

**Emotion Regulation Transmission in the Context of Parenting Behaviors
as Predictors of Adolescent Substance Use**

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Abstract

The transmission of emotion regulation from parent to adolescent as well as the relationship between adolescent emotion regulation and substance use is not clearly understood in extant psychological literature. The present study hypothesizes that parents transmit their emotion regulation skills to their adolescents via the mediator of parenting behaviors and that adolescents who are better emotion regulators are less likely to use substances. In the present study, cross-sectional and longitudinal structural equation modeling analyses were utilized to determine the relationship among these variables. In the cross-sectional analyses ($n = 219$), the sample was 55% male and were between the ages of 12 to 18 years ($M = 15.12$). In the longitudinal analyses ($n = 129$), the sample was 42% male and were between the ages of 13 to 21 years ($M = 17.13$). In both the cross-sectional and longitudinal models, adolescents with high negative parenting had higher levels of lability/negativity, whereas adolescents with high positive parenting had better emotion regulation skills and lower levels of substance use. In addition, in the longitudinal analyses, higher levels of suppression in parents were negatively related to adolescent emotion regulation. The findings of the present study highlight that parents transmit emotion regulation skills to their adolescents and that parenting behaviors may be a key point of intervention for promoting adolescent emotion regulation and demoting adolescent substance use.

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Chapter 1 – Introduction

Among high school students in the United States, almost 45% have tried cigarettes, 70.8% have tried alcohol, and almost 40% have tried marijuana. Drug use is becoming an increasing concern among adolescent populations (Centers for Disease Control and Prevention, 2012), and drug abuse in the United States is estimated to cost approximately \$510.8 billion a year (Miller & Hendrie, 2009). Consequently, determining the antecedents of and pathways that lead to adolescent substance use is crucial for both adolescent health and minimizing the societal cost of drug use. Given that the family environment is a major determinant of adolescent developmental outcomes, including substance use, it is essential to understand the mechanisms through which this environment functions. In the present study, we examine how intergenerational transmission of emotion regulation may be related to adolescents' substance use behaviors. Specifically, we investigate whether parents' emotion regulation strategies of reappraisal and suppression may predict their children's emotion regulation skills partially mediated through their positive and negative parenting behaviors.

In order to understand how family subsystems interact to influence adolescent substance use, we can utilize family systems theory. Family systems theory describes a way in which family sub-systems are able to influence adolescent development. For example, the parent-adolescent relationship may influence adolescent substance use such that an adolescent who has a poor quality relationship with a parent may choose to self-medicate with substances. The present study utilizes this theory and examines parent emotion regulation as a possible mechanism through which diminished parenting practices may occur. In addition to family systems theory, as we discuss in the following section, it is vital to utilize theories on regulation to help understand how both parent and adolescent emotion regulation function as mechanisms that are predictive of adolescent substance use behaviors in family systems theory.

1.1 - Definitions of Self- and Emotion Regulation

Although theories and definitions regarding self-regulation differ, self-regulation in the present study is defined as “exertion of control over the self by the self” (Muraven & Baumeister, 2000, pp. 247). Consistent with this definition, self-regulation then involves inhibiting or changing initial and dominant thoughts, feelings, or behaviors in order to maximize one's own long-term rewards (Baumeister & Alquist, 2009; Muraven & Baumeister, 2000).

Within this framework, self-regulation is a finite resource. That is, engaging in an act of self-regulation depletes this resource such that further immediate acts of self-regulation are impaired (Baumeister, Vohs, & Tice, 2007; Muraven & Baumeister, 2000). One can only recuperate this lost resource by not engaging in any stressful acts of self-regulation (Muraven & Baumeister, 2000). Emotion regulation, the self-regulatory skill of interest in the present study, is defined as the processes through which individuals modulate their emotions in order to respond appropriately to environmental demands (Aldao, Nolen-Hoeksema, & Schweizer, 2010).

It is possible to deplete one's emotion regulatory resources by engaging in stressful social interactions. Engaging in relationships with high negativity and low support are associated with decrements in self-regulation, whereas the opposite is true for relationships that are warm and caring (Fry et al., 2012; Moilanen et al., 2010). Adolescents who experience these poor parenting behaviors may consequently experience emotion regulatory depletion, which could put them at risk for increased risky behaviors such as engaging in substance use. Finally, we examine the relationship of these variables to the adolescent adjustment outcome of emotion regulation, which in turn is related to substance use behaviors.

Cicchetti, Ackerman, & Izard (1995) propose a theory of emotion regulation in which one must be aware of their emotions and in which both positive and negative emotions are regulated via a modification process. In addition, Gross (2002) proposes a theory of emotion regulation in which two commonly used strategies for regulating emotions are reappraisal and suppression. Reappraisal involves changing the way one thinks about a situation in order to minimize its potential emotion influence whereas suppression involves inhibiting one's displays of emotion.

1.2 - Parent Emotion Regulation Strategies

Extant research largely indicates that reappraisal is a more effective emotion regulation strategy than is suppression (Gross, 2002). Utilizing suppression – as opposed to utilizing reappraisal – is associated with a host of negative consequences. Those who utilize suppression – rather than reappraisal – show not only fewer negative but also fewer positive emotions, resulting in their being liked less and having less social support. In addition, utilizing suppression is associated with memory impairment and increases in physiological response (Gross, 2002). Finally, suppression and reappraisal are related differentially to emotional experience and behavior such that suppression is more taxing and may be related to more

disturbances in mental and physical health (Goldin, McRae, Ramel, & Gross, 2008). Thus, extant research indicates that reappraisal is a generally more effective emotion regulation strategy than is suppression.

Parent reappraisal and suppression are also related to parenting behaviors as well as adolescent emotion regulation skills. Indicating a link between parent emotion regulation strategies and parenting behaviors, extant research in toddlers indicates that mothers who utilize reappraisal are less likely to engage in harsh, over-reactive discipline because they experience and display fewer negative emotions (Lorber, 2012). In addition, parents who utilized suppression had adolescents with poorer emotional understanding possibly because parents who utilized reappraisal were more likely to engage in emotion-coaching with their adolescents (Remmes & Ehrenreich-May, 2014). Thus, parents who utilize reappraisal engage in fewer negative parenting behaviors and more emotion-coaching with their children, which may be related to better outcomes for their adolescents.

1.3 - Parent Emotion Regulation and Adolescent Emotion Regulation

The relationships between parent emotion regulation and adolescent emotion regulation have not been studied well in extant literature, especially in adolescents. In their review, Barilola, Gullone, and Hughes (2011) argue that parents must be able to manage effectively their own emotions in order to socialize properly emotions and emotion regulation in their children. It has been proposed that dysregulated emotions in parents are related to poor emotional outcomes in children, and some empirical findings indirectly support this theory suggesting that parents' dysregulated emotions – indicated by depression – predict adolescents' emotion dysregulation – also indicated by depression (e.g., Compton, Snyder, Schrepferman, Bank, & Shortt, 2003). However, few studies have examined the direction transmission of emotion regulation from parent to child. A recent study showed that mother's use of suppression as an emotion regulation strategy is related to the child's use of suppression as an emotion regulation strategy. The same was not true for father's use of suppression, suggesting that mothers and fathers may have differential effects on child and adolescent emotion regulation socialization (Barilola, Hughes, & Gullone, 2012). The present study contributes to and builds upon existing literature because literature regarding the transmission of emotion regulation skills is exceedingly scarce. In addition, most of available studies have focused primarily on child populations. Therefore, the present study extends this extant research by examining an adolescent population. Because we

know little about how parents may transmit their emotion regulation abilities to their adolescents, this study provides critical examination of possible processes through which parents' emotion regulation skills are linked to their children's emotion regulation skills.

1.4 - Parenting Behaviors and Adolescent Emotion Regulation

Both positive and negative parenting behaviors are related to adolescent emotion regulation skills. Positive parenting should bolster adolescent emotion regulation, whereas negative parenting skills should deplete adolescent emotion regulation. For example, better parent-child relationship quality predicts better child emotion regulation (Bynum & Brody, 2005). Similarly, findings from a prior cross-sectional study indicate that parent-adolescent relationship quality is associated with adolescent emotion regulation. Specifically, Hutt, Wang, and Evans (2009) examined how parents and adolescents interacted during a game and found that adolescents who engaged in more discussions of agreement with their mother had better emotion regulation than did pairs with more discussions of disagreement. In addition, harsh parenting also positively predicted inability to regulate emotional states in adolescents (Burnette, Oshri, Lax, Richards, & Ragbeer, 2012). Taken together, it appears that high levels of harsh parenting and low levels of warm parenting are predictive of low levels of emotion regulation in adolescents. The present study extends extant literature by examining simultaneously both positive and negative parenting behaviors, as well as their interaction, in the same model to evaluate their unique and relative contributions to linking between parents' and adolescents' emotion regulation.

1.5 - Adolescent Emotion Regulation and Substance Use

Adolescent emotion regulation is thought to be related to substance use in two distinct ways. First, poor emotion regulation skills are directly related to high levels of substance use (Cooper, Wood, Orcutt, & Albino, 2003). Extant research has indicated protective effects of adolescent emotion regulation for decreased substance use such that those adolescents with better emotion regulation skills are less likely to use substances (Conner, Stein, & Longshore, 2009). Second, we expect that emotion regulation may be related to substance use through regulatory depletion. In other words, adolescents whose emotion regulation skills have been depleted may be more likely to engage in substance use. Researchers have found that emotion dysregulation fully mediates the relationship between post-traumatic stress disorder (PTSD) and impulsive behaviors in adults (Weiss, Tull, Viana, Anestis, & Gratz, 2012). This result suggests that adults

may use impulsive behaviors, such as drug use, as an emotion regulation strategy. In addition, results from studying affect dysregulation in adolescents demonstrate that high levels of depression and anxiety were related to adolescent substance use. Such findings suggest that adolescents may self-medicate, or use substances to regulate their negative affect (Cooper, Flanagan, Talley, & Micheas, 2006; Dorad, Berthoz, Phan, Corcos, & Bungener, 2008).

The present study extends this extant literature by examining a variety of family stressors and their relationship to adolescent substance use. Adolescents may engage in substance use as an emotion regulation strategy to cope with negative parenting behaviors, and indeed extant literature suggests that adolescents with high levels of negative affect and low levels of positive affect are more vulnerable to substance use (Kassel et al., 2010). In addition, adolescents who have poor emotion regulation skills may be more prone to using substances and addiction (Schreiber, Grant, & Odlaug, 2012). Thus, in the present study, we posit that adolescents who have poor emotion regulation skills are more likely to utilize substances. We also hypothesize that adolescents who experience poor parenting behaviors may experience emotion regulatory depletion resulting in poor emotion regulation skills and consequently are more likely to engage in substance use.

1.6 - Gender Differences

Gender differences regarding emotion regulation have not been well explored. However, gender differences have been noted in extant literature regarding emotion regulation strategies in adults. For example, females tend to have higher levels of rumination, reappraisal, and active coping than men do (Nolen-Hoeksema & Aldao, 2011). Thus, we know that women do regulate their emotions differently than do men; but these differences have not been explored in an adolescent population. Gender differences in the relationship between parenting behaviors and adolescent emotion regulation have also not been well studied in extant literature. The present study examines gender differences in the association between parenting behaviors and adolescent emotion regulation. Furthermore, because gender differences in the transmission of emotion regulation skills from parent to adolescent have not been systematically investigated in extant literature, the present study examines any differences in the relationship between parent and adolescent emotion regulation between male and female adolescents.

In addition, although gender differences regarding levels of substance use in adolescence have been documented such that males have higher levels of substance use than do females (Wills, Resko, Ainette, & Mendoza, 2004), gender differences in the relationship between parenting behaviors and adolescent substance use have not been well explored in extant literature. Therefore, in the present study, we examine differences in the relationship between parenting behaviors and adolescent substance use between male and female adolescents. When examining adolescent emotion regulation as a predictor of adolescent substance use, some extant research has focused solely on examining the antecedents and different pathways leading to male substance use (e.g., Conner et al., 2009) while other researchers have utilized gender as a covariate rather than examine differences in associations between adolescent emotion regulation and substance use. Still other researchers suggest that the processes leading to adolescent problem behaviors are similar between male and female adolescents (Cooper et al., 2003). Because gender differences in the processes leading to adolescent substance have not been thoroughly examined in extant literature, in the present study, we examine gender differences in the relationship between adolescent emotion regulation and adolescent substance use. Due to the limited number of male caregivers in the present sample, it is not possible to examine gender differences among caregivers.

1.7 - The Present Study

In the present study, we seek to examine the associations among parent emotion regulation, parenting behaviors, and the adolescent outcomes of emotion regulation and substance use. We examine how parents and the family environment socialize emotion regulation in adolescents, a topic that is not understood well in extant literature. We test the following hypotheses using both cross-sectional and longitudinal data; however, due to the decrease in sample size while utilizing longitudinal data, the longitudinal data analyses are supplemental. Examining longitudinal data allows us to examine change over time in adolescent substance use. In the cross-sectional analyses, all variables are utilized from Time 1. In the longitudinal analyses, Time 1 parent emotion regulation and parenting behaviors and Time 2 adolescent emotion regulation was utilized. The outcome of adolescent substance use was a standardized residual score of Time 1 adolescent substance use on Time 2 adolescent substance use. Figure 1 presents a cross-sectional visual representation of the following hypotheses whereas Figure 2 presents a longitudinal visual representation of the following hypotheses.

In the present study, we have the following hypotheses:

Hypothesis 1: Adolescent emotion regulation may mediate the relationship between positive and negative parenting behaviors and substance use.

Hypothesis 1-1: Higher levels of negative parenting behaviors and lower levels of positive parenting behaviors may be related to lower levels of emotion regulatory ability in adolescents.

Hypothesis 1-2: The relationship between parent emotion regulation skills and adolescent emotion regulation may be mediated by positive and negative parenting behaviors.

Hypothesis 1-3: Adolescents who have lower emotion regulatory abilities may have higher levels of substance use.

Hypothesis 2: The relationship between parent emotion regulation and adolescent substance use may be mediated by parenting behaviors and adolescent emotion regulation.

Chapter 2 – Method

2.1 - Participants

Participants were adolescents and their primary caregivers who were part of a longitudinal study conducting research on youth's healthy development. A total of 219 adolescents (male = 55%) participated at Time 1 and were between the ages of 12 to 18 years ($M = 15.12$, $SD = 1.53$). Adolescents in the sample were 89% White with the other 11% reporting themselves as African-American, Hispanic, or other races. At Time 1 of the study, primary caregivers were 80.9% mothers, 14.5% fathers, 3.2% grandmothers, and 1.4% other, such as foster parent. Mean primary caregiver age was 45 years ($SD = 6.47$) and ranged from 28 to 71 years. Primary caregivers (14.5% male) reported their race as 90% White with the other 10% reporting themselves as African-American, Hispanic, or other races. Family income ranged from no source of income to earning more than \$200,000 a year and mean family income was between \$35,000 and \$49,000 a year at Time 1. Only adolescent and no parent data were collected at Time 2. Therefore, no income information was available at Time 2 of the study. In Time 2 of the study, 167 adolescents between the ages of 13 to 21 years ($M = 17.13$, $SD = 1.65$) participated. Adolescent participants were 54% male and reported as 89% White with the other 11% reporting themselves as African-American, Hispanic, or other races (See Appendix A for demographic questions). Data from Time 1 (cross-sectional analyses) and Time 1 and 2 (longitudinal analyses) of the study were utilized in the present analyses. The cross-sectional analyses included 219 participants who participated in Time 1 of the longitudinal study. The longitudinal analyses included 129 participants who participated in both Time 1 and 2 of the longitudinal analysis.

2.2 - Procedures

Participants included in the present study were part of a larger longitudinal study. For Time 1 of this study, participants were contacted via letters in the mail and/or by phone using previous contact information gathered during the previous wave of the study. Adolescents and their parents were interviewed privately and simultaneously at Time 1 of the study, and both received monetary compensation. For Time 2 of the study, those who participated in previous waves of the study were contacted. Adolescents who chose to participate in Time 2 of the study

were emailed a uniquely identified link to an online survey. There were 90 adolescents who did not complete Time 2 of the study. The procedures of the current study were approved by the university's Internal Review Board.

2.3 - Measures

Parent emotion regulation. Parents were asked to report their emotion regulation ability using the Emotion Regulation Questionnaire (Gross & John, 2003) at Time 1 (See Appendix B). This 10-item questionnaire examines the two emotion regulation strategies of reappraisal (6 items) and suppression (4 items) in parents using a Likert scale ranging from (1 = Strongly disagree) to (7 = Strongly agree). Reappraisal is an emotion regulation strategy that involves thinking about an emotion-eliciting situation in such a way as to change the emotional impact that situation might have, whereas suppression is an emotion regulation strategy that involves inhibiting the expression of emotions. An example of a question from the reappraisal subscale is “When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*” and from the suppression subscale is “I control my emotions by *not expressing them*.” In the current sample, the reliability (Cronbach's alpha) coefficients were .79 for the reappraisal subscale and .70 for the suppression subscale.

Negative parenting behaviors. Both adolescents and parents were asked to report on the parent-adolescent relationship using the Parent-Child Relationship Scale (Hetherington & Clingempeel, 1992) at Time 1 (See Appendices C and D). Adolescents reported separately for their relationship with mothers and fathers. This questionnaire assesses the degree of negative and conflictual behaviors in the parent-child relationship with 8-items and uses a Likert scale ranging from (1 = Extremely) to (5 = Not at all). Examples of questions are “How much do you yell at this child after you've had a bad day” and “How much does this child criticize you.” In the current sample, reliability (Cronbach's alpha) of the overall mean score was .73 for adolescent reports on mothers, .73 for adolescent reports on fathers, and .84 for parent report. We utilized the mean of these three scores as the variable of interest to evaluate the relationships among these three indicators.

Positive parenting behaviors. Adolescents were asked to report on the Inventory of Parent and Peer Attachment (Raja, McGee, & Stanton, 1992) at Time 1 (See Appendix E). This questionnaire asks about the level of perceived support from parents (12 items). Answers range from (1 = Almost never or never true) to (5 = Almost always or always true) with higher values

indicating higher levels of support. Examples of questions are “My parents help me understand myself better” and “My parents respect my feelings.” In the current sample, reliability (Cronbach’s alpha) of the overall mean score was .85.

Adolescent emotion regulation. Adolescent emotion regulation was composed of both adolescent and parent reports on the Emotion Regulation Checklist (Shields & Cicchetti, 1997; Shields & Cicchetti, 2001) in the cross-sectional analyses. No parent report was collected at Time 2. Therefore, we utilized only adolescent report of emotion regulation ability at Time 2 for the longitudinal analyses. Adolescents were asked to report their ability to emotion regulate, and parents were asked to report on their adolescent’s ability to emotion regulate. The emotion regulation subscale (8 items) asks the respondent to rate adaptive emotion regulation strategies, such as socially appropriate displays of emotion, as well as emotion awareness and the lability/negativity subscale (15 items) asks the respondent to rate their lack of flexibility and negative affect using a Likert scale ranging from (1 = Rarely/Never) to (4 = Almost always). An example of a question for adolescents on the emotion regulation skill is “I can say when I am feeling sad, angry or mad, fearful or afraid.” and on the lability/negativity subscale is “My excitement bothers other people.” In the current sample, reliability (Cronbach’s alpha) of the emotion regulation subscale score for adolescent report was .66 and .63 for parent report at Time 1. In the current sample, reliability (Cronbach’s alpha) of the lability/negativity subscale score for adolescent report was .70 and .85 for parent report at Time 1. We utilized the mean of the parent and adolescent report on emotion regulation at Time 1 and the mean of the parent and adolescent report of lability/negativity at Time 1 in the cross-sectional analyses. In the current sample, reliability (Cronbach’s alpha) was .63 for adolescent emotion regulation subscale and .76 for lability/negativity report at Time 2. We utilized the mean of the adolescent report on emotion regulation at Time 2 and the mean of the adolescent report of lability/negativity at Time 2 in the longitudinal analyses.

Adolescent substance use. Adolescents filled out the Youth Behaviors substance use measure (Chassin, Rogosch, & Barrera, 1991) at Times 1 and 2 (See Appendix F). This questionnaire asks adolescents about their current and previous drug use of cigarettes, alcohol, marijuana, and other drugs such as inhalants. The primary questions of interest were the typical frequencies of substance use in the past month. Adolescents responded about their typical drug use (1 = Never used, 6 = Usually use every day) for cigarettes, alcohol, and marijuana at Times 1

and 2. We utilized the latent variable of these three scores as the variable of interest based on CFA results. In the current sample, reliability (Cronbach's alpha) was .83 for Time 1 and .81 for Time 2.

Chapter 3 – Results

3.1 - Data Analysis Strategy

Bivariate correlations were conducted in order to determine the relationship between study variables, including positive and negative parenting behaviors, parent regulation, and adolescent regulation and substance use as well as demographic variables such as age, gender, and ethnicity. All variables were coded in a way such that higher scores indicate a higher level of the variable while gender was coded as “0” = female and “1” = male and race was coded as “0” = white and “1” = non-white. All variables were examined for normality. Variables with skewness greater than 3 and kurtosis greater than 10 (Kline, 1998) were transformed in order to meet normality assumptions for Structural Equation Modeling (SEM) analyses. Using the Generalized Linear Model (GLM), tests were conducted to determine the significance of the effects on demographic covariates (age, gender, and ethnicity) on adolescent substance use. Significant covariates were included in the following SEM analyses.

For data analysis, composite variables across parent and adolescent informants were created whenever data were available. Multiple informant data (parent and adolescent report) were available for negative parenting and adolescent emotion regulation and lability/negativity. The correlation between parent and adolescent report was .21 for negative parenting, .38 for emotion regulation, and .36 for lability/negativity. All correlations were significant at $p < .05$. Parent emotion regulation was based off only parent report, whereas positive parenting and adolescent substance were based off only adolescent report.

The SEM analyses to test the hypotheses were conducted using the Mplus Version 7.11 statistical software package (Muthén & Muthén, 2010). Overall model fit indices were examined using the following measures: (1) χ^2 value, (2) degrees of freedom, (3) corresponding p-value, (4) Root Mean Square Error of Approximation (RMSEA), and (5) Confirmatory Fit Index (CFI). An RMSEA value less than .05 and a CFI value equal to or greater than .95 indicated a good fit (Hu & Bentler, 1999). The significance of mediation effects were tested using product-of-coefficients tests using Delta method standard errors for the two-path (single-mediator) or three-path (two mediators in series) mediated effects (Taylor, MacKinnon, & Tein, 2008).

Hypotheses were tested using both cross-sectional and longitudinal analyses. In cross-sectional analyses, all variables (parent emotion regulation, positive and negative parenting behaviors, adolescent emotion regulation, and adolescent substance use) were utilized from Time 1. In the longitudinal analyses, parent emotion regulation and positive and negative parenting behaviors were utilized from Time 1 of data collection, whereas adolescent emotion regulation was utilized from Time 2 of data collection. In the longitudinal analyses, the outcome variable of adolescent substance use was the standardized residuals of Time 1 adolescent substance use on Time 2 adolescent substance use. To test hypothesis 1, we conducted a two-path mediation test to determine if adolescent emotion regulation mediates the relationship between positive and negative parenting behaviors and adolescent substance use. To test hypothesis 1-2, we conducted two-path mediation tests to determine if the relationship between parent emotion regulation skills and adolescent emotion regulation was mediated by positive and negative parenting behaviors. Finally, to test Hypothesis 2, a three-path mediation test determined the significance of the effects of parent emotion regulation on adolescent substance use through the two mediators of parenting behaviors and adolescent emotion regulation.

A two-group SEM was intended to be conducted to examine gender differences in the structural relations among the variables of the cross-sectional model. However, when attempting to examine gender differences, we were unable to conduct nested model comparisons because of the lack of factor invariance for the substance use latent factor between males and females. For females, there was not sufficient variance in marijuana use to be included as a manifest variable for the substance use latent factor. Therefore, substance use latent factor for girls was composed solely of cigarette and alcohol use, whereas substance latent factor for boys was composed of cigarette, alcohol, and marijuana use. The sample was divided in to two groups of male and female adolescents, and the hypothesized models were run separately for each gender group.

An α level of .05 was used for all statistical tests except in the case of the interactions. As prior research has practiced (e.g., Pluess & Belsky, 2010), we used $\alpha = .10$ for testing interactions, considering the low power that characterizes analyses of moderator effects in quasi-experimental research designs (McClelland & Judd, 1993).

3.2 - Preliminary Analysis

Summary statistics and bivariate correlations of the study variables for cross-sectional analyses are presented in Table 1, whereas summary statistics and bivariate correlations of the

study variables for longitudinal analyses are presented in Table 2. The hypothesized relationships among study variables are presented in Figure 1 for cross-sectional analyses and Figure 2 for longitudinal analyses.

Cross-sectional analyses. Based on a GLM analysis, adolescent age was a significant covariate with adolescent emotion regulation and lability/negativity at Time 1 ($p < .001$). In order to control for this significant covariate, adolescent age at Time 1 was regressed on both adolescent emotion regulation and lability/negativity at Time 1 and the standardized residuals were utilized in the cross-sectional analyses. Because of skewness greater than 3 and kurtosis greater than 10, adolescent cigarette, alcohol, and marijuana use at Time 1 were log transformed. These transformed variables were utilized in all cross-sectional analyses.

Longitudinal analyses. Based on a GLM analysis, adolescent age was a significant covariate with adolescent emotion regulation and lability/negativity at Time 2 ($p < .001$). In order to control for this significant covariate, adolescent age at Time 1 was regressed on both adolescent emotion regulation and lability/negativity at Time 2 and the standardized residuals were utilized in the longitudinal analyses. In the longitudinal analyses, the outcome variable of adolescent substance use was the standardized residuals of Time 2 adolescent substance use after controlling for Time 1 adolescent substance use.

3.2 - Hypothesis Testing

Cross-sectional analyses. Model 1 of the cross-sectional analyses examined the relationship between parent suppression and reappraisal, positive and negative parenting, adolescent emotion regulation and lability/negativity, and adolescent substance use at Time 1. Model 1 had a $\chi^2 = 19.77$, $df = 14$, $p = .14$, CFI = .99, RMSEA = .04 $p = .56$ indicating a good model fit. As presented in Figure 3, negative parenting was positively related to adolescent lability/negativity ($b = .34$, SE = .10, $p < .001$). Positive parenting was negatively related to adolescent lability/negativity ($b = -.56$, SE = .12, $p < .001$) and negatively related to adolescent substance use ($b = -.03$, SE = .01, $p = .002$). This finding indicates that adolescents with high negative parenting and low positive parenting had higher levels of lability/negativity. Positive parenting also positively related to adolescent emotion regulation ($b = .70$, SE = .12, $p < .001$), indicating that adolescents with positive parenting had lower levels of substance use. More importantly, the interaction between positive and negative parenting was also significantly and negatively related to adolescent emotion regulation ($b = -.24$, SE = .14, $p = .08$).

The significant interaction effect ($p < .10$) of positive and negative parenting on adolescent emotion regulation was probed via linear regression examining the difference between high and low positive parenting groups and high and low negative parenting groups. It was found that when examining differences between high and low positive parenting groups (see Figure 4), negative parenting were negatively related to adolescent emotion regulation ($b = -.29$, $SE = .12$, $p = .02$) in the high positive parenting group, whereas the effects of negative parenting were not significant for the low positive parenting group ($b = .02$, $SE = .12$, $p = .86$). The findings indicated that for adolescents who received high positive parenting, higher negative parenting was significantly associated with lower adolescent emotion regulation ability. When examining the differences between the high and low negative parenting group, the effects of positive parenting were significant for both the high and low negative parenting groups, indicating that experiencing more positive parenting was related to higher adolescent emotion regulation regardless of the level of negative parenting (see Figure 5).

With respect to mediation effects in Model 1, all possible indirect effects were examined. For two-path mediation pathways, the indirect effects of parent suppression and reappraisal at Time 1 on adolescent emotion regulation and lability/negativity at Time 1 through positive and negative parenting and the parenting interaction at Time 1 were examined. In addition, the indirect effects of positive and negative parenting and the parenting interaction at Time 1 on adolescent substance use at Time 1 through adolescent emotion regulation and lability/negativity at Time 1 were examined. For three-path mediation pathways, the indirect effects of parent suppression and reappraisal at Time 1 on adolescent substance use at Time 1 through positive and negative parenting and the parenting interaction and adolescent emotion regulation and lability/negativity at Time 1 were examined. There were no significant indirect effects in the model among parent suppression and reappraisal, positive and negative parenting, adolescent emotion regulation and lability/negativity, and adolescent substance use for two-path ($p = .14$ to $.79$) and three-path ($p = .25$ to $.82$) mediation. Adolescent emotion regulation did not mediate the relationship between positive and negative parenting behaviors and substance use; thus, hypothesis 1 was not supported. In addition, the relationship between parent emotion regulation and adolescent substance use was not mediated by parenting behaviors and adolescent emotion regulation; thus, hypothesis 2 was not supported.

Gender differences. Model 2 of the cross-sectional analyses examined the relationship between parent suppression and reappraisal, positive and negative parenting, adolescent emotion regulation and lability/negativity, and adolescent substance use at Time 1 for boys in the sample. Model 2 had a $\chi^2 = 25.56$, $df = 14$, $p = .03$, CFI = .93, RMSEA = .08, $p = .14$ indicating a good model fit. As presented in Figure 6, parent reappraisal was negatively related to negative parenting ($b = -.17$, SE = .08, $p = .03$). Parents who utilized reappraisal as an emotion regulation strategy were less likely to use negative parenting tactics. Negative parenting was positively related to adolescent lability/negativity ($b = .27$, SE = .11, $p = .01$), and positive parenting was negatively related to adolescent lability/negativity ($b = -.66$, SE = .15, $p < .001$). Thus, adolescent boys with high negative parenting and low positive parenting had higher levels of lability/negativity. Positive parenting was positively related to adolescent emotion regulation ($b = .71$, SE = .14, $p < .001$) and negatively related to adolescent substance use ($b = -.03$, SE = .01, $p = .04$). Thus, adolescent boys with positive parenting had better emotion regulation skills and lower levels of substance use.

For Model 2, all possible indirect effects were examined. For two-path mediation pathways, the indirect effects of parent suppression and reappraisal at Time 1 on adolescent emotion regulation and lability/negativity at Time 1 through positive and negative parenting and the parenting interaction at Time 1 were examined. In addition, the indirect effects of positive and negative parenting and the parenting interaction at Time 1 on adolescent substance use at Time 1 through adolescent emotion regulation and lability/negativity at Time 1 were examined. For three-path mediation pathways, the indirect effects of parent suppression and reappraisal at Time 1 on adolescent substance use at Time 1 through positive and negative parenting and the parenting interaction and adolescent emotion regulation and lability/negativity at Time 1 were examined. There were no significant indirect effects in the model among parent suppression and reappraisal, positive and negative parenting, adolescent emotion regulation and lability/negativity, and adolescent substance use for two-path ($p = .25$ to $.87$) and three-path ($p = .45$ to $.82$) mediation. Adolescent emotion regulation did not mediate the relationship between positive and negative parenting behaviors and substance use; thus, hypothesis 1 was not supported. In addition, the relationship between parent emotion regulation and adolescent substance use was not mediated by parenting behaviors and adolescent emotion regulation; thus, hypothesis 2 was not supported.

Model 3 of the cross-sectional analyses examined the relationship between parent suppression and reappraisal, positive and negative parenting, adolescent emotion regulation and lability/negativity, and adolescent substance use at Time 1 for girls in the sample. Model 3 had a $\chi^2 = 9.63$, $df = 7$, $p = .21$, CFI = .99, RMSEA = .06 $p = .36$ indicating a good model fit. As presented in Figure 7, parent suppression at Time 1 was negatively related to positive parenting at Time 1 ($b = -.12$, SE = .05, $p = .03$). Positive parenting was positively related to adolescent emotion regulation ($b = .68$, SE = .22, $p = .002$) and was negatively related to adolescent substance use ($b = -.03$, SE = .05, $p = .05$). The findings indicated that parents with higher suppression showed lower positive parenting behaviors and adolescent girls with positive parenting had better emotion regulation skills and lower levels of substance use. Negative parenting had better emotion regulation skills and lower levels of substance use. Negative parenting was positively related to adolescent lability/negativity ($b = .55$, SE = .21, $p = .01$). Thus, adolescent girls with higher negative parenting showed higher levels of lability/negativity.

For Model 3, all possible indirect effects were examined. For two-path mediation pathways, the indirect effects of parent suppression and reappraisal at Time 1 on adolescent emotion regulation and lability/negativity at Time 1 through positive and negative parenting and the parenting interaction at Time 1 were examined. In addition, the indirect effects of positive and negative parenting and the parenting interaction at Time 1 on adolescent substance use at Time 1 through adolescent emotion regulation and lability/negativity at Time 1 were examined. For three-path mediation pathways, the indirect effects of parent suppression and reappraisal at Time 1 on adolescent substance use at Time 1 through positive and negative parenting and the parenting interaction and adolescent emotion regulation and lability/negativity at Time 1 were examined. There were no significant indirect effects in the model among parent suppression and reappraisal, positive and negative parenting, adolescent emotion regulation and lability/negativity, and adolescent substance use for two-path ($p = .07$ to $.92$) and three-path ($p = .74$ to $.93$) mediation. Adolescent emotion regulation did not mediate the relationship between positive and negative parenting behaviors and substance use; thus, hypothesis 1 was not supported. In addition, the relationship between parent emotion regulation and adolescent substance use was not mediated by parenting behaviors and adolescent emotion regulation; thus, hypothesis 2 was not supported.

Longitudinal analyses. Model 4 of the longitudinal analyses examined the relationship between parent suppression and reappraisal and positive and negative parenting at Time 1 and adolescent emotion regulation and lability/negativity at Time 2. The outcome variable of changes in adolescent substance use was the standardized residuals of Time 1 adolescent substance use on Time 2 adolescent substance use. Model 4 had a $\chi^2 = 0.00$, $df = 0$, $p = .00$, CFI = 1.00, RMSEA = .00, $p = .00$ indicating a just identified model. As presented in Figure 8, parent suppression at Time 1 negatively predicted adolescent emotion regulation at Time 2 ($b = -.20$, $SE = .07$, $p = .01$). Thus, parents who utilized suppression as an emotion regulation strategy also had adolescents with poorer emotion regulation skills. Negative parenting at Time 1 negatively predicted adolescent emotion regulation at Time 2 ($b = -.35$, $SE = .13$, $p = .01$) and positively predicted adolescent lability/negativity at Time 2 ($b = .31$, $SE = .14$, $p = .03$). The findings indicate that negative parenting was negatively associated with adolescent emotion regulation skills over time, such that adolescents who received negative parenting were worse emotion regulators and showed higher lability/negativity. Positive parenting at Time 1 positively predicted adolescent emotion regulation at Time 2 ($b = .38$, $SE = .17$, $p = .02$), indicating that adolescents who experienced positive parenting became better emotion regulators.

For Model 4, all possible indirect effects were examined. For two-path mediation pathways, the indirect effects of parent suppression and reappraisal at Time 1 on adolescent emotion regulation and lability/negativity at Time 2 through positive and negative parenting and the parenting interaction at Time 1 were examined. In addition, the indirect effects of positive and negative parenting and the parenting interaction at Time 1 on changes in adolescent substance use through adolescent emotion regulation and lability/negativity at Time 2 were examined. For three-path mediation pathways, the indirect effects of parent suppression and reappraisal at Time 1 on changes in adolescent substance use through positive and negative parenting and the parenting interaction at Time 1 and adolescent emotion regulation and lability/negativity at Time 2 were examined. There were no significant indirect effects in the model among parent suppression and reappraisal, positive and negative parenting, adolescent emotion regulation and lability/negativity, and changes in adolescent substance use for two-path ($p = .29$ to $.88$) and three-path ($p = .65$ to $.89$) mediation. Adolescent emotion regulation did not mediate the relationship between positive and negative parenting behaviors and changes in

substance use; thus, hypothesis 1 was not supported. In addition, the relationship between parent emotion regulation strategies and changes in adolescent substance use was not mediated by parenting behaviors and adolescent emotion regulation; thus, hypothesis 2 was not supported.

Post-hoc analyses. Additional post-hoc analyses were conducted based on the cross-sectional model in order to probe whether adolescent emotion regulation is differentially related to substance use behaviors depending on adolescent developmental stage or depending on the type of substances. In these post-hoc analyses, the sample was divided via a mean split into younger (below age 15, $n = 107$) and older (age 15 and above, $n = 112$) adolescents and structural equation models were then conducted based on bivariate correlations between adolescent emotion regulation and substance use. It was found that, in younger adolescents, there was a significant bivariate correlation between emotion regulation and cigarette use, but there was no significant correlation between emotion regulation and alcohol or marijuana use. In older adolescents, there was a significant bivariate correlation between emotion regulation and marijuana use, but there was no significant correlation between emotion regulation and cigarette or alcohol use for older adolescents. Based on this significant bivariate correlation, two structural equation models were conducted. The first utilized just the sample of younger adolescents with the outcome of cigarette use. However, in this SEM model, adolescent emotion regulation was not predictive of cigarette use, and this model was not examined further.

The second SEM model utilized just the older adolescents with the outcome of marijuana use as a manifest variable. The model fit was $\chi^2 = 0.00$, $df = 0$, $p = .00$, $CFI = 1.00$, $RMSEA = .00$, $p = .00$ indicating a just identified model. In this model, parent suppression at Time 1 was negatively related to older adolescents' emotion regulation at Time 1 ($b = -.16$, $SE = .08$, $b^* = -.16$, $p = .05$), whereas positive parenting at Time 1 was positively related to older adolescents' emotion regulation at Time 1 ($b = .47$, $SE = .09$, $b^* = .47$, $p < .001$). Positive parenting was negatively related to older adolescents' lability/negativity ($b = -.39$, $SE = .10$, $b^* = -.39$, $p < .001$), whereas negative parenting was positively related to older adolescents lability/negativity ($b = .19$, $SE = .10$, $b^* = .19$, $p = .05$). Parent reappraisal was positively related to older adolescents marijuana use ($b = .20$, $SE = .09$, $b^* = .24$, $p = .02$), whereas positive parenting was negatively related to older adolescents' marijuana use ($b = -.25$, $SE = .12$, $b^* = -.25$, $p = .03$). Finally, adolescent emotion regulation was significantly and negatively related to adolescent marijuana use ($b = -.35$, $SE = .11$, $b^* = -.35$, $p = .001$). In addition, there was significant

mediation from positive parenting to adolescent marijuana use through adolescent emotion regulation ($b = -.03$, $SE = .01$, $b^* = -.15$, $p = .01$). There were no significant indirect effects in the model among parent suppression and reappraisal, positive and negative parenting, adolescent emotion regulation and lability/negativity, and changes in adolescent substance use for two-path ($p = .10$ to $.97$) and three-path ($p = .29$ to $.97$) mediation. The results of this model indicate that in older adolescents' better emotion regulation was related to less marijuana use and that positive parenting was indirectly related to lower levels of older adolescent marijuana use through higher levels of emotion regulation.

Chapter 4 – Discussion

This study examined the relationship between positive and negative parent emotion regulation strategies and their adolescent positive and negative emotion regulation skills. It was proposed that one mechanism through which this transmission of emotion regulation may occur was positive and negative parenting behaviors. Finally, the relationship of these variables to the outcome of adolescent substance use was examined. In particular, this study represents the first to investigate the transmission of emotion regulation from parent to adolescent as well as the parenting mechanisms through which this transmission might occur.

The results of the cross-sectional analyses indicate that adolescents with high negative parenting and low positive parenting had higher levels of lability/negativity and adolescents with high positive parenting had better emotion regulation. This result is consistent with the family systems theory framework in demonstrating a direct relationship between the parent-adolescent family sub-system to the adolescent outcome of lability/negativity and emotion regulation. Previous research demonstrates that better parent-child relationship quality predicted better child emotion regulation (Bynum & Brody, 2005) and that harsh parenting positively predicted inability to regulate emotional states in adolescents (Burnette et al., 2012). The present study extends this previous research by not only examining adolescent emotion regulation but also lability/negativity. Therefore, the results of the present study highlight the vital role that positive and negative parenting play in not only emotion regulation but also adolescent flexibility of emotion regulation and negative affect. In addition, our study also highlights the importance of studying adolescent emotion regulation within family systems theory.

In addition, the relationship of the interaction between positive and negative parenting on adolescents has been neglected in extant literature and that was examined in the present study. Extant research has examined separately the relationship of both positive and negative parenting behaviors to adolescent self-regulation (e.g., Brody & Ge, 2001; Finkenauer, Engels, & Baumeister, 2005), but the interaction between positive and negative parenting behaviors and its relationship to regulation have not been examined. Therefore, the present study presents a marked step forward in examining the relationship of parenting behaviors to adolescent self-regulation. The current finding revealed a significant interaction effect between positive and negative parenting, such that for adolescents who experienced high positive parenting, higher

negative parenting was significantly associated with lower adolescent emotion regulation and higher lability/negativity. These findings supported hypothesis 1-1. However, for those adolescents who experienced a low level of positive parenting, negative parenting was not a significant predictor of adolescent emotion regulation. The results of the present study suggest that it is both high positive parenting and low negative parenting together that promote adolescent emotion regulation. For all other parenting groups of high positive/high negative, low positive/low negative, and low positive/high negative parenting, we saw similar levels of emotion regulation. Thus, the present study provides evidence that positive and negative parenting alone may not be the most important predictor of adolescent emotion regulation and lability/negativity; the interaction between positive and negative parenting may be more important for the development of adolescent emotion regulation.

It is possible that for those adolescents who experience high levels of positive parenting negative parenting behaviors stand out in sharp contrast to these positive behaviors, whereas for those adolescent who rarely experience positive parenting negative parenting behaviors have few positive parenting behaviors to be compared to. Therefore, the results of the present study highlight the importance of examining the context in which parenting behaviors are happening, a viewpoint that is consistent with family systems theory. Both positive and negative parenting behaviors occur in the general context of parent-adolescent relationship, and the results of the present study highlights the importance of considering conjoint contributions of positive and negative parenting behaviors to adolescent development as opposed to simply studying the levels of positive and negative parenting separately.

In addition, in the cross-sectional model, adolescents with high levels of positive parenting had lower levels of substance use, whereas levels of negative parenting were not predictive of adolescent substance use. Extant research on African-American males has also found that harsh parenting was not a predictor of their adolescent substance use or sexual risk behaviors (Murry, Simons, Simons, & Gibbons, 2013). The extant research states that authoritative and indulgent parenting styles were associated with lower levels of substance use in adolescents than was an authoritarian parenting style (Calafat, García, Juan, Becoña, & Fernández-Hermida, 2014). Building upon these extant studies, the results of the present study suggest that positive parenting may be more important to preventing adolescent substance use than is negative parenting. Therefore, parents having a positive, warm, and close relationship

with their adolescent may be more important for preventing problems with substance use than parents having less conflict with their adolescents. The present study highlights the importance of having a close and warm parent-adolescent relationship for the prevention of adolescent substance use. It may be beneficial for future interventions to target improving the quality of the parent-adolescent sub-system for the prevention of adolescent substance use.

There was no evidence for significant mediation effects in the cross-sectional or longitudinal models. Specifically, it was not found that adolescent emotion regulation mediated the relationship between positive and negative parenting behaviors and substance use; therefore, hypothesis 1 was not supported. This lack of mediation appears to be primarily due to the lack of direct relationship of adolescent emotion regulation to adolescent substance use. Using substances to self-medicate may not be characteristic of the typically developing adolescent population. In addition, the relationship between parent emotion regulation strategies and adolescent emotion regulation and lability/negativity was not mediated by positive and negative parenting behaviors; therefore, hypothesis 1-2 was not supported. The lack of mediation effects seems to be mainly due to the weak relationship between parent emotional strategies and parenting behaviors. In the present study, the measures utilized to measure positive and negative parenting were somewhat behavior oriented (i.e., yelling, criticizing). It may be that utilizing more behavior oriented, rather than emotion oriented, measure of parent regulation may capture more variance in a behavior-oriented measure of parenting behaviors. Finally, the relationship between parent emotion regulation strategies and adolescent substance use was not mediated by parenting behaviors and adolescent emotion regulation and lability/negativity; therefore, hypothesis 2 was not supported. There were only significant direct effects of parent parenting behaviors on adolescent outcomes. In addition, hypothesis 1-3, that adolescents who have lower emotion regulatory abilities may have higher levels of substance use, was not supported. Our community sample of adolescents showed relatively low levels of substance use, which were not indicative of addictive or abusive drug use behaviors. It is possible that, at low levels of substance use, adolescents are engaging in experimentation with or trying drugs, rather than their drug use being indicative of a lack of emotion regulation skill or self-medicating behavior.

Gender Differences

The present study represents the first to examine systematically gender differences in the relationship between parenting, adolescent emotion regulation and lability/negativity, and

adolescent substance use. In the cross-sectional analyses, some gender similarities and differences were noted. When examining similarities, first, both adolescent boys and girls with high negative parenting had higher levels of lability/negativity. Second, adolescent boys with positive parenting had better emotion regulation skills and lower levels of substance use. For both boys and girls, positive parenting was associated with better emotion regulation and lower levels of substance use. However, there were some differences between the gender groups. First, adolescent boys experiencing low positive parenting had higher levels of lability/negativity, but the relationship between positive parenting and lability/negativity was not significant for adolescent girls. Thus, it seems that positive parenting was more important for lability/negativity levels in boys than in girls. Previous research does suggest that males and females do regulate their emotions differently (Nolen-Hoeksema & Aldao, 2011) such that females may engage in better coping strategies (e.g., reappraisal, active coping) than males do. Therefore, because females may regulate their emotions differently than males and have different levels of emotion regulation skill, it is plausible that positive parenting may not be as important for developing emotion regulation in females. It may be important to consider the gender composition of both the parent and adolescent when examining the effects that the parent-adolescent family subsystem may have on adolescent development.

Second, for adolescent boys, parents who utilized reappraisal as an emotion regulation strategy were less likely to use negative parenting tactics. However, this pathway was not significant for girls. Extant research in toddlers indicated that mothers who utilized reappraisal were less likely to engage in harsh, over-reactive discipline because they experienced and displayed fewer negative emotions (Lorber, 2012). We may see this relationship only in males in adolescence because the different challenges faced by a parent of a male versus a female adolescent may be accentuated in adolescence. Reappraisal may be a particularly effective strategy for parenting male adolescents. It is also possible that reappraisal may be particularly effective as a stress coping mechanism for parents of male adolescents.

Longitudinal Model

In the longitudinal analyses, parents who utilized the less adaptive emotion regulation strategy of suppression at Time 1 also had adolescents who had poorer emotion regulation skills at Time 2. The present study was the first to examine specifically the transmission of emotion regulation from parent to adolescent. Thus, this study presents primary evidence that there is

similarity in emotion regulation skills between parents and adolescents. Previous research examining the transmission of regulation of emotions between parent and adolescent have largely focused on the transmission of depression (e.g., Compton et al., 2003). Furthermore, based on some of this research in depression, other researchers have theorized that dysregulated emotions in parents are related to dysregulated emotions in their children (e.g., Bariola et al., 2011). However, the transmission of emotion regulation from parent to adolescent has not been directly studied.

It is possible that this transmission takes place between parent and adolescent because adolescents model their parents' emotion regulation strategies and skills. For parents who suppress their displays of emotion, adolescents may have trouble learning how to regulate effectively their emotions because they have few emotion regulation behaviors to model. Extant research does indicate that utilizing suppression as an emotion regulation strategy has negative social consequences. Those who utilized suppression – rather than reappraisal – showed not only fewer negative but also fewer positive emotions, resulting in their being liked less and having less social support (Gross, 2002). In our sample, parents who utilized suppression may be demonstrating fewer emotional behaviors for their adolescents to model. Suppression and reappraisal are related differentially to emotional experience and behavior such that suppression is more taxing and may be related to more disturbances in mental and physical health (Goldin et al., 2008). In our sample, those parents who utilized suppression may be experiencing some decrements to mental health that prevent them from effectively modeling or emotion coaching good emotion regulation skills with their adolescents. In addition, although not measured in the present study, recent research suggests that parents who are poor emotion regulators invalidate their adolescents' emotions, which is in turn negatively related to adolescent emotion regulation (Buckholdt, Parra, & Jobe-Shields, 2014). Therefore, the results of the present study suggest that targeting parents' emotion regulation ability as a point of intervention may have beneficial effects for adolescent emotion regulation skills. Future research may target additional mechanisms through which this transmission of emotion regulation may occur, such as emotion coaching and modeling.

Finally, the findings from the longitudinal model indicated that negative parenting at Time 1 was negatively associated with adolescent emotion regulation skills at Time 2, such that adolescents were worse emotion regulators and had higher lability/negativity. This finding

supports hypothesis 1-1. In addition, consistent with the cross-sectional model, adolescents who experienced positive parenting at Time 1 were better emotion regulators at Time 2.

Cross-Sectional and Longitudinal Model Comparison

There were some key similarities and differences between the cross-sectional and longitudinal model. First, in both the cross-sectional and longitudinal models, adolescents with high negative parenting had higher levels of lability/negativity. In addition, in both the cross-sectional and longitudinal models, adolescents with high levels of positive parenting had better emotion regulation skills and lower levels of substance use. However, only in the cross-sectional model did we find that low positive parenting was associated with higher levels of lability/negativity. In addition, only in the cross-sectional model was the interaction between positive and negative parenting negatively related to adolescent emotion regulation, such that adolescents who experienced high positive parenting, higher negative parenting was significantly associated with lower adolescent emotion regulation ability. Only in the longitudinal model did we find that parents who utilized suppression as an emotion regulation strategy also had adolescents with poorer emotion regulation skills and that negative parenting was negatively associated with adolescent emotion regulation skills.

The similarities and differences between these two models highlight the importance of examining differences in the relationships among variables over time. In the cross-sectional analyses, the interaction between positive and negative parenting was predictive of adolescent emotion regulation, whereas in the longitudinal analyses negative parenting was predictive of adolescent emotion regulation. Although it is important to replicate this finding, it can be speculated that, as adolescents age, the characteristics of parenting that are most important for their developmental outcomes change. It is possible that the qualities and characteristics that make up the parent-adolescent subsystem as well as the influence this sub-system may have on adolescent development change as adolescents age. Finally, only in the longitudinal model did we find that parents who utilized suppression as an emotion regulation strategy also had adolescents with poorer emotion regulation skills. It is possible that the transmission of emotion regulation may require a certain timespan to occur and may not be witnessed in contemporaneous measurement. Finally, we cannot rule out that the discrepancy between the cross-sectional and longitudinal results may be due to differences in sample characteristics between the cross-sectional and longitudinal samples.

Post-hoc Analyses

In the post-hoc analyses, we examined the relationship between adolescent emotion regulation and lability/negativity and different types of substance use (cigarette, alcohol, and marijuana) based on age (younger versus older adolescents). We found that older adolescents with higher levels of emotion regulation were less likely to use marijuana. This relationship was not found for other types of substances in older adolescents or among younger adolescents. The results indicated that emotion regulation may have differential effect on substance use among age groups and that adolescents may use different types of substances for different reasons. Previous research indicates that there may be different relationships between emotional intelligence and different types of substance use such that emotional intelligence is related to lower alcohol and marijuana use but is unrelated to cigarette use in college students (Claros & Sharma, 2012). It may be that the relationship between emotion regulation and substance use may depend on the type of substance measured as well as developmental stage. In our sample, there was not a significant difference in the levels of marijuana use reported between younger and older adolescents ($t = -1.31, p = .19$). Therefore, the differing relationship between emotion regulation and marijuana use between younger and older adolescents does not seem to be a result of level differences in use of marijuana. The motivation for using marijuana may differ by adolescent age. Older adolescents may choose to utilize marijuana for a reason that is more closely linked to their lack of emotion regulation skill (such as altering their mood) than the reason that younger adolescents choose to utilize marijuana (such as simply experimenting), although further research is needed to test this hypothesis. Therefore, our results suggest that it is important to examine the development of adolescent substance differently between different age groups and that it is important to examine different types of substance use separately.

Caveats and Conclusions

Although this study's findings have potentials to make a significant contribution to existing literature, it has some limitations. First, one limitation of the present study was only having parenting reports from one parent rather than both parents. There may be significant discrepancy between parents with respect to positive and negative parenting behaviors with their adolescents. Second, the levels of substance use in the current community sample were relatively low. Future studies should replicate the findings with diverse samples with differing levels of substance use (e.g., high-risk or clinical samples). Third, our negative parenting

variable, as well as adolescent emotion regulation in our cross-sectional model, were measured utilizing multiple informants. However, parent emotion regulation strategies, positive parenting behaviors, and substance use were measured solely using self-reports. Future studies may utilize a wider variety of methods (e.g., observation, laboratory tasks) and informants (e.g., teachers, peers) in order to attenuate possible informant or method bias. In addition, by using multiple informants for some, but not all, constructs we may have unintentionally introduced informant bias into our model.

Fourth, we measured parent emotion regulation by their use of emotion regulation strategies of suppression and reappraisal. Suppression and reappraisal are two commonly utilized negative and positive emotion regulation strategies. However, measuring only these two strategies may not be entirely representative of parents' ability to regulate their emotions. In addition, the scales utilized to measure parent emotion regulation strategies measured a somewhat different construct compared to the scales utilized to measure adolescent emotion regulation skill. Thus, there was some inconsistency between how emotion regulation was measured between parents and adolescents. Therefore, future studies could use measures that assess a broader range of parental emotion regulation and consider a closer match between scales that measure similar constructs of emotion regulation between parents and adolescents. Fifth, due to the lack of invariance in the measurement model of the substance use latent factor between males and females, we were not able to conduct statistical tests of gender differences. Finally, our data involved only two waves and were thus limited for testing mediational effects. Future studies could utilize data with at least three waves in order to conduct rigorous mediation tests.

Despite these limitations, the present study makes a unique contribution to existing literature by directly testing and demonstrating a model of emotion regulation transmission between parent and adolescent within the family systems framework. We found that parents who used suppression as an emotion regulation strategy had adolescents who became poorer emotion regulators, perhaps because when parents suppress their emotions adolescents are not able to witness effective emotion regulation. In addition, only in the context of positive parenting was negative parenting harmful for adolescent emotion regulation. Furthermore, positive parenting, but not negative parenting, was related to lower levels of substance use in adolescents, highlighting the importance of parental warmth, rather than the lack of negative or

controlling parenting behaviors, in preventing adolescent substance use. This study provides evidence that a positive and closeness in parent-adolescent relationship may be a key area of prevention for adolescent substance use. Overall, the current findings demonstrate that positive quality of the parent-adolescent family subsystem is vital to adolescent developmental outcomes and that the contributions, as well as the effects, of this subsystem may change over adolescent development.

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Table 1.

Bivariate Correlations and Summary Statistics of Cross-Sectional Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Reapp1											
2. Supp1	-.15*										
3. PosPar1	-.02	-.10									
4. NegPar1	-.06	.06	-.44*								
5. ParInt1	-.08	.08	.29*	-.09							
6. EmReg1	.12	-.16*	.40*	-.24*	-.03						
7. LaNeg1	-.15	.11	-.39*	.35*	-.02	-.62*					
8. Cig1	.09	-.05	-.23*	.03	.01	-.13	.13*				
9. Alc1	.08	-.09	-.05	.05	-.13	-.02	-.03	.22*			
10. Mar1	.09	-.03	-.27*	.08	-.01	-.17*	.10	.60*	.41*		
11. Cage1	.09	.02	-.08	.10	-.23*	.15*	-.22*	.10	.25*	.12	
<i>M</i>	5.21	2.98	4.10	1.95	-.17	3.30	1.70	1.13	1.24	1.20	15.08
<i>SD</i>	.93	1.06	.57	.69	.46	.32	.30	.68	.68	.81	1.56

Note. Reapp1 = Parent Reappraisal Time 1, Supp1 = Parent Suppression Time 1, PosPar1 = Positive Parenting Time 1, NegPar1 = Negative Parenting Time 1, ParInt1 = Parenting Interaction Time 1, EmReg1 = Adolescent Emotion Regulation Time 1, LaNeg1 = Adolescent Lability/Negativity Time 1, Cig1 = Adolescent Cigarette Time 1, Alc1 = Adolescent Alcohol Use Time 1, Mar1 = Adolescent Marijuana Use Time 1, Cage1 = Adolescent Age Time 1

* $p < .05$

Table 2.

Bivariate Correlations and Summary Statistics of Longitudinal Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Reapl														
2. Suppl	-.10													
3. Cig1	.00	-.02												
4. Alc1	.06	-.03	.44											
5. Mar1	-.00	.03	.13	.53*										
6. PosPar1	-.05	-.14	-.21*	-.09	-.13									
7. NegPar1	-.11	.05	.17	.15	.09	-.44*								
8. PariNT1	.17*	.08	-.06	.09	-.04	-.04	-.03							
9. EmReg2	.18*	-.24*	-.10	-.03	.12	.31*	-.30*	.15						
10. LaNeg2	-.17*	.07	.04	.00	.06	-.19*	.23*	-.15	-.52*					
11. Cig2	-.04	-.06	.22*	.55*	.37*	-.02	.08	.09	-.06	-.03				
12. Alc2	.12	-.04	.15	.46*	.43*	.01	.03	-.10	-.05	.08	.49			
13. Mar2	.17*	.00	.32*	.40*	.45*	-.24*	.13	.09	-.03	-.02	.43*	.47*		
14. Cage1	.12	.11	-.08	.13	.10	-.01	.16	.10	.21*	-.23	.10	.24*	.10	
<i>M</i>	5.23	2.99	1.04	1.20	1.10	4.16	1.87	.15	3.33	1.67	1.24	1.57	1.35	15.04
<i>SD</i>	.88	1.06	.19	.64	.47	.53	.66	.36	.41	.36	.90	1.11	1.06	1.47

Note. Reapp1 = Parent Reappraisal Time 1, Suppl = Parent Suppression Time 1, Cig1 = Adolescent Cigarette Time 1, Alc1 = Adolescent Alcohol Use Time 1, Mar1 = Adolescent Marijuana Use Time 1, PosPar1 = Positive Parenting Time 1, NegPar1 = Negative Parenting Time 1, ParInt1 = Parenting Interaction Time 1, EmReg2 = Adolescent Emotion Regulation Time 2, LaNeg2 = Adolescent Lability/Negativity Time 2, Cig2 = Adolescent Cigarette Time 2, Alc2 = Adolescent Alcohol Use Time 2, Mar2 = Adolescent Marijuana Use Time 2, Cage1 = Adolescent Age Time 1

* $p < .05$

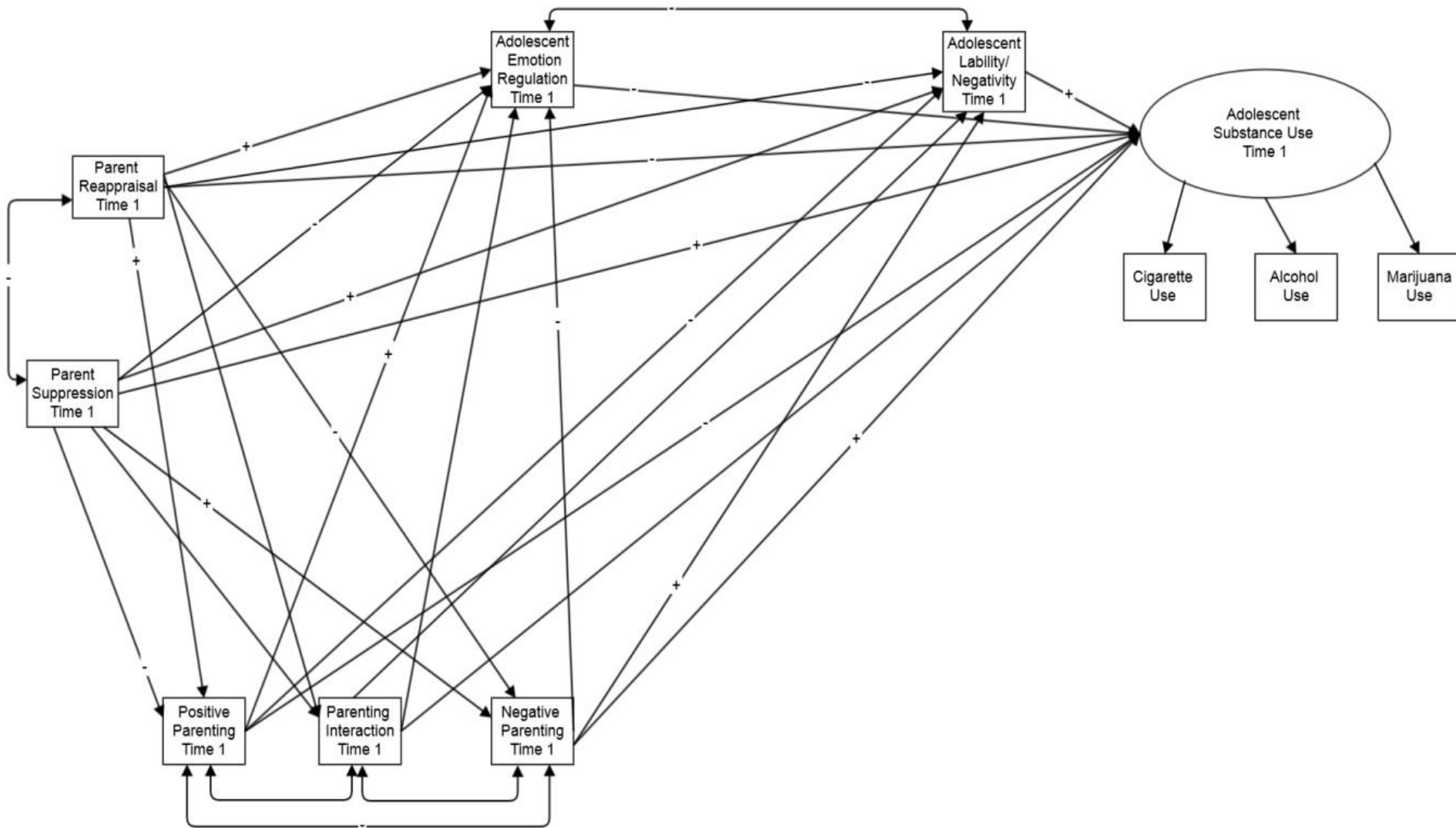


Figure 1. The hypothesized cross-sectional relationships among parent emotion regulation, parenting behaviors, and adolescent emotion regulation and substance use.

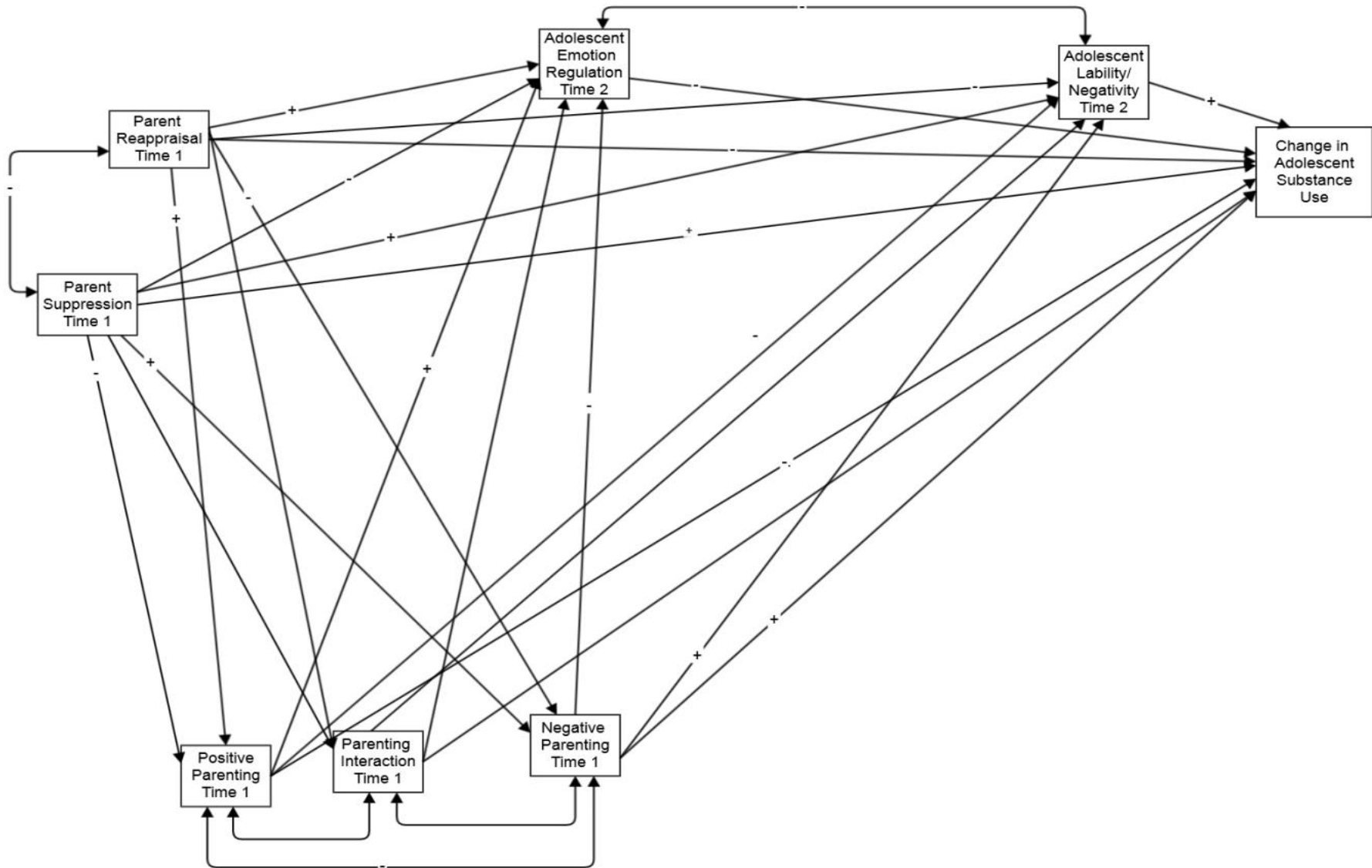


Figure 2. The hypothesized longitudinal relationships among parent emotion regulation, parenting behaviors, and adolescent emotion regulation and substance use.

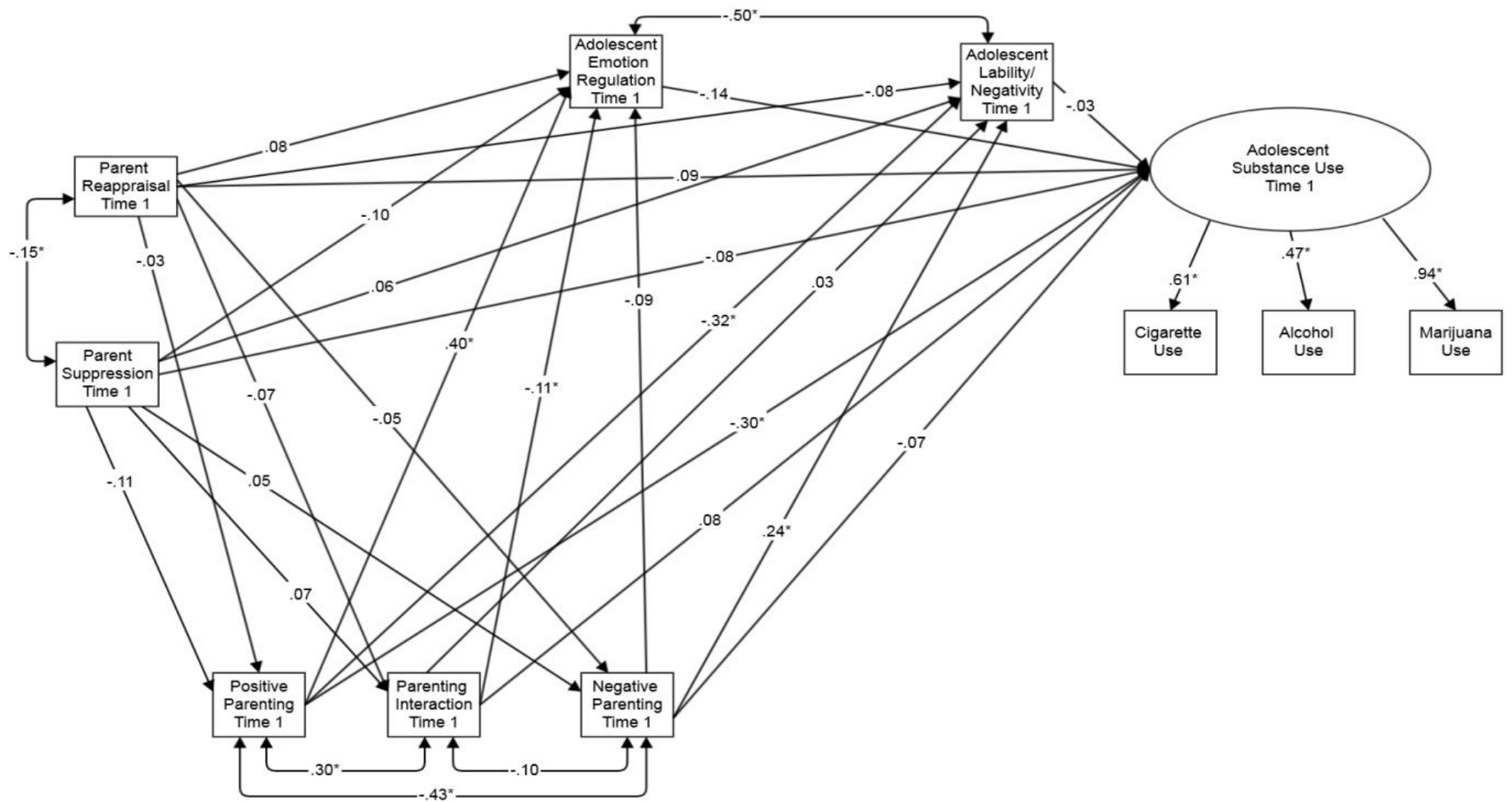


Figure 3. The overall model fitting results of the cross-sectional relationships among parent emotion regulation, parenting behaviors, and adolescent emotion regulation and substance use.

Note. Numbers on paths are unstandardized coefficient (SE)/standardized coefficient. $*p < .05$.

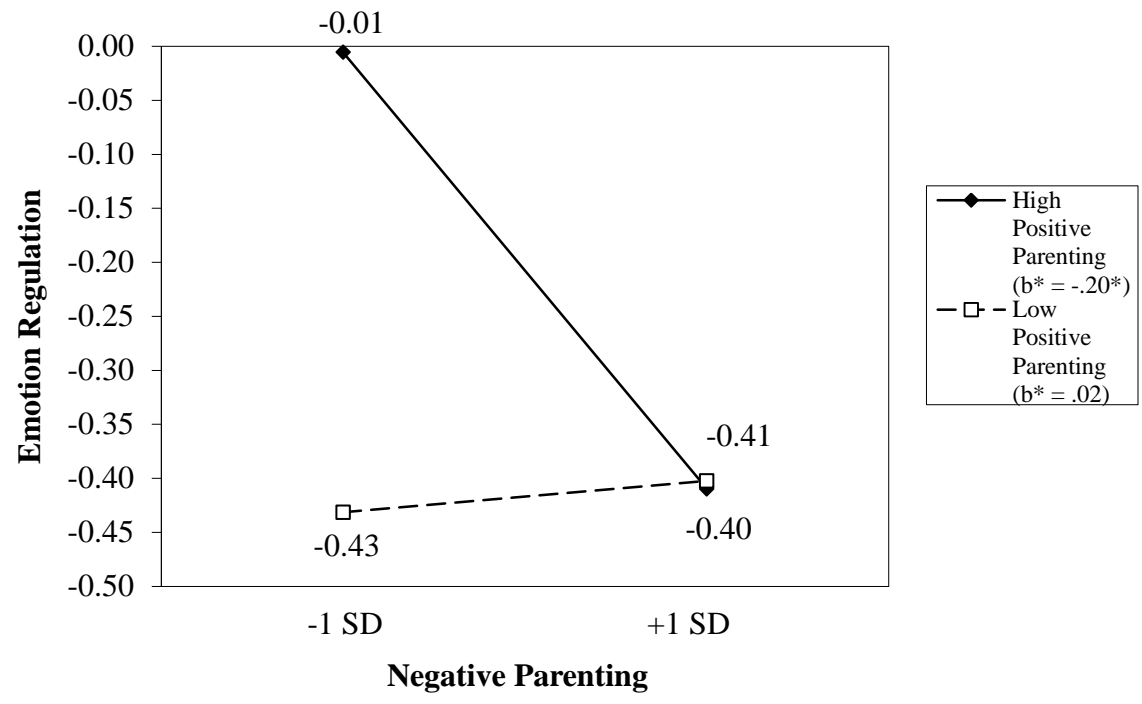


Figure 4. Interaction regression lines for relations between negative parenting and adolescent emotion regulation by positive parenting.

b^* = standardized regression coefficient (simple slope).

* $p < .05$.

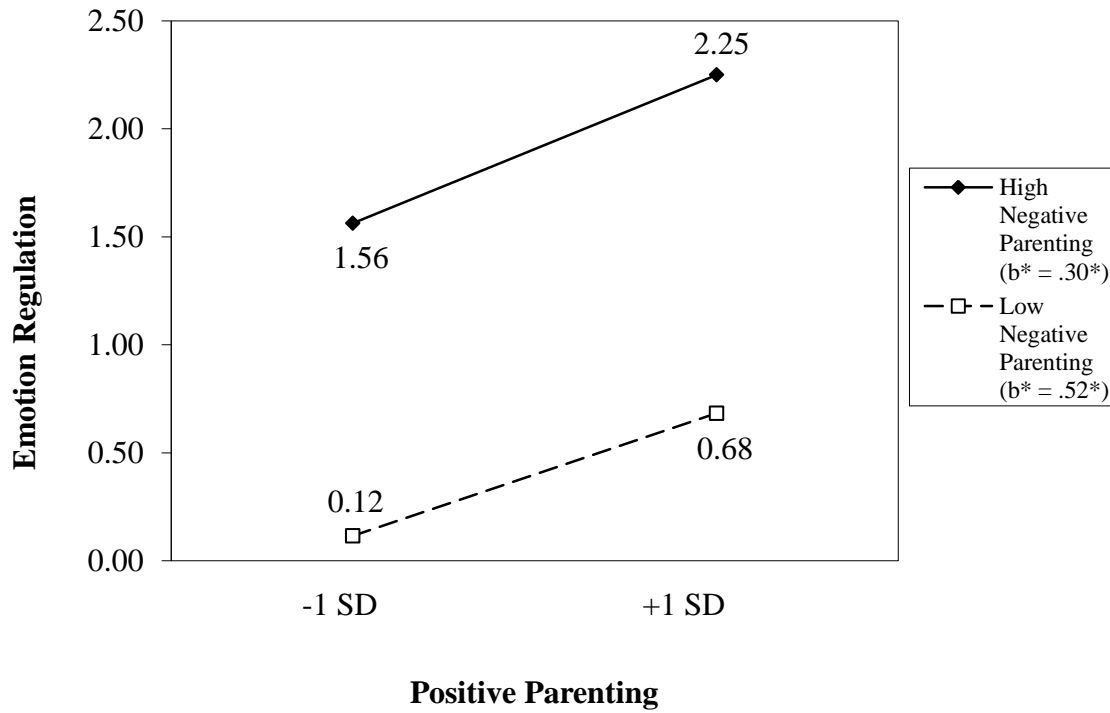


Figure 5. Interaction regression lines for relations between positive parenting and adolescent emotion regulation by negative parenting.

b^* = standardized regression coefficient (simple slope).

* $p < .05$.

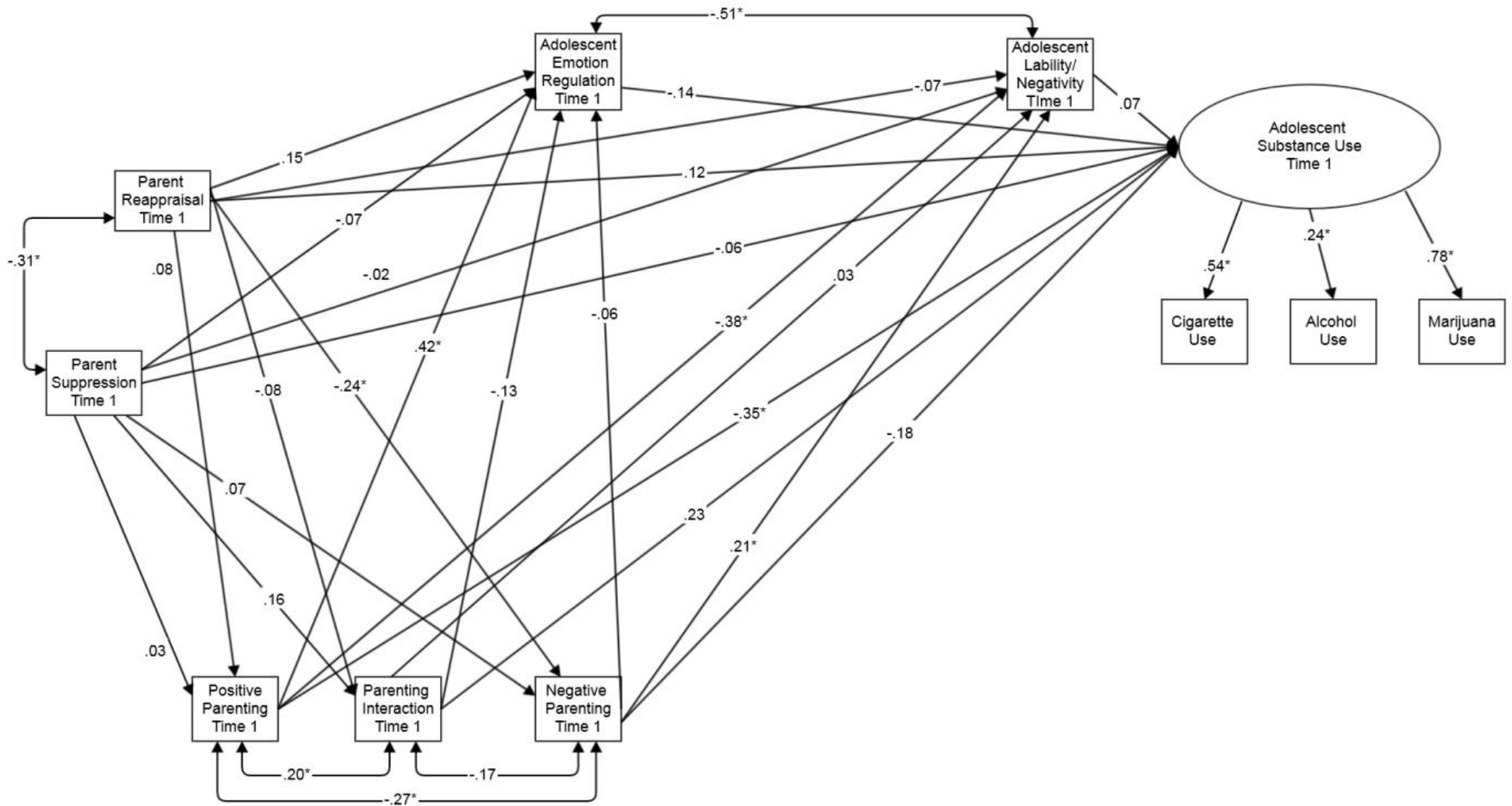


Figure 6. The model fitting results for boys of the cross-sectional relationships among parent emotion regulation, parenting behaviors, and adolescent emotion regulation and substance use.

Note. Numbers on paths are unstandardized coefficient (SE)/standardized coefficient. * $p < .05$.

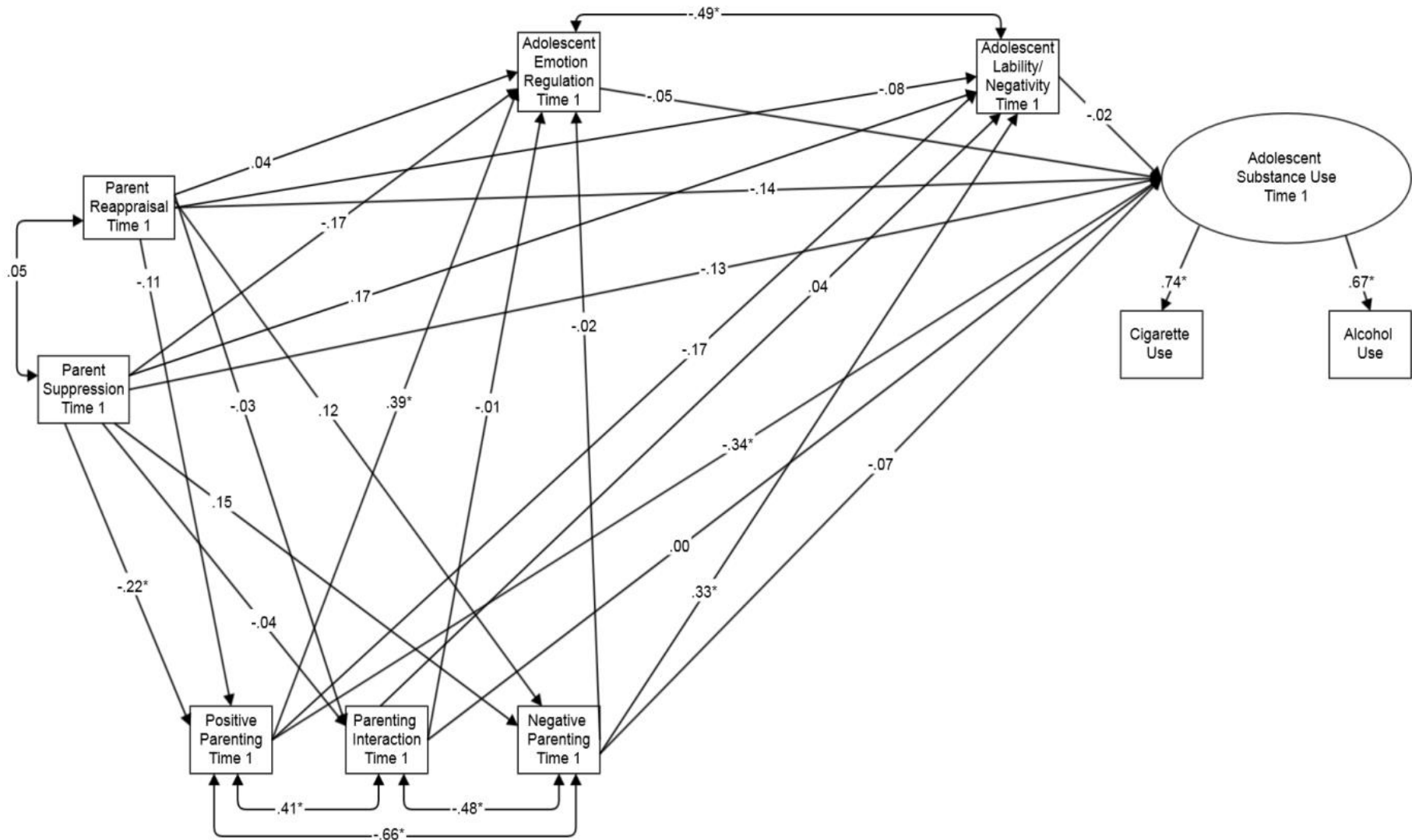


Figure 7. The model fitting results for girls of the cross-sectional relationships among parent emotion regulation, parenting behaviors, and adolescent emotion regulation and substance use.

Note. Numbers on paths are unstandardized coefficient (SE)/standardized coefficient. * $p < .05$.

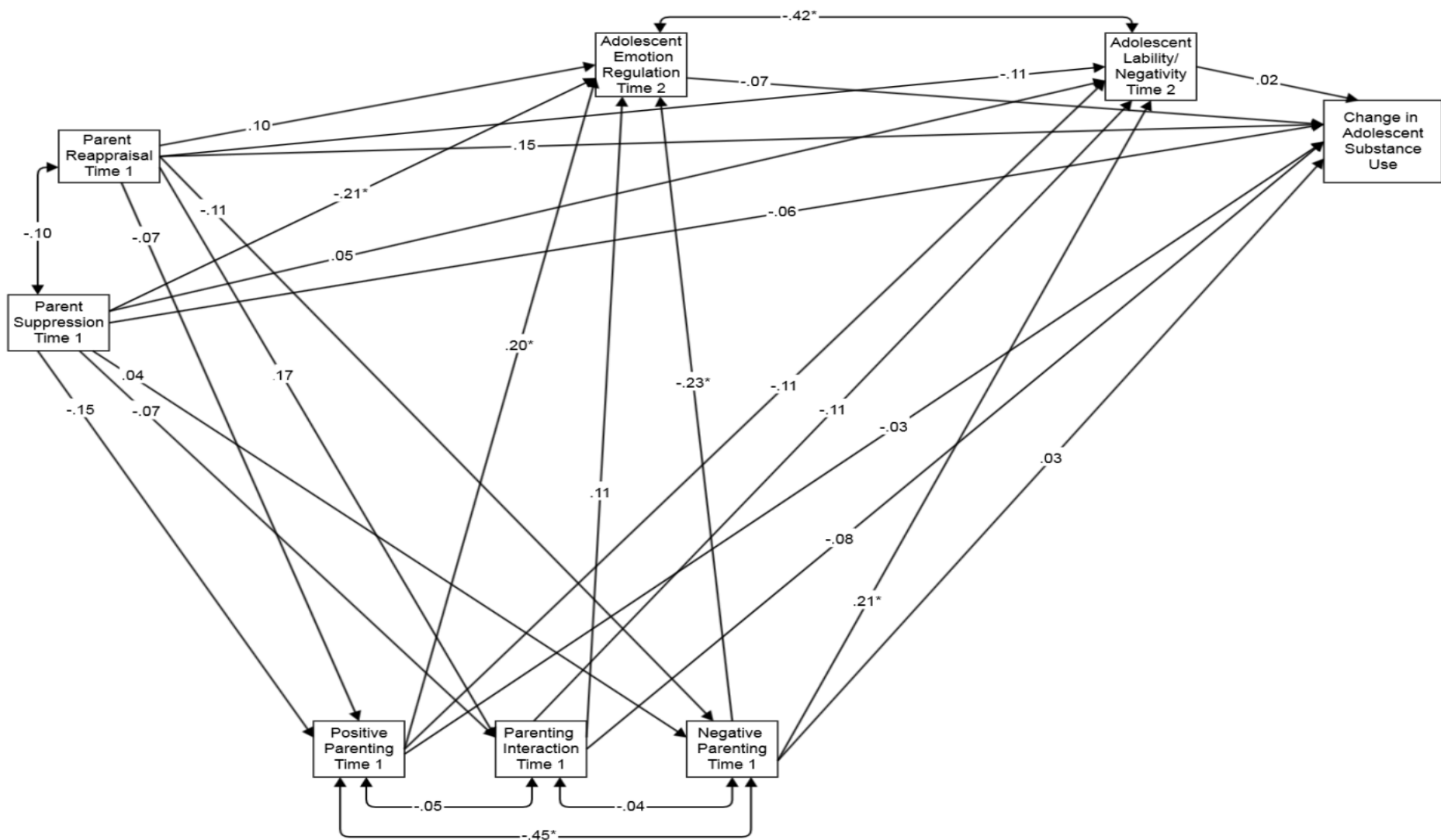


Figure 8. The model fitting results of the longitudinal relationships among parent emotion regulation, parenting behaviors, and adolescent emotion regulation and substance use.

Note. Numbers on paths are unstandardized coefficient (SE)/standardized coefficient. * $p < .05$.

Appendix A

Demographic Information

1. What is your current marital status- married, widowed, separated, divorced, or never married?
(If separated, ask "Is this separation legal or not legal?")

1 = never married

2 = married

3 = widowed

4 = divorced

5 = legally separated

6 = separated, not legally
living with someone as though married

RMASTAT _____ 7 =
1-7

2. How would you describe your own race?

1. Black

40 African American

41 Caribbean or West Indian

42 Cuban

43 Dominican

44 Puerto Rican

90 Other _____ (specify) Black mix- with 2 or more black ethnicities.

2 White

80 White, Caucasian, Euro-American not of Latino Origin

3 Latino or Hispanic, Non-Black

50 Cuban

51 Dominican

52 Puerto Rican

53 Mexican

Other _____ (specify)

90 Other _____ (specify) Latino/ Nonblack mix with 2 or more

Latino/nonblack ethnicities

4,5, or 6 Biracial or Multiracial

4 90 Black / White

5 90 Latino / White

6 90 Latino / Black

9 90 Other _____ (specify)

7 Asian or Asian-America

30 Chinese

31 (East) Indian

32 Filipino

33 Japanese

34 Other _____ (specify)

90 Other _____ (specify) Asian mix- with 2 or more Asian
ethnicities

8 20 American Indian

9 Other

10 Alaskan Native / Eskimo / Aleut

60 Middle Eastern

70 Pacific Islander

91 Other _____(specify)

RACE _____
SUBRACE _____

3. 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.

- 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

4. Starting with your oldest, please tell me all of the children to whom you have given birth (fathered), including the child participating in this study if applicable: (For each child ask about the child's sex, race, birth date. *Please use the race codes on the following page*)

First name / Last name	Sex	Race / sub	Date of Birth

RBRTKIDS_____

5. Are there any children who are not your own but who live in your household? (Ask first / last name, child’s sex, race [code below] and D.O.B. Include the child participating in this study if applicable)

First name / Last name	Sex	Race / sub	Date of Birth

6. What is your relation to the child?

RESNM _____

(1=mother, 2=father, 3=grandmother, 4=grandfather, 5=foster parent,
6=other – specify who other is _____).

R_GENDER: Male Female

If respondent is not the biological parent ask:

“How long has this child been in your care?” RCARE _____

Appendix B

Emotion Regulation (Parent Report)

ERQ

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1-----2-----3-----4-----5-----6-----7

strongly

neutral

strongly

disagree

agree

1. When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.

1-----2-----3-----4-----5-----6-----7

strongly

neutral

strongly

disagree

agree

2. I keep my emotions to myself.

1-----2-----3-----4-----5-----6-----7

strongly

neutral

strongly

disagree

agree

3. When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about*.

1-----2-----3-----4-----5-----6-----7

strongly

neutral

strongly

disagree

agree

4. When I am feeling *positive* emotions, I am careful not to express them.

1-----2-----3-----4-----5-----6-----7

strongly

neutral

strongly

disagree

agree

5. When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.

1-----2-----3-----4-----5-----6-----7

strongly neutral strongly
disagree agree

6. I control my emotions by *not expressing them*.

1-----2-----3-----4-----5-----6-----7

strongly neutral strongly
disagree agree

7. When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.

1-----2-----3-----4-----5-----6-----7

strongly neutral strongly
disagree agree

8. I control my emotions by *changing the way I think* about the situation I'm in.

1-----2-----3-----4-----5-----6-----7

strongly

neutral

strongly

disagree

agree

9. When I am feeling *negative* emotions, I make sure not to express them.

1-----2-----3-----4-----5-----6-----7

strongly

neutral

strongly

disagree

agree

10. When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation.

1-----2-----3-----4-----5-----6-----7

strongly

neutral

strongly

disagree

agree

Appendix C

Parent-Child Relationship (Parent Report)

Child _____

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

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 D

Parent-Child Relationship (Adolescent Report)

(Step) mother _____

(Step) father _____

The following questions deal with your relationship with _____, your (step) mother and your relationship with _____, your (step) father. Read each question and first circle the number that describes your relationship with _____, your (step) mother. The circle the number that describes your relationship with _____, your (step) father.

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

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

	(Step) MOTHER		(Step) FATHER	
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 (step) child?.....	1	2	3	4 5

Appendix E

IPPA-Parent (Adolescent Report)

This questionnaire asks about your relationship with important people in your life; your parents. Please read the directions carefully.

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

(step) mother _____

(step) father _____

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

	Almost Never or Never True	Not Very Often True	Some- times True	Often True	Almost Always or Always True
1. I tell my parents about my problems and troubles.	1	2	3	4	5
2. My parents help me understand myself better.	1	2	3	4	5
3. If my parents know something is bothering me, they ask me.	1	2	3	4	5
4. My parents have their own problems, so I don't bother them with mine.	1	2	3	4	5
5. My parents respect my feelings.	1	2	3	4	5
6. When I'm angry about something my parents try to be understanding.	1	2	3	4	5
7. I wish I had different parents.	1	2	3	4	5
8. My parents accept me as I am.	1	2	3	4	5

	Almost Never or Never True	Not Very Often True	Some- times True	Often True	Almost Always or Always True
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 parents makes me feel ashamed or foolish.	1	2	3	4	5
12. I feel angry with my parents.	1	2	3	4	5

Appendix F

Youth Behaviors (Adolescent Report)

1. During the past 30 days, on how many days did you smoke cigarettes?
 - A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

2. During the past 30 days, on how many days did you have at least one drink of alcohol?
 - A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

3. During the past 30 days, on how many days did you have at least one puff of marijuana?
 - A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days