would be sequentially mediated by parent stress and then family emotional climate. Due to the lack of growth in ER across time, we were only able to predict the intercept of ER, resulting in a cross-sectional model. However, it is not advised to conduct mediation analyses on cross-sectional data (Maxwell & Cole, 2007). Thus, in order to determine whether the effect persisted over time, we rescaled the intercept at Time 4. Results revealed indirect paths via parent stress and family emotional climate, such that, higher SES was related to less parental stress which in turn was related to a more positive family emotional climate which then predicted ER at Time 4. However, we acknowledge that our predictor and mediators were measured at the same time point which makes it impossible to determine temporal precedence (Preacher, 2015).

Though we were unable to test growth trajectories of ER across adolescence, we were still interested in elucidating intraindividual variation in ER development. Thus, we proceeded with a latent change score model (McArdle, 2009) in which the annual change in ER was estimated and predicted by SES at Time 1 and repeated measures of parent perceived stress, and family emotional climate. Latent change score modeling has the ability to capture change processes more sensitively than growth curve modeling by simultaneously estimating the general trajectory of growth across time (as in growth curve modeling) and how previous levels of a variable affect future levels (as in autoregressive modeling) to capture change in a construct between two adjacent time points (Clark, Nuttall, & Bowles, 2018). As such, latent change score models are a valuable tool for modeling determinants of change in a construct over time.

Based on previous literature emphasizing the role of stress as a mediator between SES and several facets of family functioning (Conger & Donnellan, 2007), we expected that parental perceived stress would mediate the association between SES and family emotional climate.

Indeed, in the Mediation Growth Curve Model (Figures 2 and 3), the indirect effect of SES on ER through parent perceived stress and then family emotional climate was significant. However, in the Consecutive Mediators Latent Change Score Model (Figure 4), direct effects from SES to parent perceived stress and from parental perceived stress to family emotional climate were not significant. This discrepancy may be in part attributed to the different modeling techniques used. Traditional mediation analyses allow researchers to ask how an initial factor impacts a later outcome, providing an interpretation of causal developmental processes as they unfold across time (Selig & Preacher, 2009). However, the Mediation Growth Curve Model involved cross-sectional mediated pathways among SES, parental perceived stress, and family emotional climate, limiting our capacity to draw inferences about how SES, perceived stress, family emotional climate, and ER are related to each other as they unfold across development.

In contrast, the Consecutive Mediators Latent Change Score Model provided a more rigorous and flexible test of the dynamic relationships among the variables, capturing changes within *and* across individuals. Given the ability of latent change score models to represent change as the difference between adjacent measurements of a variable (i.e., one year in our data), they are advantageous when change is hypothesized to vary across time points. In the Consecutive Mediators Latent Change Score Model, parent perceived stress was not a mediator between SES and family emotional climate because SES at Time 1 failed to consistently predict *changes* in perceived stress (after controlling for the levels of parent perceived stress in the previous year) and parent perceived stress failed to consistently predict year-to-year *changes* in ER. More specifically, the Mediation Growth Curve Model indicated that SES at Time 1 was associated with the *level* of perceived stress at Time 1 and parent perceived stress at Time 1 was associated with the *level* of family emotional climate at Time 1. However, when we focused on

developmental changes of parent perceived stress and family emotional climate, the Consecutive Mediators Latent Change Score Model demonstrated that SES at Time 1 did not consistently predict *changes* in parent perceived stress, and *changes* in parent perceived stress did not predict *changes* in family emotional climate across measurement occasions. Thus, for model parsimony, parent perceived stress was removed from our model, allowing us to focus on family emotional climate as a more proximal factor related to ER development.

After removing perceived stress from the model, our latent change score modeling analyses indicated that higher baseline SES predicted a more positive family emotional climate at Time 1 and Time 3. Family emotional climate then in turn predicted increases in ER across time. These results corroborate previous empirical and theoretical work demonstrating that higher SES and higher levels of financial satisfaction are associated with better parenting practices (i.e., monitoring) and parent-child relations (Wadsworth et al., 2016) which in turn are related to better adolescent ER (Farley & Kim-Spoon, 2017; Moilanen & Manuel, 2017; Morris et al., 2007). However, the path from SES at Time 1 to the family emotional climate at Time 2 was not significant, yielding inconsistency in our results. This may be, in part, attributed to weaker construct validation for the family emotional climate at Time 2 in comparison to the other time points. The unstandardized factor loading for DERS was not significant in the measurement model of the family emotional climate at Time 2, unlike other time points. Perhaps a measure of positive ER for parents, as opposed to emotion dysregulation, would have been a better indicator within our latent factor of the family emotional climate. Nonetheless, the direct effects from family emotional climate at each time point to changes in ER were significant, supporting the theoretical model by Morris et al. (2007) and demonstrating value in conceptualizing the family emotional climate as a latent construct based on our measures of



DERS (reflecting observation), PCR and PMS (reflecting parenting practices) and IPPA (reflecting attachment).

Additionally, the significant indirect effects confirmed our hypothesis that SES is linked to ER via the family emotional climate, such that adolescents from higher SES backgrounds tend to experience a more positive family emotional climate that promotes increases in ER abilities over time. More specifically, our results demonstrated both constant change which indicated an increasing trend in ER abilities across adolescence and proportional change such that adolescents from higher SES backgrounds and more positive family emotional climates show greater increases in ER abilities from year-to-year. Indeed, research has shown that higher SES is associated with better parenting (Wadsworth et al., 2016) and that parents who display appropriate ER, warm responsive parenting, and foster a supportive parent-child relationship help to create an environment in which adaptive ER is taught, practiced, and encouraged (for a review see Morris et al., 2007). By the same token, our results suggest that low SES may disrupt ER acquisition via a more negative family emotional climate. Low-SES families often lack resources and structures that aid in quality parenting, including social support networks, physical resources, and stimulating environments (Kim et al., 2013; Liberzon et al., 2015; Wadsworth et al., 2016). Such results have important implications for intervention work. Individuals may develop ER skills at different rates, due to family contextual factors, that result in different consequences for adjustment. For example, individuals with delayed growth in ER may have difficulty responding to challenges in appropriate and adaptive ways, resulting in a vulnerability for behavioral and emotional problems, including psychopathology (King et al., 2012). Thus, it is crucial to elucidate the factors related to intraindividual changes in ER development in order to prevent such cascading risk. Bearing this in mind, intervention efforts that aim to improve ER

abilities for individuals from low SES families can meaningfully and practically target the family emotional climate as a more proximal factor.

Post hoc analyses were conducted to disentangle the individual effects of each component of the family emotional climate (parenting practices, parent difficulties with ER, and attachment) on developmental changes in ER. Both parenting practices and attachment were significant mediators in the association between SES and ER. However, for the model with parent ER as the mediator, the lack of significance in the mean and variance of the slope and in the proportional effects suggested that there is no internal source of change to extract in the model. Taken together, results from the post hoc analyses suggest that within the family emotional climate, the parenting and parent-adolescent relationship components (i.e., monitoring, warmth), rather than parents' own ER, appear to drive the indirect effect between SES and ER. As such, intervention work for improving adolescent ER may target parenting and relationship factors.

Yet, our findings demonstrate the value of considering multiple factors of the family emotional climate simultaneously as well as individually. While theoretical work has previously outlined three components of the family emotional climate as distinct (Morris et al., 2007), our analyses demonstrate both construct validity and predicative validity of family emotional climate as a single latent construct. Further, a comparison of our models demonstrated that both the single mediator latent change score models report indirect effects from SES at Time 1 to changes in ER between Time 1 and Time 2 through the Time 1 mediator (family emotional climate composite, parenting practices, or attachment). However, when using the family emotional climate composite, there was further evidence demonstrating that *changes* in the mediator explain the effects of Time 1 SES on *later changes* in ER. Thus, not only do our results reveal that as a composite family emotional climate predicts ER development as well as each individual

factor, but our significant indirect effects provide stronger evidence for the composite as a significant mediator between SES and ER than the parenting factors alone. We argue that the composite reflects a more comprehensive and realistic environment in which the adolescent is developing and as such, meaningfully predicts changes in ER development. Moreover, the use of latent change score modeling allowed us to examine time lagged effects between the family emotional climate and ER to determine how variability in the family emotional climate at each time point predicted changes in ER within individuals. Results provide strong support that altering the family emotional climate through an intervention may elicit positive changes in ER. Nevertheless, there is value in evaluating individual components of the family emotional climate in terms of practical implications for intervention work. Future research and application will benefit from elucidating how intervention at one distinct factor may alter the family emotional climate more broadly, resulting in adaptive ER.

Several limitations and avenues for future research should be noted. First, future studies may benefit from including multiple levels of assessments (e.g., observations, interviews, neurobiological measures) to better capture the dynamic process of ER. Given that ER abilities may differentiate between contexts, multiple measures may reflect a more objective measure of ER than self-report. Secondly, it is important to consider the possibility of a bidirectional relationship between family emotional climate and ER. Indeed, research has demonstrated that children's emotion dysregulation is associated with punitive parenting and parental distress and has suggested a bidirectional relationship between child ER and parental reactions (Eisenberg et al., 1999; King et al., 2012). Additionally, while we sought to examine how aspects of the family emotional climate as a whole jointly contributed to ER, we were unable to involve measures representing all aspects of the family emotional climate (e.g., marital relations, emotion

contagion) identified in the tripartite model proposed by Morris et al. (2007) because such measures were not available in our data set. Future studies that wish to replicate the theoretical model proposed by Morris and colleagues (2007) may consider including additional measures that more completely capture the tripartite model and are also age-appropriate in order to sensitively capture these constructs across developmental trajectories. Moreover, while our sample included adolescents and their primary caregivers, 82% were biological mothers. Consistent with a family systems perspective, more work is needed to determine how fathers as well as additional family members, such as siblings, are socializing ER. Furthermore, as contexts outside of the family become more important during the developmental period of adolescence, it is crucial to understand how such contexts (i.e., peers, school, neighborhoods) may affect ongoing development of ER. Finally, we recognize that these associations may be affected by additional contextual factors. Future research will benefit from the identification of moderators within the associations between SES, family emotional climate, and ER (i.e., child temperament, gender, culture).

In conclusion, identifying the family emotional climate as a mediator between SES and ER is particularly meaningful within adolescence, given the ongoing maturation of prefrontal brain regions (McRae et al., 2012; Steinberg, 2005) that make adaptive ER possible, and the restructuring of relationships that play a role in ER development (Nickerson & Nagle, 2005). The present study illustrates developmental processes through which family context and parents' emotion-related socialization behaviors contribute to intraindividual changes in ER development. To our knowledge, this is the first study to use a longitudinal data set encompassing early to middle adolescence to model dynamic intraindividual changes in ER. The use of latent change scores increases our confidence towards a causal longitudinal mediation model since it includes

time lagged effects. Further, our findings emphasize the constraints placed on ER development as a result of low SES and highlight the need for intervention efforts at proximal levels such as the family emotional climate for adolescents who face such distal risk factors.

## References

- Arbuckle, J. L. (1996). Full information estimation in the presence of incomplete data. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling: Issues and techniques* (pp. 243-277). Mahwah, NJ: Erlbaum.
- Bariola, E., Gullone, E., & Hughes, E. K. (2011). Child and adolescent emotion regulation: The role of parental emotion regulation and expression. *Clinical Child and Family Psychology Review, 14*, 198-212. doi:10.1007/s10567-011-0092-5
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*, 238–246. doi:10.1037/0033-2909.107.2.238.
- Bentler, P. M., & Chou, C. P. (1987) Practical issues in structural modeling. *Sociological Methods & Research, 16*, 78-117.
- Bernier, A., Carlson, S.M., Deschenes, M., & Matte-Gagne, C. (2012). Social factors in the development of early executive functioning: a closer look at the caregiving environment. *Developmental Science, 15 (1)*, 12–24. doi: 10.1111/j.1467-7687.2011.01093.x
- Blandon, A. Y., Calkins, S. D., Keane, S. P., & O'Brien, M. (2008). Individual differences in trajectories of emotion regulation processes: The effects of maternal depressive symptomatology and children's physiological regulation. *Developmental Psychology, 44*, 1110-1123. doi:10.1037/0012-1649.44.4.1110
- Boe, T., Sivertsen, B., Heiervang, E., Goodman, R., Lundervold, A. J., Hysing, M. (2014). Socioeconomic status and child mental health: The role of parental emotional well-being and parenting practices. *Journal of Abnormal Child Psychology, 42*, 705-715. doi:10.1007/s10802-013-9818-9

- Bronfenbrenner, U. (2001). Human development, bioecological theory of. In N.J. Smelser & P.B. Baltes (Eds.), *International encyclopedia of the social and behavioral sciences* (pp. 6963–6970). Oxford: Elsevier.
- Buckholdt, K. E., Parra, G. R., & Jobe-Shields, L. (2014). Intergenerational transmission of emotion dysregulation through parental invalidation of emotions: Implications for adolescent internalizing and externalizing behavior. *Journal of Child Family Studies, 23*, 324-332. doi:10.1007/s10826-013-9768-4
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In Bollen & S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Beverly Hills: Sage.
- Coldwell, J., Pike, A., & Dunn, J. (2006). Household chaos - links with parenting and child behavior. *Journal of Child Psychology and Psychiatry, 47*, 1116-1122. doi:10.1111/j.1469-7610.2006.01655.x
- Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: methodological challenges and directions for child development research. *Child Development, 75*(2), 317-333. doi:10.1111/j.1467-8624.2004.00673.x
- Conger, R. D. & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology, 58*, 175-199. doi: 10.1146/annurev.psych.58.110405.085551
- Contreras, J. M., Kerns, K. A., Weimer, B. L., Gentzler, A. L., & Tomich, P. L. (2000). Emotion regulation as a mediator of associations between mother–child attachment and peer relationships in middle childhood. *Journal of Family Psychology, 14*(1), 111-124. doi:10.1037/0893-3200.14.1.111

- Crandall, A. A., Magnusson, B. M., & Novilla, M. L. B. (2018). Growth in Adolescent Self-Regulation and Impact on Sexual Risk-Taking: A Curve-of-Factors Analysis. *Journal of Youth and Adolescence*, *47*, 793-806. doi: 10.1007/s10964-017-0706-4
- Eisenberg, N., Fabes, R. A., Shepard, S. A., Guthrie, I. K., Murphy, B. C., & Reiser, M. (1999). Parental reactions to children's negative emotions: Longitudinal relations to quality of children's social functioning. *Child Development*, *70*, 513-534.
- Evans, G. W., & Kim, P. (2013). Childhood Poverty, Chronic Stress, Self-Regulation, and Coping. *Child Development Perspectives*, *7*, 43-48. doi:10.1111/cdep.12013
- Farley, J. P., & Kim-Spoon, J. (2014). The development of adolescent self-regulation: The role of parent, peer, friend, and romantic relationships. *Journal of Adolescence*, *37*, 433-440. doi:10.1016/j.adolescence.2014.03.009
- Farley, J. P., & Kim-Spoon, J. (2017). Parenting and adolescent self-regulation mediate between family socioeconomic status and adolescent adjustment. *Journal of Early Adolescence*, *37*(4), 502-524. doi: 10.1177/0272431615611253
- Feng, X., Shaw, D. S., Kovacs, M., Lane, T., O'Rourke, F. E. & Alarcon, J. H. (2007). Emotion regulation in preschoolers: The roles of behavioral inhibition, maternal affective behavior, and maternal depression. *The Journal of Child Psychology and Psychiatry*, *49*(2), 132-141. doi:10.1111/j.1469-7610.2007.01828.x
- Finkenauer, C. Engels, R. C. M. E., Baumeister, R. F. (2005). Parenting behavior and adolescent behavioral and emotional problems: The role of self-control. *International Journal of Behavioral Development*, *29*(1), 58-69. doi:10.1080/01650250444000333
- Fosco, G. M., & Grych. J. H. (2012). Capturing the family context of emotion regulation: A family systems model comparison approach. *Journal of Family Issues*, *34*, 557-578.



doi:10.1177/0192513X12445889

- Gallo, L. C. & Matthews, K. A. (2003). Understanding the association between socioeconomic status and physical health: Do negative emotions play a role? *Psychological Bulletin*, *129*(1), 10-51. doi: 10.1037/0033-2909.129.1.10
- Gestsdottir, S., & Lerner, R.M. (2007). Intentional self-regulation and positive youth development in early adolescence: Findings from the 4-H study of positive youth development. *Developmental Psychology*, *43*, 508–521. doi:10.1037/0012-1649.43.2.508
- Ghosh, D., & A. Vogt. (2012). Outliers: An evaluation of methodologies. In *Joint Statistical Meetings* (pp. 3455–3460). American Statistical Association, San Diego, CA.
- Gilliom, M., Shaw, D. S., Beck, J. E., Schonberg, M. A., & Lukon, J. L. (2002). Anger regulation in disadvantaged preschool boys: Strategies, antecedents, and the development of self-control. *Developmental Psychology*, *38*(2), 222-235. doi:10.1037/0012-1649.38.2.222
- Grant, K. E., Compas, B. E., Stuhlmacher, A. F., Thurm, A. E., McMahon, S. D., & Halpert, J. A. (2003). Stressors and child and adolescent psychopathology: Moving from markers to mechanisms of risk. *Psychological Bulletin*, *129*, 447-466. doi:10.1037/0033-2909.129.3.447
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, *26*, 41-54. doi:10.1023/B:JOBA.0000007455.08539.94

- Gross, J. J., & Thompson, R. A. (2007). Emotion Regulation: Conceptual Foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3-24). New York, NY, US: Guilford Press.
- Gumora, G., & Arsenio, W. F. (2002). Emotionality, Emotion Regulation, and School Performance in Middle School Children. *Journal of School Psychology, 40*, 395–413. doi: 10.1016/S0022-4405(02)00108-5
- Gutman, L. M., McLoyd, V. C., & Tokoyawa, T. (2005), Financial Strain, Neighborhood Stress, Parenting Behaviors, and Adolescent Adjustment in Urban African American Families. *Journal of Research on Adolescence, 15*, 425–449. doi:10.1111/j.1532-7795.2005.00106.x
- Hetherington, E.M. & Clingempeel, W.G. (1992). Coping with marital transitions: A family systems perspective. *Monographs of the Society for Research in Child Development, 57*, 1-242. doi:10.1111/j.1540-5834.1992.tb00300.x
- Heylen, J., Vasey, M. W., Dujardin, A., Vandevivere, E., Braet, C., De Raedt, R., & Bosmans, G. (2017). Attachment and effortful control: Relationships with maladjustment in early adolescence. *Journal of Early Adolescence, 37*, 289-315. doi:10.1177/0272431615599063
- John, O. P. and Gross, J. J. (2004), Healthy and Unhealthy Emotion Regulation: Personality Processes, Individual Differences, and Life Span Development. *Journal of Personality, 72*, 1301–1334. doi:10.1111/j.1467-6494.2004.00298.x
- King, K. M., Lengua, L. J., & Monahan, K. C. (2013). Individual differences in the development of self-regulation during pre-adolescence: Connections to context and adjustment. *Journal of Abnormal Child Psychology, 41*, 57-69. doi: 10.1007/s10802-012-9665-0

- Kim, P., Evans, G. W., Angstadt, M., Ho, S. S., Sripada, C. S., Swain, J. E., ... & Phan, K. L. (2013). Effects of childhood poverty and chronic stress on emotion regulatory brain function in adulthood. *PNAS*, *110*, 18442-18447. doi: 10.1073/pnas.1308240110
- Kobak, R. R., and Sceery, A. (1988). Attachment in late adolescence: working models, affect regulation, and representations of self and others. *Child Development*, *59*, 135–146. doi: 10.2307/1130395
- Kline, R. B., (2011). *Principles and practice of structural equation modeling* (3<sup>rd</sup> ed.). New York: Guildford Press.
- Kotchick, B.A. & Forehand, R. (2002) Putting parenting in perspective: A discussion of contextual factors that shape parenting practices. *Journal of Child and Family Studies* *11*, 255-269. doi:10.1023/A:1016863921662
- Ladd, G.W. (2005). *Children's peer relations and social competence: A century of progress*. New Haven, CT: Yale University Press.
- Lieberman, M., Doyle, A., & Markiewicz, D. (1999). Developmental patterns in security attachment to mother and father in late childhood and early adolescence: Associations with peer relations. *Child Development*, *70*, 202-213. doi:10.1111/1467-8624.00015
- Liberzon, I., Ma, S. T., Okada, G., Ho, S. S., Swain, J. E., & Evans, G. W. (2015). Childhood poverty and recruitment of adult emotion regulatory neurocircuitry. *Social Cognitive and Affective Neuroscience*, 1596-1606. doi: 10.1093/scan/nsv045
- Luebke, A. M., Bump, K. A., Fussner, L. M., & Rulon, K. J. (2014). Perceived Maternal and Paternal Psychological Control: Relations to Adolescent Anxiety Through Deficits in Emotion Regulation. *Child Psychiatry & Human Development*, *45*, 565–576. doi:10.1007/s10578-013-0425-3

- Maciejewski, D. F., van Lier, P. A. C., Branje, S. J. T., Meeus, W. H. J., & Koot, H. M. (2015). A 5-year longitudinal study on mood variability across adolescence using daily diaries. *Child Development, 86*, 1908-1921. doi:10.1111/cdev.12420
- Maxwell, S. E. & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods, 12*, 23-44. doi: 10.1037/1082-989X.12.1.23
- McArdle, J. J. (2009). Latent Variable Modeling of Differences and Changes with Longitudinal Data. *Annual Review of Psychology, 60*, 577-605. doi:10.1146/annurev.psych.60.110707.163612
- McRae, K., Gross, J. J., Weber, J., Robertson, E. R., Sokol-Hessner, P., Ray, R. D., Gabrieli, J. D. E., & Ochsner, K. N. (2012). The development of emotion regulation: An fMRI study of cognitive reappraisal in children, adolescents and young adults. *Social Cognitive and Affective Neuroscience, 7*, 11–22. doi:10.1093/scan/nsr093
- Meyer, S., Raikes, A., Virmani, E. A., Waters, S., & Thompson, R. A. (2014). Parent emotion representations and the socialization of emotion regulation in the family. *International Journal of Behavioral Development, 38*(2), 164-173. doi:10.1177/0165025413519014
- Mills-Koonce, W. R., Willoughby, M. T., Garrett-peters, P., Wagner, N., Vernon-Feagans, L., and The Family Life Project Key Investigators. (2016). The interplay among socioeconomic status, household chaos, and parenting in the prediction of child conduct problems and callous-unemotional behaviors. *Development and Psychopathology, 28*, 757-771. doi:10.1017/S0954579416000298
- Moilanen, K. L., & Manuel, M. L. (2017). Parenting, self-regulation and social competence with peers and romantic partners. *Journal of Applied Developmental Psychology, 49*, 46-54. doi: 10.1016/j.appdev.2017.02.003

- Moilanen, K. L., & Rambo-Hernandez, K. E. (2017). Effects of maternal parenting and mother-child relationship quality on short-term longitudinal change in self-regulation in early adolescence. *Journal of Early Adolescence, 37*, 618-641.  
doi:10.1177/0272431615617293
- Morris, A. S., Houlberg, B. J., Criss, M. M., & Bosler, C. D. (2017). Family context and psychopathology: The mediating role of children's emotion regulation. Centifanti, L. C. & Williams D. M (Eds.), *The Wiley Handbook of Developmental Psychopathology* (pp. 365-389). Chichester, UK: John Wiley & Sons, Ltd. doi:10.1002/9781118554470.ch18
- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*, 361-388. doi:10.1111/j.1467-9507.2007.00389.x
- Morris, A. S., Silk, J. S., Steinberg, L., Terranova, A. M., & Kithakye, M. (2010). Concurrent and Longitudinal Links Between Children's Externalizing Behavior in School and Observed Anger Regulation in the Mother-Child Dyad. *Journal of Psychopathology and Behavioral Assessment, 32*(1), 48-56. doi:10.1007/s10862-009-9166-9
- Muthén, L. K., & Muthén, B. (2012). Mplus user's guide [Computer software and manual] (7th ed.). Los Angeles, CA: Author.
- Nickerson, A. B., & Nagle, R. J. (2005). Parent and Peer Attachment in Late Childhood and Early Adolescence, *Journal of Early Adolescence, 25*, 223-249.  
doi:10.1177/0272431604274174
- Nigg, J. T. (2017). Annual Research Review: On the relations among self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-

- taking, and inhibition for developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 58, 361-383. doi:10.1111/jcpp.12675
- Ordaz, S. J., Foran, W., Velanova, K., & Luna, B. (2013). Longitudinal growth curves of brain function underlying inhibitory control through adolescence. *The Journal of Neuroscience*, 33(46), 18109-18124. doi:10.1523/jneurosci.1741-13.2013
- Ponnet, K., Van Leeuwen, K., & Wouters, E. (2014). Examining mediating pathways between financial stress of mothers and fathers and problem behavior in adolescents. *Journal of Family Studies*, 20(1), 66–78. doi:10.5172/jfs.2014.20.1.66
- Preacher, K. J. (2015). Advances in Mediation Analysis: A Survey and Synthesis of New Developments. *Annual Review of Psychology*, 66, 825-852. doi: 10.1146/annurev-psych-010814-015258
- Raffaelli, M., Crockett, L. J., & Shen, Y.-L. (2005). Developmental Stability and Change in Self-Regulation From Childhood to Adolescence. *The Journal of Genetic Psychology*, 166, 54-75. doi: 10.3200/GNTP.166.1.54-76
- Raja, S. N., McGee, R., & Stanton, W. R. (1992). Perceived attachments to parents and peers and psychological well-being in adolescence. *Journal of Youth and Adolescence*, 21, 471-485. doi:10.1007/bf01537898
- Sarıtaş, D., & Gençöz, T. (2012). Discrepancies between Turkish mothers' and adolescents' reports of adolescents' emotion regulation difficulties. *Journal of Clinical Psychology*, 68, 661-671. doi:10.1002/jclp.21849
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7, 147-177. doi:10.1037/1082-989X.7.2.147

- Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale. *Developmental Psychology*, *33*, 906-916. doi:10.1037/0012-1649.33.6.906
- Silk, J. S., Shaw, D.S., Skuban, E. M., Oland, A. A., & Kovacs, M. (2006). Emotion regulation strategies in offspring of childhood-onset depressed mothers. *Journal of Child Psychology and Psychiatry*, *47*(1), 69-78. doi:10.1111/j.1469-7610.2005.01440.x
- Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child Development*, *74*, 1869-1880. doi:10.1046/j.1467-8624.2003.00643.x
- Stattin, H., & Kerr, M. (2000). Parental monitoring: A reinterpretation. *Child Development*, *71*, 1072-1085. doi:10.1111/1467-8624.00210
- Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences*, *9*, 69-74. doi:10.1016/j.tics.2004.12.005
- Steinberg, L., & Silk, J. S. (2002). Parenting adolescents. In M. H. Bornstein (Ed.), *Handbook of parenting: Vol. 1: Children and parenting* (pp. 103–133). Mahwah, NJ: Lawrence Erlbaum Associates.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate analysis*. New York: Harper and Row.
- Thompson, R. A. (1994). Emotion regulation: A theme in search of a definition. In: Fox N. A editor. *Monographs of the Society for Research in Child Development* (pp. 25–52). Serial No. 240 ed. Vol. 59. Chicago, IL: University of Chicago Press

- Thorell, L. B., Rydell, A. M., & Bohlin, G. (2012) Parent–child attachment and executive functioning in relation to ADHD symptoms in middle childhood, *Attachment & Human Development, 14*, 517-532. doi:10.1080/14616734.2012.706396
- Ursache, A., & Noble, K. G. (2016). Neurocognitive development in socioeconomic context: Multiple mechanisms and implications for measuring socioeconomic status. *Psychophysiology, 53*, 71-82. doi: 10.1111/psyp.12547
- Wadsworth, M. E., Evans, G. W., Grant, K., Carter, J. S., & Duffy, S. (2016). Poverty and the Development of Psychopathology. *Developmental Psychopathology, 4*, 1–44. doi: 10.1002/9781119125556.devpsy404
- Walton, A. & Flouri, E. (2010). Contextual risk, maternal parenting, and adolescent externalizing behavior problems: The role of emotion regulation. *Child: Care, Health, and Development, 36*(2), 275-284. doi:10.1111/j.1365-2214.2009.01065.x



Table 1  
*Descriptive Statistics and Correlations for Study Variables*

	1	2	3	4	5	6	7	8	9	10	11	<i>M (SE)</i>	<i>Min</i>	<i>Max</i>
1. Socio-economic Status	-											0.00 (.74)	-1.93	1.83
2. Perceived Stress T1	-.38**	-										1.56 (.66)	.30	3.40
3. Monitoring (Parent report) T1	.09	-.25**	-									4.41 (.36)	3.40	5.00
4. Monitoring (Child Report) T1	.25**	-.07	.28**	-								4.06 (.54)	2.44	5.00
5. PCR (Parent Report) T1	.04	-.17*	.23**	.09	-							4.06 (.62)	2.00	5.00
6. PCR (Child Report) T1	.17*	-.04	.08	.16*	.32**	-						3.93 (.89)	1.33	5.00
7. DERS (Parent report) T1	.28**	-.49**	.30**	.05	.23**	.19*	-					4.44 (.59)	2.67	5.00
8. Attachment (Child Report) T1	.24**	-.07	.29**	.57**	.20*	.49**	.12	-				4.06 (.58)	2.33	5.00
9. FEC T1	.34**	-.34**	.49**	.55**	.42**	.58**	.65**	.78**	-			0.00 (.69)	-2.85	1.19
10. Perceived Stress T2	-.31**	.65**	-.17	-.07	-.16	-.08	-.47**	-.09	-.34**	-		1.60 (.67)	0.00	3.60
11. Monitoring (Parent report) T2	.00	-.11	.82**	.21*	.26**	.06	.14	.26**	.36**	-.13	-	4.37 (.38)	3.08	5.00
12. Monitoring (Child Report) T2	.27**	-.07	.30**	.62**	.12	.05	.00	.32**	.32**	-.05	.29**	3.98 (.81)	2.36	4.92
13. PCR (Parent Report) T2	.04	-.15	.30**	.12	.67**	.26**	.12	.18*	.33**	-.15	.36**	4.13 (.66)	2.33	5.00
14. PCR (Child Report) T2	.24**	-.03	.09	.18*	.32**	.62**	.22*	.40**	.48**	-.11	.13	3.81 (.81)	1.67	5.00
15. DERS (Parent report) T2	.19*	-.40**	.20*	-.03	.18*	.18*	.60**	.21**	.47**	-.56**	.17*	4.47 (.56)	2.33	5.00
16. Attachment (Child Report) T2	.26**	-.03	.24**	.45**	.25**	.35**	.10	.73**	.60**	.02	.29**	3.95 (.69)	1.58	5.00
17. FEC T2	.32**	-.26**	.42**	.39**	.41**	.41**	.41**	.64**	.74**	-.32**	.47**	0.00 (.68)	-2.91	1.10
18. Perceived Stress T3	-.32**	.63**	-.32**	-.15	-.08	-.03	-.51**	-.10	-.37**	.67**	-.19*	1.59 (.65)	.30	3.50
19. Monitoring (Parent report) T3	.06	-.16	.77**	.14	.21*	.06	.19*	.23**	.35**	-.15	.83**	4.32 (.41)	3.16	5.00
20. Monitoring (Child Report) T3	.17*	-.12	.21*	.52**	.17*	.04	.08	.29**	.32**	-.07	.20*	3.98 (.57)	1.84	4.96

---

21. PCR (Parent Report) T3	.04	-.15	.33**	.15	.70**	.23**	.18*	.26**	.41**	-.17	.29**	4.08 (.64)	1.67	5.00
22. PCR (Child Report) T3	.14	.00	-.06	.20	.29**	.53**	.14	.39**	.40**	-.06	-.03	3.73 (.91)	1.00	5.00
23. DERS (Parent report) T3	.32**	-.35**	.26**	.00	.03	.14	.61**	.12	.42**	-.35**	.13	4.46 (.56)	2.17	5.00
24. Attachment (Child Report) T3	.19*	.04	.03	.35**	.23**	.27**	.07	.63**	.48**	-.02	.04	3.97 (.64)	1.92	4.92
25. FEC T3	.33**	-.22*	.31**	.34**	.34**	.34**	.43**	.56**	.68**	-.25**	.26**	0.00 (.67)	-2.50	1.23
26. ER T1	.19*	-.16*	.24**	.42**	.23**	.17*	.07	.38**	.38**	-.20	.29**	3.13 (.37)	2.25	3.88
27. ER T2	.15	-.11	.08	.24**	.16	.07	.07	.30**	.26**	-.10	.16	3.10 (.37)	2.00	4.00
28. ER T3	.22**	-.15	.08	.33	.23**	.10	.11	.37**	.35**	-.11	.13	3.14 (.41)	2.13	3.88
29. ER T4	.21*	-.16	-.03	.16	.19*	.08	.10	.24**	.22**	-.11	.02	3.15 (.41)	2.13	3.88

---

Table 1 continued  
*Descriptive Statistics and Correlations for Study Variables*

	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
12. Monitoring (Child Report) T2	-																
13. PCR (Parent Report) T2	.15	-															
14. PCR (Child Report) T2	.26**	.32**	-														
15. DERS (Parent report) T2	-.03	.17*	.17*	-													
16. Attachment (Child Report) T2	.47**	.18*	.57**	.12	-												
17. FEC T2	.50**	.43**	.64**	.62**	.79**	-											
18. Perceived Stress T3	-.05	-.05	-.02	-.39**	-.03	-.25**	-										
19. Monitoring (Parent report) T3	.25**	.37**	.12	.16	.26**	.42**	-.25**	-									
20. Monitoring (Child Report) T3	.61**	.13	.19*	.05	.40**	.41**	-.10	.29**	-								
21. PCR (Parent Report) T3	.09	.74**	.24**	.19*	.22**	.39**	-.20*	.31**	.12	-							
22. PCR (Child Report) T3	.18*	.18	.62**	.12	.49**	.46**	.00	.04	.23**	.27**	-						
23. DERS (Parent report) T3	-.06	.002	.06	.59**	-.02	.30**	-.46**	.26**	.09	.12	.15	-					
24. Attachment (Child Report) T3	.32**	.13	.45**	.05	.74**	.55**	.04	.10	.46**	.18*	.63**	.03	-				
25. FEC T3	.32**	.28**	.45**	.40**	.59**	.70**	-.29**	.41**	.55**	.38**	.65**	.61**	.75**	-			
26. ER T1	.37**	.22**	.15	.16	.38**	.42**	-.15	.24**	.21*	.15	.14	.09	.25**	.29**	-		
27. ER T2	.37**	.07	.12	.12	.41**	.38**	-.18	.14	.16	.13	.19*	.07	.31**	.29**	.50**	-	
28. ER T3	.31**	.15	.16	.09	.41**	.37**	-.18	.17*	.39**	.15	.24**	.15	.48**	.48**	.51**	.52**	-
29. ER T4	.15	.07	.08	.15	.25**	.25**	-.04	.10	.24**	.01	.27**	.08	.44**	.37**	.38**	.52**	.57**

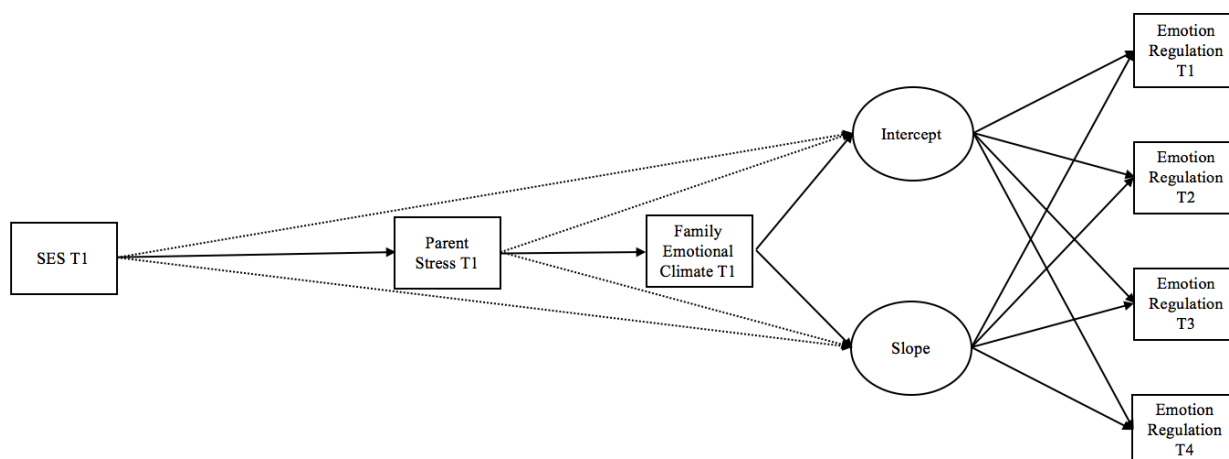
Note. T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 2

*Fit Indices for Nested Sequence of Emotion Regulation Growth Curve Models*

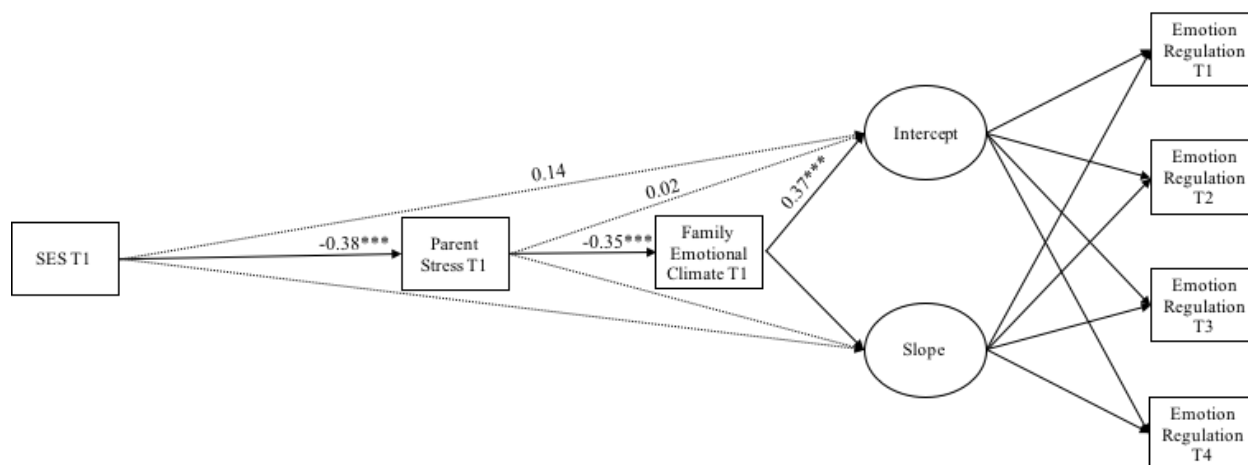
Model	$\chi^2$	<i>df</i>	<i>p</i>	RMSEA	CFI	$\Delta\chi^2$	$\Delta df$	<i>p</i> (d)
<b>1. No-growth model</b>	<b>9.44</b>	<b>11</b>	<b>.58</b>	<b>.00</b>	<b>1.00</b>			
2. Linear growth model	4.52	8	.81	.00	1.00	4.92	3	.17
3. Latent growth model	3.83	6	.70	.00	1.00	5.61	5	.35

*Note.* Best-fitting baseline model in boldface. CFI = comparative fit index; RMSEA = root mean square error of approximation;  $\Delta\chi^2$  = difference in likelihood ratio tests;  $\Delta df$  = difference in *df*; *p*(d) = probability of the difference tests.



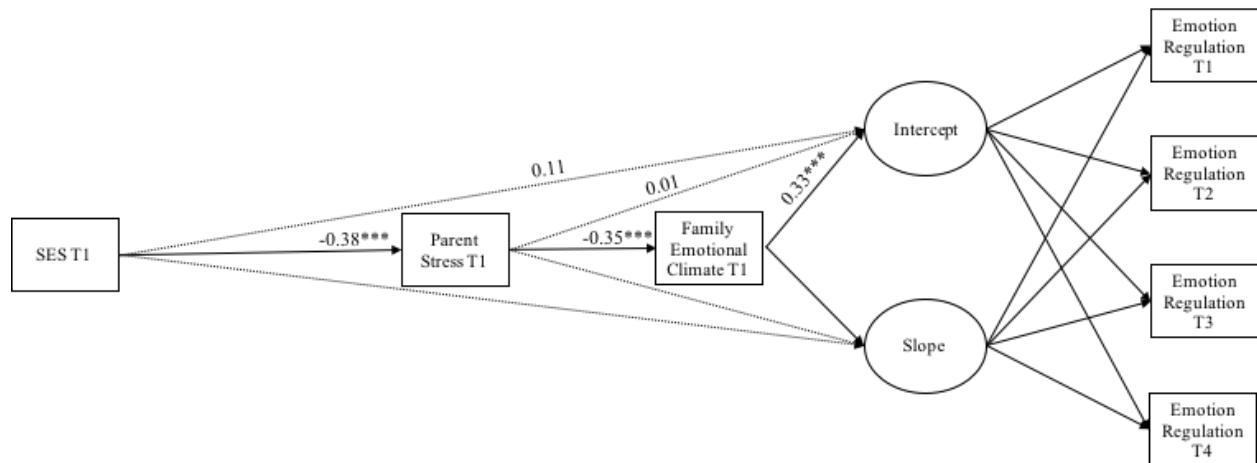
*Figure 1.* Proposed longitudinal mediation model examining the effects of SES on developmental trajectories of emotion regulation via parent stress and family emotional climate.

*Note.* T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4.



*Figure 2.* Standardized estimates of the cross-sectional mediation model examining the effects of SES on initial levels of emotion regulation via parent stress and family emotional climate.

*Note.* T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .



*Figure 3.* Standardized estimates of the rescaled longitudinal mediation model examining the effects of SES on emotion regulation at T4 via parent stress and family emotional climate.

*Note.* T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

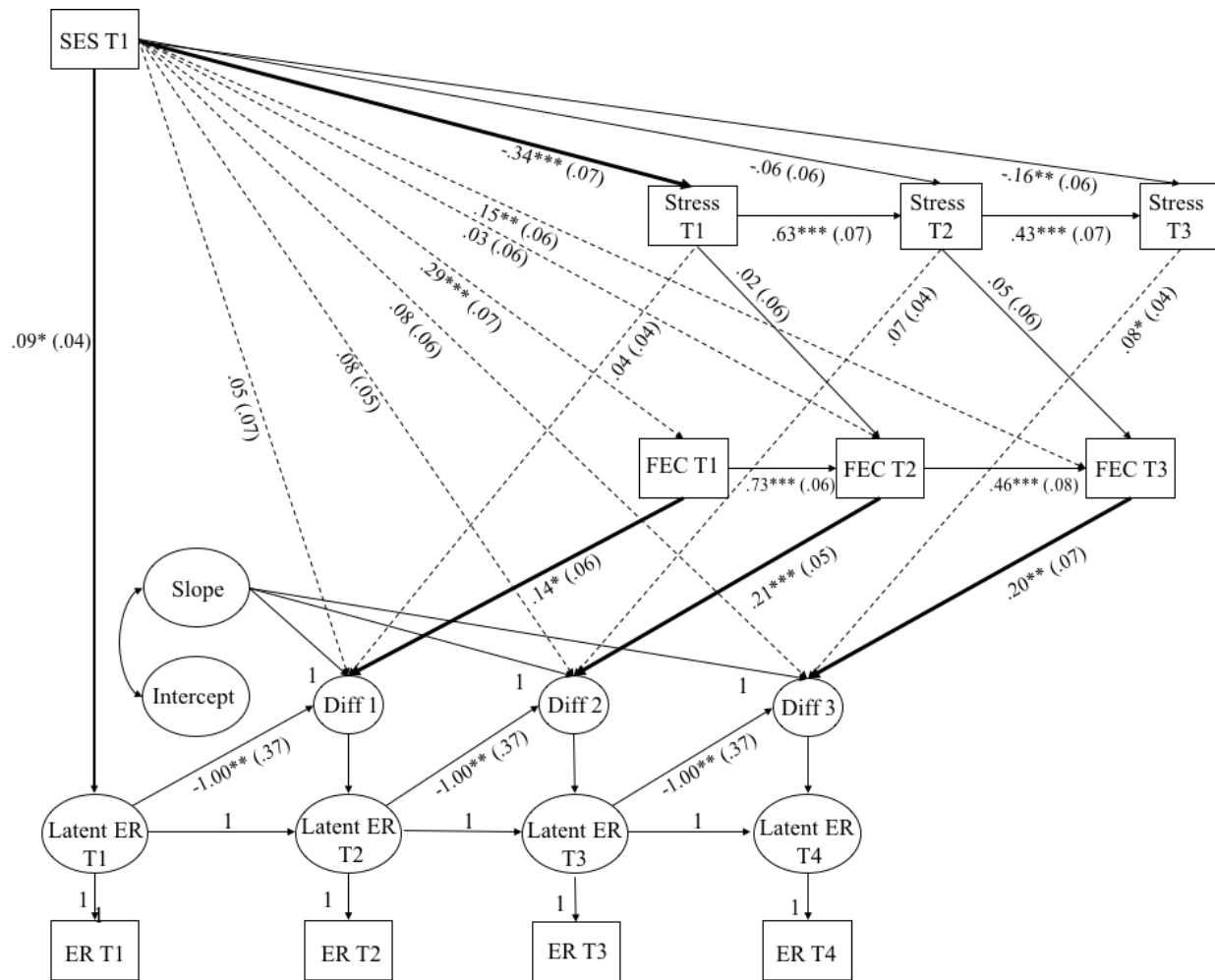


Figure 4. Full Latent Change Score Model of Socioeconomic Status Effects on Family Emotional Climate and Emotion Regulation.

Note. Unstandardized parameter estimates (SE) are presented. For clarity of presentation, residual variances and correlations among variables are not shown. PSS T1  $\leftrightarrow$  PSS T3,  $b = 0.03$ ,  $SE = 0.03$ ,  $p = .001$ ; FEC T1  $\leftrightarrow$  FEC T3,  $b = 0.10$ ,  $SE = 0.03$ ,  $p = .001$ ; FEC T1  $\leftrightarrow$  ER T1,  $b = 0.07$ ,  $SE = 0.02$ ,  $p = .001$ ; FEC T2  $\leftrightarrow$  ER T2,  $b = 0.04$ ,  $SE = 0.01$ ,  $p = .001$ ; FEC T3  $\leftrightarrow$  ER T3,  $b = 0.04$ ,  $SE = 0.01$ ,  $p = .000$ . Diff = latent difference score factor. Model fit:  $\chi^2 = 12.56$ ,  $df = 13$ ,  $p = 0.48$ , RMSEA = 0.00, CFI = 1.00. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .



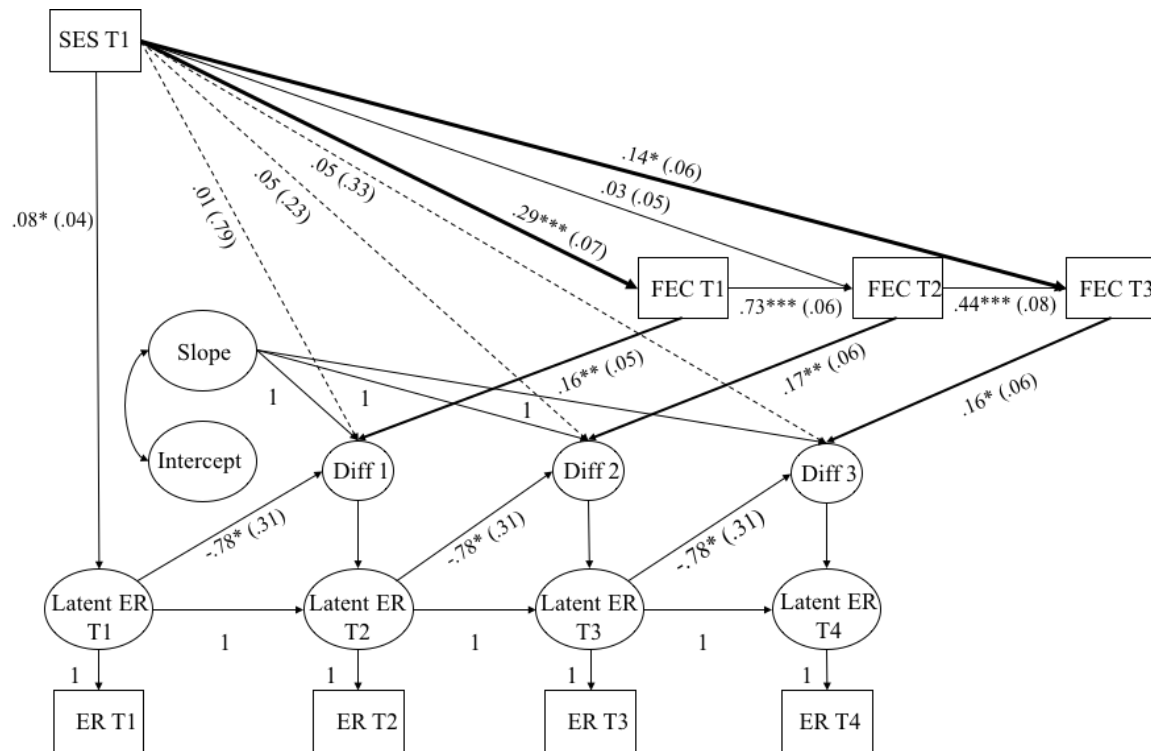


Figure 5. Latent Change Score Model of Socioeconomic Status Effects on Family Emotional Climate and Emotion Regulation.

Note. Unstandardized parameter estimates (SE) are presented. For clarity of presentation, residual variances and correlations among variables are not shown.  $FEC\ T1 \Leftrightarrow FEC\ T3$ ,  $b = 0.10$ ,  $SE = 0.03$ ,  $p = .001$ ;  $FEC\ T1 \Leftrightarrow ER\ T1$ ,  $b = 0.07$ ,  $SE = 0.02$ ,  $p = .001$ ;  $FEC\ T2 \Leftrightarrow ER\ T2$ ,  $b = 0.04$ ,  $SE = 0.01$ ,  $p = .001$ ;  $FEC\ T3 \Leftrightarrow ER\ T3$ ,  $b = 0.04$ ,  $SE = 0.01$ ,  $p = .000$ ). Diff = latent difference score factor. Model fit:  $\chi^2 = 12.56$ ,  $df = 13$ ,  $p = 0.48$ ,  $RMSEA = 0.00$ ,  $CFI = 1.00$ .

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

## Appendices

*Appendix A.*

## Demographic Interview

1. What is your sex?

0-Male

1-Female

4. How old are you? (Record age in years.)

\_\_\_\_\_

13a. How would you describe your own race?

1 = American Indian/Alaska Native

2 = Asian

3 = Native Hawaiian or Other Pacific Islander

4 = Black or African American

5 = White

6 = More than one race

7 = Other \_\_\_\_\_

13c. How would you describe your own ethnicity?

1 Hispanic or Latino

2 Not Hispanic or Latino

14a. How many years of school do you have credit for altogether? (*Use 1-12 for elementary school through high school; 13-16 for college undergraduate work; and use 17 as the cap for the highest grade in school when the respondent has some post undergraduate work. Do not add years for GED.*)

20. Do you receive any public income assistance such as TANF (Temporary Assistance for Needy Families), AFDC (Aid to Families with Dependent Children), food stamps, fuel assistance, rent vouchers or SSI (Supplemental Security Income)? (AID)

1 Yes

2 No

21. What is your total annual family income before taxes for all the adults in your household? Please include all (including TANF, AFDC, food stamps, SSI, rent voucher, fuel assistance and child support). If you are not sure about the amount, please estimate. (RTOTINC)

- |   |                       |    |                              |
|---|-----------------------|----|------------------------------|
| A | None                  | or | \$0 per month                |
| B | Less than 1,000       | or | Less than \$83 per month     |
| C | \$1,000 - \$2,999     | or | \$83 - \$249 per month       |
| D | \$3,000 - \$4,999     | or | \$250 - \$416 per month      |
| E | \$5,000 - \$7,499     | or | \$417 - \$624 per month      |
| F | \$7,500 - \$9,999     | or | \$625 - \$833 per month      |
| G | \$10,000 - \$14,999   | or | \$834 - \$1,249 per month    |
| H | \$15,000 - \$19,999   | or | \$1,250 - \$1,666 per month  |
| I | \$20,000 - \$24,999   | or | \$1,667 - \$2,083 per month  |
| J | \$25,000 - \$34,999   | or | \$2,084 - \$2,916 per month  |
| K | \$35,000 - \$49,999   | or | \$2,917 - \$4,167 per month  |
| L | \$50,000 - \$74,999   | or | \$4,168 - \$6,249 per month  |
| M | \$75,000 - \$99,999   | or | \$6,250 - \$8,333 per month  |
| N | \$100,000 - \$199,999 | or | \$8,334 - \$16,666 per month |
| O | \$200,000 or more     | or | \$16,667 or more per month   |

**Please circle the number corresponding with your answer to the following questions about your health.**

22. During the last 12 months (one year), would you say that your general health has been...(HEALTH)

- 1 Excellent
- 2 Good
- 3 Fair
- 4 Poor

23. Would you say that you have been SICKLY a large part of your life? (SICKLY)

- 1 Yes
- 2 Somewhat
- 3 No

24. How well off would you say your family is? (RCURWOF)

- 1 very poor (at times no money for food, clothing, and / or shelter)
- 2 poor (limited money for anything more than the basics)
- 3 lower middle class (able to afford necessities for modern life)

- 4 middle class (own house, meet the bills with some extra)
- 5 upper middle class (own nice home, many luxuries)

25. How satisfied are you with your overall financial situation? (RFINSAT)

- 1 very satisfied
- 2 satisfied
- 3 unsatisfied
- 4 very unsatisfied

26. How satisfied are you with your current income? (RINSAT)

- 1 very satisfied
- 2 satisfied
- 3 unsatisfied
- 4 very unsatisfied

27. How satisfied are you with your material possessions, for example, TV's, household appliances, and other things that your family owns? (RPOSSA)

- 1 very satisfied
- 2 satisfied
- 3 unsatisfied
- 4 very unsatisfied

28. How often do you worry about your family's financial situation? (RFINWOR)

- 1 very often
- 2 often
- 3 seldom
- 4 never

*Appendix B.***Home Environment Scale**

Below are statements about the environment in your home. After each statement, indicate how much you agree that the statement is true of your home by circling the number you think is best, from:

- 1 = Definitely Untrue
- 2 = Somewhat Untrue
- 3 = Neither Untrue or True
- 4 = Somewhat True
- 5 = Definitely True

	<b>1) Definitely UNTRUE</b>	<b>2) Somewhat UNTRUE</b>	<b>3) Neither UNTRUE OR TRUE</b>	<b>4) Somewhat TRUE</b>	<b>5) Definitely TRUE</b>
1. We are usually able to stay on top of things.	1	2	3	4	5
2. It's a real zoo in our home.	1	2	3	4	5
3. You can't hear yourself think in our home.	1	2	3	4	5
4. There is usually a television turned on somewhere in our home.	1	2	3	4	5
5. The atmosphere in our home is calm.	1	2	3	4	5
6. We have a regular morning routine at home.	1	2	3	4	5

*Appendix C.*

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the choice that seems like a reasonable estimate.

For each question choose from the following alternatives:

	<b>Never</b>	<b>Almost Never</b>	<b>Sometimes</b>	<b>Fairly Often</b>	<b>Very Often</b>
1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that happened that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

*Appendix D.*

## Difficulties in Emotion Regulation Scale

**DERS**

We would like to ask you some questions about your emotional life. For each item, please answer using the following scale:

	<b>1) Almost never (0-10%)</b>	<b>2) Sometimes (11-35%)</b>	<b>3) About half the time (36-65%)</b>	<b>4) Most of the time (66-90%)</b>	<b>5) Almost always (91-100%)</b>
1. I experience my emotions as overwhelming and out of control.	1	2	3	4	5
2. When I'm upset, I have difficulty getting work done.	1	2	3	4	5
3. When I'm upset, I become out of control.	1	2	3	4	5
4. When I'm upset, I have difficulty focusing on other things.	1	2	3	4	5
5. When I'm upset, I feel out of control.	1	2	3	4	5
6. When I'm upset, I can still get things done.	1	2	3	4	5
7. When I'm upset, I feel I can remain in control over my behaviors.	1	2	3	4	5
8. When I'm upset, I have difficulty concentrating.	1	2	3	4	5
9. When I'm upset, I have difficulty controlling my behaviors.	1	2	3	4	5
10. When I'm upset, I lose control over my behaviors.	1	2	3	4	5



*Appendix E.*

## Parental Monitoring (Parent Report)

**Parental Monitoring**

We are interested in how much you know about what your child does in school and out of school, who his/her friends are, and so forth. For each item below, circle the number that best describes your child and yourself.

1. Do you know what your child does during his/her free time?
  - 1) Almost always
  - 2) Most of the time
  - 3) It varies
  - 4) Seldom
  - 5) Never
  
2. Do you usually know what type of homework your child has?
  - 1) Almost always
  - 2) Most of the time
  - 3) It varies
  - 4) Seldom
  - 5) Never
  
3. Do you know what your child spends his/her money on?
  - 1) Almost always
  - 2) Most of the time
  - 3) It varies
  - 4) Seldom
  - 5) Never
  
4. Do you usually know when your child has an exam or paper due at school?
  - 1) Almost always
  - 2) Most of the time
  - 3) It varies
  - 4) Seldom
  - 5) Never
  
5. Do you know where your child goes when he/she is out with friends at night?
  - 1) Yes, fully
  - 2) Yes, pretty well
  - 3) Yes, some

- 4) No, very little
  - 5) No, nothing
6. In the last month, have you ever had no idea where your child was at night?
- 1) It has not happened
  - 2) At a single occasion
  - 3) At some occasions
  - 4) At many occasions
  - 5) Practically all of the time
7. Do you usually know where your child goes and what he/she does after school?
- 1) Yes, fully
  - 2) Yes, pretty well
  - 3) Yes, some
  - 4) No, very little
  - 5) No, nothing
8. Do you know which friends your child hangs out with during his/her free time?
- 1) Know all of them
  - 2) Know most of them
  - 3) Know some of them
  - 4) Know only a few
  - 5) Know none of them
9. Does your child talk at home about how he/she is doing in the different subjects at school?
- 1) Tells almost everything
  - 2) Tells quite much
  - 3) Partly
  - 4) Keeps a lot to him/herself
  - 5) Keeps almost everything to him/herself
10. Does your child have a lot of secrets from you about what he/she does during his/her free time?
- 1) Very much
  - 2) Quite a lot
  - 3) Some
  - 4) Only a little
  - 5) Not at all

11. Does your child hide a lot from you about what he/she does during nights and on weekends?
- 1) Very much
  - 2) Quite much
  - 3) A part
  - 4) Just a little
  - 5) Not at all
12. Does your child usually tell you how school was when he/she gets home (how he/she did on different exams, his/her relationships with teachers etc.)?
- 1) Very often
  - 2) Quite often
  - 3) Occasionally
  - 4) More seldom
  - 5) Almost never
13. When your child has been out in the evening, does he/she want to tell you where he/she went and what he/she did?
- 1) Very often
  - 2) Quite often
  - 3) Occasionally
  - 4) More seldom
  - 5) Almost never
14. In the last month, have you talked with the parents of your child's friends?
- 1) Several times a week
  - 2) At least once a week
  - 3) A few times this month
  - 4) At some occasion this month
  - 5) No
15. How often do you talk to your child's friends when they come to your house (ask what they do, how they think and feel about different things)?
- 1) Almost always
  - 2) Often
  - 3) Now and then
  - 4) Seldom
  - 5) Almost never

16. During the past month, how often have you started a conversation with your child about his/her free time?
- 1) Several times a week
  - 2) At least once a week
  - 3) A few times this month
  - 4) At some occasion this month
  - 5) No
17. How often do you ask your child to tell you about things that have happened during a regular day in school?
- 1) Several times a week
  - 2) At least once a week
  - 3) A few times this month
  - 4) At some occasion this month
  - 5) No
18. Do you usually ask your child to tell you what has happened during his/her free time (who he/she saw in town, free time activities, etc.)?
- 1) Very often
  - 2) Quite often
  - 3) Now and then
  - 4) Seldom
  - 5) Almost never
19. How often do you ask your child to sit down and tell you about things that have happened during a regular day in school?
- 1) Very often
  - 2) Quite often
  - 3) Now and then
  - 4) Seldom
  - 5) Almost never
20. If your child has been out very late one night, do you require that he/she explains what he/she did and whom he/she was with?
- 1) Yes, always
  - 2) Yes, most of the time
  - 3) Yes, sometimes
  - 4) No, seldom
  - 5) No, never
21. Does your child need to have your permission to stay out late on a weekday evening?

- 1) Yes, always
- 2) Yes, most of the time
- 3) Yes, sometimes
- 4) No, seldom
- 5) No, never

22. Before your child goes out on a Saturday night, does he/she have to tell you where he/she is going and with whom?

- 1) Yes, always
- 2) Yes, most of the time
- 3) Yes, sometimes
- 4) No, seldom
- 5) No, never

23. Does your child have to tell you where he/she is at night, who he/she is with, and what they do together?

- 1) Yes, always
- 2) Yes, most of the time
- 3) Yes, sometimes
- 4) No, seldom
- 5) No, never

24. Do you always want to know your child's whereabouts' on his/her free time?

- 1) Yes, always
- 2) Yes, most of the time
- 3) Yes, sometimes
- 4) No, seldom
- 5) No, never

25. If your child goes out on a Saturday night, does he/she have to inform you in advance about who he/she will be with and what he/she will be doing?

- 1) Yes, always
- 2) Yes, most of the time
- 3) Yes, sometimes
- 4) No, seldom
- 5) No, never

*Appendix F.*

## Parental Monitoring (Adolescent Report)

**Parental Monitoring**

We are interested in how much your parents know about what you do in school and out of school, who your friends are, and so forth. For each item below, circle the number that best describes your parents and yourself.

1. Do your parents know what you do during your free time?
  - 1) Almost always
  - 2) Most of the time
  - 3) It varies
  - 4) Seldom
  - 5) Never
  
2. Do your parents usually know what type of homework you have?
  - 1) Almost always
  - 2) Most of the time
  - 3) It varies
  - 4) Seldom
  - 5) Never
  
3. Do your parents usually know what you spend your money on?
  - 1) Almost always
  - 2) Most of the time
  - 3) It varies
  - 4) Seldom
  - 5) Never
  
4. Do your parents usually know when you have an exam or paper due at school?
  - 1) Almost always
  - 2) Most of the time
  - 3) It varies
  - 4) Seldom
  - 5) Never
  
5. Do your parents know where you go when you are out with friends at night?
  - 1) Yes, fully
  - 2) Yes, pretty well
  - 3) Yes, some
  - 4) No, very little

- 5) No, nothing
6. In the last month, have your parents ever had no idea where you were at night?
  - 1) It has not happened
  - 2) At a single occasion
  - 3) At some occasions
  - 4) At many occasions
  - 5) Practically all of the time
7. Do your parents usually know where you go and what you do after school?
  - 1) Yes, fully
  - 2) Yes, pretty well
  - 3) Yes, some
  - 4) No, very little
  - 5) No, nothing
8. Do your parents know which friends you hang out with during your free time?
  - 1) Know all of them
  - 2) Know most of them
  - 3) Know some of them
  - 4) Know only a few
  - 5) Know none of them
9. Do you talk at home about how you are doing in different subjects in school?
  - 1) Tell almost everything
  - 2) Tell quite much
  - 3) Partly
  - 4) Keep a lot to myself
  - 5) Keep almost everything to myself
10. Do you have a lot of secrets from your parents about what you do in your free time?
  - 1) Very much
  - 2) Quite a lot
  - 3) Some
  - 4) Only a little
  - 5) Not at all
11. Do you hide a lot from your parents about what you do during nights and on weekends?
  - 1) Very much
  - 2) Quite much

- 3) A part
  - 4) Just a little
  - 5) Not at all
12. Do you usually tell your parents how school was when you get home (how you did on different exams, your relationships with teachers, etc.)?
- 1) Very often
  - 2) Quite often
  - 3) Occasionally
  - 4) More seldom
  - 5) Almost never
13. When you have been out in the evening, do you want to tell your parents where you went and what you did?
- 1) Very often
  - 2) Quite often
  - 3) Occasionally
  - 4) More seldom
  - 5) Almost never
14. In the last month, have your parents talked with the parents of your friends?
- 1) Several times a week
  - 2) At least once a week
  - 3) A few times this month
  - 4) At some occasion this month
  - 5) No
15. How often do your parents talk to your friends when they come to your house? (Ask what they do, how they think and feel about different things)
- 1) Almost always
  - 2) Often
  - 3) Now and then
  - 4) Seldom
  - 5) Almost never
16. During the past month, how often have your parents started a conversation with you about your free time?
- 1) Several times a week
  - 2) At least once a week
  - 3) A few times this month
  - 4) At some occasion this month



- 5) No
17. How often do your parents ask you to tell them about things that have happened during a regular day in school?
- 1) Very often
  - 2) Quite often
  - 3) Now and then
  - 4) Seldom
  - 5) Almost Never
18. Do your parents usually ask you to tell them what has happened during your free time? (who you saw in town, free time activities, etc.)
- 1) Very often
  - 2) Quite often
  - 3) Now and then
  - 4) Seldom
  - 5) Almost never
19. How often do your parents ask you to sit down and tell them about things that have happened during a regular day in school?
- 1) Very often
  - 2) Quite often
  - 3) Now and then
  - 4) Seldom
  - 5) Almost never
20. If you have been out very late one night, do your parents require that you explain what you did and whom you were with?
- 1) Yes, always
  - 2) Yes, most of the time
  - 3) Yes, sometimes
  - 4) No, seldom
  - 5) No, never
21. Do you need to have your parents' permission to stay out late on a weekday evening?
- 1) Yes, always
  - 2) Yes, most of the time
  - 3) Yes, sometimes
  - 4) No, seldom
  - 5) No, never

22. Before you go out on a Saturday night, do you have to tell your parents where you are going and with whom?
- 1) Yes, always
  - 2) Yes, most of the time
  - 3) Yes, sometimes
  - 4) No, seldom
  - 5) No, never
23. Do you have to tell your parents where you are at night, who you are with, and what you do together?
- 1) Yes, always
  - 2) Yes, most of the time
  - 3) Yes, sometimes
  - 4) No, seldom
  - 5) No, never
24. Do your parents always want to know your whereabouts' on your free time?
- 1) Yes, always
  - 2) Yes, most of the time
  - 3) Yes, sometimes
  - 4) No, seldom
  - 5) No, never
25. If you go out on a Saturday night, do you have to inform your parents in advance about who you will be with and what you will be doing?
- 1) Yes, always
  - 2) Yes, most of the time
  - 3) Yes, sometimes
  - 4) No, seldom
  - 5) No, never

*Appendix G.*

## Parent-Child Relationship (Parent Report)

**Parent-Child Relationship**

The following questions deal with your relationship with **this child**. Read each question and circle the number that describes your relationship with him/her.

For questions 1 through 8, please use the following scale:

- 1 = Extremely
- 2 = Very
- 3 = Somewhat
- 4 = A little
- 5 = Not at all

	<b>1) Extremely</b>	<b>2) Very</b>	<b>3) Somewhat</b>	<b>4) A little</b>	<b>5) Not at all</b>
1. How much do you yell at this child after you've had a bad day?	1	2	3	4	5
2. How much does this child yell at you after he or she has had a bad day?	1	2	3	4	5
3. How much do you nag this child about what he or she is doing wrong?	1	2	3	4	5
4. How much does this child nag you about what you are doing wrong?	1	2	3	4	5
5. How much do you criticize this child?	1	2	3	4	5
6. How much does this child criticize you?	1	2	3	4	5
7. How often does this child get into disagreements or fights with you?	1	2	3	4	5
8. How much do you enjoy being this child's parent (or caregiver)?	1	2	3	4	5

*Appendix H.*

## Parent-Child Relationship (Adolescent Report)

**Parent-Child Relationship**

Mother/Stepmother \_\_\_\_\_

The following questions deal with your relationship with your mother. Read each question and circle the number that describes your relationship with your mother.

Please use the following scale:

- 1 = Extremely
- 2 = Very
- 3 = Somewhat
- 4 = A little
- 5 = Not at all

<b>MOTHER/STEPMOTHER</b>					
	<b>1) Extremel y</b>	<b>2) Very</b>	<b>3) Somewha t</b>	<b>4) A little</b>	<b>5) Not at all</b>
1. How much do you yell at this person after you've had a bad day?	1	2	3	4	5
2. How much does this person yell at you after he or she has had a bad day?	1	2	3	4	5
3. How much do you nag this person about what he or she is doing wrong?	1	2	3	4	5
4. How much does this person nag you about what you are doing wrong?	1	2	3	4	5
5. How much do you criticize this person?	1	2	3	4	5
6. How much does this person criticize you?	1	2	3	4	5
7. How often does this person get into disagreements or fights with you?	1	2	3	4	5
8. How much do you enjoy being this person's child/stepchild?	1	2	3	4	5

Father/Stepfather \_\_\_\_\_

The following questions deal with your relationship with your father. Read each question and circle the number that describes your relationship with your father.

<b>FATHER/STEPFATHER</b>					
	<b>1) Extremely</b>	<b>2) Very</b>	<b>3) Somewhat</b>	<b>4) A little</b>	<b>5) Not at all</b>
1. How much do you yell at this person after you've had a bad day?	1	2	3	4	5
2. How much does this person yell at you after he or she has had a bad day?	1	2	3	4	5
3. How much do you nag this person about what he or she is doing wrong?	1	2	3	4	5
4. How much does this person nag you about what you are doing wrong?	1	2	3	4	5
5. How much do you criticize this person?	1	2	3	4	5
6. How much does this person criticize you?	1	2	3	4	5
7. How often does this person get into disagreements or fights with you?	1	2	3	4	5
8. How much do you enjoy being this person's child/stepchild?	1	2	3	4	5

*Appendix I.*

Inventory of Parent and Peer Attachment

**IPPA-Mother**

This questionnaire asks about your relationship with an important person in your life; your mother. Please read the directions carefully.

Some of the following statements ask about your feelings about your mother or the person who has acted as your mother. If you have more than one person acting as your mother (e.g. a natural mother and step-mother) answer the questions for the one you feel has most influenced you.

Mother (stepmother) \_\_\_\_\_

Please circle each statement and circle the ONE number that tells how true the statement is for you now.

	<b>1) Almost Never or Never True</b>	<b>2) Not Very Often True</b>	<b>3) Some- times True</b>	<b>4) Often True</b>	<b>5) Almost Always or Always True</b>
1. I tell my mother about my problems and troubles.	1	2	3	4	5
2. My mother helps me understand myself better.	1	2	3	4	5
3. If my mother knows something is bothering me, she asks me.	1	2	3	4	5
4. My mother has her own problems, so I don't bother her with mine.	1	2	3	4	5
5. My mother respects my feelings.	1	2	3	4	5
6. When I'm angry about something my mother tries to be understanding.	1	2	3	4	5
7. I wish I had a different mother.	1	2	3	4	5

8. My mother accepts me as I am.	1	2	3	4	5
9. I don't get much attention at home.	1	2	3	4	5
10. I get easily upset at home.	1	2	3	4	5
11. Talking over my problems with my mother makes me feel ashamed or foolish.	1	2	3	4	5
12. I feel angry with my mother.	1	2	3	4	5

### IPPA-Father

This questionnaire asks about your relationship with an important person in your life; your father. Please read the directions carefully.

Some of the following statements ask about your feelings about your father or the person who has acted as your father. If you have more than one person acting as your father (e.g. a stepfather and natural father) answer the questions for the one you feel has most influenced you.

Father (stepfather) \_\_\_\_\_

Please circle each statement and circle the ONE number that tells how true the statement is for you now.

	<b>1) Almost Never or Never True</b>	<b>2) Not Very Often True</b>	<b>3) Some- times True</b>	<b>4) Often True</b>	<b>5) Almost Always or Always True</b>
1. I tell my father about my problems and troubles.	1	2	3	4	5
2. My father helps me understand myself better.	1	2	3	4	5
3. If my father knows something is bothering me, he asks me.	1	2	3	4	5

4. My father has his own problems, so I don't bother him with mine.	1	2	3	4	5
5. My father respects my feelings.	1	2	3	4	5
6. When I'm angry about something my father tries to be understanding.	1	2	3	4	5
7. I wish I had a different father.	1	2	3	4	5
8. My father accepts me as I am.	1	2	3	4	5
9. I don't get much attention at home.	1	2	3	4	5
10. I get easily upset at home.	1	2	3	4	5
11. Talking over my problems with my father makes me feel ashamed or foolish.	1	2	3	4	5
12. I feel angry with my father.	1	2	3	4	5



*Appendix J.*

## Emotion Regulation Checklist

**ERC**

The following statements describe how people respond to different situations. Please select the number that best describes you. Be sure you give an answer for all the statements.

	<b>1) Rarely/Never</b>	<b>2) Sometimes</b>	<b>3) Often</b>	<b>4) Almost always</b>
1. I am a cheerful person.	1	2	3	4
2. I respond well (positively) to adults when they act friendly or neutral to me.	1	2	3	4
3. I respond well (positively) when friends act friendly or neutral to me.	1	2	3	4
4. I can say when I am feeling sad, angry or mad, fearful or afraid.	1	2	3	4
5. I feel sad or I have no energy.	1	2	3	4
6. I show very little feeling. People think I don't have feelings.	1	2	3	4
7. I show concern and understanding when others are upset or distressed.	1	2	3	4
8. When friends are mean to me or treat me badly, I have normal negative feelings such as anger, fear or frustration.	1	2	3	4