REGULATION OF POSITIVE EMOTIONS IN YOUTH:

RELATIONS WITH AFFECT AND DEPRESSION

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

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a candidate for the degree of doctor of philosophy,

and hereby certify that, in their opinion, it is worthy of acceptance.

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For my parents, Jennifer and Richard Early and for my brother Sam. I take pride in our family's value of intellect as well as compassion. You each challenge me to live these values every day. Mom and Dad, you have always listened to me and loved me. Through my journey of becoming a Psychologist you have supported me and my family in every possible way.
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ABSTRACT

The main goal of the current study was to investigate the role of Regulation of Positive Emotions (RPE) or the "ability to manage responses to positive emotions" in youth development of depression. In order to accomplish this goal it was first necessary to develop a measure of RPE; thus, development and validation of a new self-report measure of RPE (i.e. the Youth Regulation of Positive Emotions Scale; YRPES) was a preliminary goal of this study as well. The YRPES was preliminarily investigated in an emerging adult sample (N= 548) while the primary analyses were conducted in a school sample of typically developing youth grades 5 through 8 (N=254). Participants completed measure of emotion regulation, affect, and anxiety and depression symptoms. Youth participants were assessed at two time points approximately 6-months apart. Results provided support for the construct of RPE which was related to higher levels of Positive Affect (PA) and lower levels of depression symptoms in youth. RPE provided incremental validity in predicting both PA and depression symptoms relative to established measures of emotion regulation. Support was also found for a mediation model in which PA partially mediated the association between RPE and Depression. While RPE did not significantly predict depression symptoms at follow up after controlling for initial symptom, changes in RPE were significantly associated with changes in depression symptoms. This association was also partially mediated by changes in PA. Relations of RPE with NA, anxiety symptoms were also investigated as were the moderating effects of gender and age. Implications for future research and interventions that include positive emotion regulation strategies are discussed.

INTRODUCTION

Prominent theories of depression in youth have identified both high negative affect (NA) and low positive affect (PA) as core components of depression (see Figure 1; Clark & Watson, 1991, Joiner, Lewinsohn, & Seeley, 2002, Lewinsohn & Graf, 1973). Thus, in addition to experiencing the problems associated with NA (e.g., overwhelming guilt, irritability, behavioral withdrawal, and physical symptoms (Forgas, 2003; Mineka, Rafaeli, Yovel, 2003; Watson & Pennebaker, 1989), depressed youth miss experiencing the benefits of PA such as self-esteem, optimism, cognitive flexibility, behavioral approach, and health promotion (Durbin & Shafir, 2008, Forgas, 2003; Gray, 1987; Mineka, Rafaeli, & Yovel, 2003; Ryff & Singer, 2003). Poor emotion regulation (ER), or the inability to effectively alter emotional responses (Cole, Luby, & Sullivan, 2008) has been implicated in this combination of overly high NA and suboptimal PA. Several researchers have identified ER problems related to depression symptoms in youth (Garber, Braafladt, & Bahr Weiss, 1995, Suveg, Hoffman, Zeman, & Thomassin, 2009). For example, youth with depression symptoms tend to engage in more ineffective regulation strategies such as rumination or suppression in response to NA (Garnefski, Kraaij, Rieffe, Jellesma, Terwogt, 2007; Nolen-Hoeksema, Wisco, Lyubomirski, 2008; Silk et al., 2003). This research suggests that one reason depressed youth have high NA is that their skills for managing (i.e., minimizing or down-regulating) NA are inadequate. One largely unexplored question is the extent to which depressed youth's low PA might result from a similar ER deficit – i.e., whether youth depression is associated with an inability to manage (in this case, sustain or extend) positive emotions. Fuller understanding how youth regulate their *positive emotions* would inform developmental theories of depression and highlight potential interventions for youth at risk for mood problems. For example, if research supports that youth who lack the ability to regulate positive emotions are at increased risk for depression, it would suggest that depression

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interventions should target skills aimed at more successful regulation of positive affect. Such interventions might encourage youth to capitalize on everyday events by sharing and celebrating success rather than dismissing or dampening positive feelings.

This dissertation will review the research literature on three topics relevant to advancing our understanding of emotion regulation in youth depression. First I will give a brief overview of youth depression. Second I will summarize what research has discovered regarding positive and negative affect in youth. Third I will discuss the emotion regulation literature with specific emphasis on youths' ability to influence their own emotional experience. After reviewing these literatures I will describe an emotion regulation theory of depression in youth and illuminate the necessity of incorporating positive emotion and its regulation into our understanding of depression's development. Finally, I will report the results of a short-term longitudinal study testing an emotion regulation model of depression development in youth.

The primary aim of the proposed study is to advance our understanding of how youth regulate positive emotions and whether their ability to regulate is associated with depression risk. Because no measure currently exists to assess how youth regulate their own positive emotions, an initial aim of the study was to create and validate a developmentally appropriate measure of youth's regulation of positive emotions. The second aim of the study was to test a developmental model of youth depression in which youth's regulation of positive emotions (RPE) and regulation of negative emotions (RNE) predicts depression symptoms with PA and NA mediating the link between affect and depression (see Figure 2).

A secondary aim of the study was to examine the specificity of this model to depression. Specifically, based on prior evidence that depression relates to both PA and NA whereas other internalizing conditions such as anxiety relate only to NA (Joiner, Lewinsohn, & Seeley, 2002),

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the developmental model presented in this study predicts that RPE will predict depression but not anxiety (see Figure 3).

The current study uses strategies consistent with a developmental psychopathology approach to investigate the role of affect and emotion regulation in the development of depression. This type of approach emphasizes the importance of understanding abnormal development in the context of typical development (Sroufe & Rutter, 1994). One strategy of this approach is to treat data as continuous rather than categorical. For example in our study we collected data from a typically developing sample in order to study the entire spectrum of depression symptoms rather than only recruiting youth with the presence or absence of a particular disorder. Our focus on symptoms of depression rather than depression disorders also maximizes statistical power by taking advantage of the full range of continuous variables. Another aspect of the developmental psychopathology approach is to consider behavior in the context of individual factors such as age and gender. We also paid particular attention to sensitive periods in development and the moderating effects of age and gender. Finally developmental psychopathology is concerned with how characteristics change over time. This study utilized a longitudinal methodology to examine not only variables that are concurrently related to depression but also those variables predict future depression as well.

Literature Review

Youth depression. Depression is a negative mood state characterized by sadness, hopelessness, and lack of pleasure or enjoyment (Mirriam-Webster, 2011). Depression is often accompanied by cognitive (e.g. trouble concentrating, indecisiveness, or thoughts of suicide) and physical (e.g. fatigue, changing in sleeping or eating patterns) symptoms (*DSM-IV-TR*, American

Psychological Association, 2000). At mild levels, depressed mood is a common experience affecting as many as 1 in 4 youth by the end of adolescence (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). At more severe levels, depressive disorders affect approximately 15% of youth (Copeland, Shanahan, Costello, & Angold, 2011). A diagnosis of depression in individuals under 18 requires the presence over two weeks of depressed or irritable mood or lack of interest in previously enjoyed activities, three to four other cognitive, behavioral, or physiological symptoms, and clinically significant impairment in functioning (*DSM-IV-TR*).

Depression is among the most common mental health problems facing youth (Copeland et al., 2011; Costello, Foley, & Angold, 2006; Kessler et al., 2003). The consequences of depression at both mild and clinical levels of severity include academic and social problems (Kendall, Cantwell, & Kazdin, 1989), later problems with depression as adolescents and adults (Pine, Cohen, Gurley, Brooke, & Ma, 1998), and risk for suicide (Birmaher, Arbelaez, & Brent, 2002). The monetary costs associated both treated and untreated depression have been estimated to be at least $36 billion annually (AHRQ, 2000).

Development of depression. Depression has been diagnosed in children as young as 2 to 3 years of age although it is much more common for onset to occur post-puberty (age 12 or older; Luby, 2010; Kessler et al, 2003). At all ages it is more common for youth to experience clinically relevant symptoms of depression than to receive a depression diagnosis (Tram & Cole, 2006). Behavioral and physiological symptoms of depression (e.g. changes in eating, sleeping, activity level) have a bigger role for infants and young children than they do for older children and adolescents whose symptoms also include cognitive and social problems (Luby, 2010). Rates of depressive disorders are relatively low in infants and young children (2%; National Institutes of Mental Health, 2003). Rates remain relatively stable until youth reach adolescence at which point a sharp increase in the rates of depressive disorders is observed with rates as high as 20% in teens

(Avenevoli, Knight, Kessler, & Merikangas, 2008; Hankin et al., 1998). Adolescents are more

likely than younger youth to experience depression symptoms similar to adults, such as depressed

mood, decreased interest in previously enjoyed activities, feelings of worthlessness and thoughts

of suicide (Gotlib, Lewinsohn, & Seeley, 1995). Though depression rates increase during the

transition to adolescence for both males and females, by age 15 a marked gender difference has

emerged with females being at least twice as likely to receive a depression diagnosis (Hankin, et

al., 1998). Despite some differences in presentation across childhood, Depression does show at

least moderate continuity (Cole, Luby, & Sullivan, 2008; Keenan, Feng, Hipwell, &

Klosetermann, 2009). Stability estimates range from r = 0.15 to 0.77 depending on the length of

the interval being examined and the specific time period being studied (Devine et al., 1994;

Wierzbicki & McCabe, 1988). Tram & Cole (2006) found that stability was lowest for youth

during the transition from elementary to middle school (e.g. 6th to 7th grade) and suggest this may

be a critical period in which to investigate factors which might influence depression. Middle

childhood or pre-adolescence is a developmental period which has received little attention with

regard to depression, especially compared with later adolescence. However, attention to this age

period would enhance our understanding of youth depression, illuminate depression precursors,

and highlight a developmental target for prevention and intervention (Feng et al., 2009; Tram &

Cole, 2006) Thus, this study followed youth during this transition to adolescence (grades 5

through 8), when many youth are beginning to have problems with depression.

  Many theories exist to address the development of depression in youth. Some theories

focus on child specific vulnerabilities such as: having a family history of depression, having a

difficult or negative temperament, lacking positive affect, or having a negative cognitive style

(Caspi, Henry, McGee, Moffitt, & Silva, 1995; Durbin, Klein, Hayden, Buckley, & Moerk, 2005;

Lakdawalla, Hankin, & Mermelstein, R., 2007; Lewinsohn & Graf, 1973, Weissman et al., 2006).

Other theories focus on environmental risk factors such as experiencing stressful events or changes, living in an environment lacking predictability, or positive reinforcement, or having a parent with depression problems (Caspi, et al., 2003; Compas, Grant, & Eyeberg, 1994; Sheeber, Hops, Andrews, Alpert, & Davis, 1998). Interpersonal problems are also emphasized in many theories (e.g. youth lacking appropriate social skills, having increased conflict during family interactions; Hammen, 1999; Joiner, 1999; Sheeber et al., 1998). Though evidence implicates many risk factors relative to depression, there may be a way to organize these seemingly disparate variables in order to understand depression in a more simple yet comprehensive way.

Depression and Affect. The current study focuses on the affective issues involved in the experience and development of youth depression. One widely supported affective model of depression across youth and adulthood is Clark and Watson's (1991) tripartite model of depression and anxiety. With this model, Clark & Watson sought to better understand internalizing symptoms and disorders by illuminating their core components. This strategy of examining simpler patterns that exist in the relatively vast array of internalizing symptoms and variables yielded two such components relative to depression -- general distress or negative affect (NA), and interest/pleasure or positive affect (PA). The tripartite model proposes that NA and PA are orthogonal constructs that relate differently to different types of internalizing problems. Specifically, both NA are PA are posited to be significantly associated with depression (Clark & Watson, 1991). However, only NA is predicted to relate to anxiety, with PA predicted to be unrelated to anxiety.

Thus, it is this unique combination of high NA and low PA that is specific to depression. This model has received robust support in samples of youth of various ages (Chorpita, 2002; Daleiden, Chorpita, & Lu, 2000; Jacques & Mash, 2004; Joiner, Catanzaro, & Laurent, 1996; Ollendick et al., 2003). This elegant model has provided a useful way to organize the study of

youth depression into processes that influence the NA component and those that influence the PA component (e.g.,temperament, Durbin et al, 2005; social cognitive processes, Bell et al., 2009; Luebbe et al., 2010; family interaction processes, Luebbe & Bell, in press). This study tests an extension of the tripartite model in which low PA and high NA are not simply components of depression but also developmental risk factors. This study also examines whether emotion regulation can be organized based on their relations with PA and NA and whether poor emotion regulation might also act as a risk factor.

Affect. Our primary interest in affect results from its prominence in the tripartite model developed by Clark and Watson. In this model, the authors define negative affect (NA) as the experience of feeling distressed or unpleasant (e.g. angry, guilty, sad, afraid, or worried). Positive affect (PA) refers to the experiencing a "zest for life" and other pleasurable feelings (e.g. excited, interested, and proud; Clark & Watson, 1991). At moderate levels PA and NA act as cues, alerting individuals to important issues. NA alerts people to danger or threat and facilitates vigilance and action in order to prevent harm in response to threat (Taylor, 1991). Experiencing NA lets an individual know that something is wrong and should be avoided or changed in order to preserve or improve one's well-being. Acute NA is associated with the sympathetic nervous system's fight or flight response which promote cognitive and physiological changes that promote survival under extreme threat conditions (e.g. a child running away from a barking dog; Dickerson, & Kemeny, 2004). A more moderate example of NA facilitating action would be a school-aged youth feeling anxiety which induces them to study for a spelling test. Experiencing PA serves to reward behaviors that encourage survival or enhance well-being such as accomplishing a goal, socializing, reproducing, nourishing, and being physically active (Ashby, Isen, & Turken, 1999; Fredrickson, & Branigan, 2005; Isen, 1990). For example, many people experience PA by socializing at a party, making them more likely to attend future parties.

Extreme PA, sometimes referred to as exuberance, can be problematic if it results in a child who is too excited to attend to important tasks or act in a socially appropriate manner (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996). However in moderate levels, PA is associated with enhanced problem solving, flexibility, creativity, and memory for other positive information (Ashby, Isen, & Turken, 1999; Isen, 1990).

One important caveat in understanding the literature on youth affect is the issue of how researchers measure affect. Given that we are interested in individuals' own experience of affect, the use of self-report instruments, particularly with adults, is standard. However, quite different methods are often necessary for assessing youth affect. For example, the assessment of affect in infants and very young children is largely restricted to observations of behavior (play activities and body movements), facial expressions (smiling or grimacing), vocalizations (crying or cooing), or reports from parents or caregivers which are primarily based on these same external indicators. Even when youth gain the ability to report on their own internal affect, self-report instruments must be evaluated carefully to ensure that youth of different ages can adequately comprehend the items. These measurement differences are necessary developmental accommodations, but can create challenges when comparing affect across ages. As we review the literature on typical development of affect, we will take care to consider the assessment or measurement strategies used while interpreting findings on youth affect.

Affect in Youth. Affect has been studied in individuals as young as babies in-utero all the way through adulthood (Kurjak, Stanojevic, Azumendi, & Carrera, 2005; Watson & Tellegen, 1985). These studies suggest that NA is an early and common affective experience. Infancy is often characterized by frequent and intense NA (Sallquist et al., 2009). Parent-report and observer ratings confirm frequent episodes of crying or fussing, or other signs of distress are typical of most children through the first year of life (Sallquist et al.,). As infants transition into toddlers,

they continue to frequently display NA but their ability to communicate distress becomes more sophisticated (e.g. verbal expressions of dissatisfaction) and differentiated (displaying fear vs. frustration.) Findings are inconsistent as to the exact age at which displays of NA become less frequent and intense but most agree that it occurs for most toddlers by age 3 (Gaertner, Spinrad, Eisenberg, 2008; Mathiesen & Tambs, 1999; Murphy, Eisenberg, Fabes, Shepard, & Guthrie, 1999; Rothbart, Ahadi, Hershy, & Fisher, 2001; Sallquist et al.).

By the time children reach school age, most have learned to mask certain emotions as appropriate for social situations (Saarni, 1984). This makes it difficult to interpret direct comparisons of observed NA at different ages. Youth may be experiencing NA but not displaying it externally. However parent-report and youth self-report suggest that levels of NA continue to decrease throughout the school-aged years until youth reach adolescence (Sallquist, et al., 2009). During adolescence, youth's NA usually becomes a more frequent experience and during these NA episodes the negative emotions are more intense than in previous years (Hammen & Rudolph, 2003; Garber, Keiley, & Martin, 2002; Silk, Steinberg & Morris, 2003). After adolecsence, NA in young adults gradually decreases and remains relatively stable during adulthood.

In general, youth experience an opposite pattern with PA. Though smiles have been observed prenatally (Kurjek et al., 2005) they remain relatively rare in newborns. Infant displays (e.g. smiling and laughing) of PA become more frequent and intense through the first year of life. Frequency of low to high intensity PA continues to increase throughout toddlerhood (based on observer ratings and parent report; Olino et al, 2011; Rothbart, Ahadi, Hershey, & Fisher, 2001). Parent-report and youth self-report indicate that for most youth PA remains relatively stable from age 5 to adolescence (Guerin & Gottfried, 1994). During adolescence, youth can continue to experience episodes of high-intensity PA (Larson & Richards, 1994), but frequency of more

moderate levels of PA decreases (Ciarrochi, Heaven, & Supavadeeprasit, 2008;Larson, Moneta,

Richards, & Wilson, 2002; Sallquist, 2009). PA increases again for young adults and for most

adults remains relatively stable or increases gradually throughout their lives (Mroczek & Kolarz,

1998).

While patterns of normative development for PA and NA tend to contrast, rank order

stability of both constructs remains constant after about 2 to 3 years of age (Lemery, Goldsmith,

Klinnert, & Mrazek, 1999; Durbin et al., 2007; Rothbart & Bates 1999; Sallquist et al., 2009). In

other words, by late toddlerhood, youth tend to remain fairly stable in their levels of PA and NA

relative to their age-mates. Few studies have gone beyond early adolescence to assess stability of

affect in older youth, but those that do generally support continued rank-order stability from early

childhood through adulthood (Caspi, Moffitt, Newman, & Silva, 1998; Sallquist et al., 2009).

Affect and depression. A developmental psychopathology perspective takes these typical

trajectories and presentations of affect into account when considering circumstances in which

certain patterns of affect would lead to problems. Deviations from typical trajectories can be

associated with risk for psychopathology. For example, youth with NA that is more frequent and

intense than average are at increased risk for psychopathology including behavior problems,

anxiety, and depression. Though high PA is generally considered desirable, too much high-

intensity PA or *exuberance* can put kids at risk for externalizing problems (Rydell, Berlin, &

Bohlin, 2003).

Most relevant to this dissertation is a combination of high NA and low PA. Several studies

have documented a concurrent association between depression and this pattern of high NA and

low PA (Jacques & Mash, 2004; Chorpita, 2002; Lonigan et al., 1999; Cole et al., 1998;

Ollendick et al., 2003). However, relatively few studies have examined these relations using

longitudinal or other methods to determine whether youth who are experiencing low PA and high NA are at increased risk for experiencing depression symptoms in the future as well.

Longitudinal studies conducted by Lonigan and colleagues have shown low PA and high NA to predict later depression symptoms over short time intervals in youth in grades 4 through 11(e.g. 2 and 7 months; Joiner & Lonigan, 2000; Lonigan et al., 2003). NA and PA observed in toddlers has been shown to predict risk for depression several years later (Early & Buss, In Prep, Hayden et al., 2006; Dietz, Birmaher, Williams, Silk, Dahl, Axelson, Ehmann, & Ryan, 2008). In one of the longest prospective longitudinal studies relevant to this issue Caspi, Moffitt, Newman, and Silva (1998) observed a link between low PA and high NA at age 3 with depression at age 21.

Some researchers have also linked youth's affect with their parents' history of depression as an alternative way to study affect's role as a risk factor (Durbin et al., 2005). Parental and/or maternal history of depression is one of the largest documented risk factors for youth (Weissman et al., 2006). Thus, characteristics that occur more often to youth in this group relative to youth whose parents have never been depressed are considered to be risk factors as well. Youth with parental histories of depression tend to have lower levels of PA and higher levels of NA (Dietz et al., 2008; Forbes, Cohn, Allen & Lewinsohn, 2004; Shaw et al., 2006). Developmental trajectories of PA were different (e.g. less steep) for youth with vs. without familial risk for depression across ages 1-9 (Olino et al., 2011) though NA trajectories did not vary as a function of familial risk Overall, the emerging developmental evidence is confirming the role of specific affective patterns acting as risk factors for depression in youth. The current study will further examine affect's role as a risk factor while also exploring factors that influence affect.

Emotion regulation. "Emotion regulation" is a broad term that has been used to describe many emotional and behavioral phenomena (Cole, Martin, & Dennis, 2004). This term can refer to the effects emotion has on other processes (e.g., the effects of emotional arousal on performance in a cognitive task) or it can refer to the processes that affect emotion (e.g., the effects of self-soothing behaviors in response to fear; Durbin & Shafir, 2008). Some definitions emphasize effortful processes or strategies while others stress the importance of physiological or unconscious processes that are more difficult for an individual to control (Cole, Martin, & Dennis, 2004). Another confusing issue is whether emotion regulation refers to all processes that affect emotion or only those processes that successfully result in a desirable emotional experience. This study does not assume or restrict the definition of emotion regulation to only those instances in which regulation strategies are effective at producing the desired emotional experience. For the purposes of this study our focus will be on *effortful abilities or strategies that contribute to management of an individual's emotional experience*. This conceptualization is consistent with definitions offered by leading researchers (Cole, Luby, & Sullivan, 2008). In discussing these abilities and strategies, we will specify activities that tend to result in successful regulation or those that interfere with regulation. We acknowledge that all of the above aspects of regulation have implications for our understanding of depression development. Our operational definition reflects our goals of gaining insight into what strategies promote successful management of PA in youth, whether these same strategies are associated with decreased risk for depression, and whether these strategies might be useful for interventions targeting depression in youth.

Emotion regulation in youth. The ability to affect one's own emotional experience emerges as early as infancy (Kopp, 1989). However, the developmental process of mastering emotion regulation requires a complex interplay of learning mechanisms and physiological

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maturation (Fox, 1994). Early regulation efforts can be observed as children self soothe with a

pacifier or blanket, avert their gaze in response to overstimulation, or physically move to more

comfortable accommodations as their increasing mobility allows. However the majority of infant

emotion regulation relies heavily on caregivers responding to their baby's cues (Grolnick,

Bridges, & Connell, 1996). Children's self-regulation efforts become more common at 2 to 3

years (Grolnick, Bridges & Connell, 1996). Important regulation milestones include the ability to

manage emotional distress due to parental separation, delay of gratification (e.g. control one's

immediate emotions in pursuit of a larger goal), and displaying emotions in socially appropriate

ways (e.g. smiling after receiving an undesirable toy). By later childhood most youth have

developed more sophisticated strategies for "down-regulating" or successfully managing negative

emotions (Garber, Braafladt, & Weiss, 1995). Youth continue to use *behavioral* strategies such as

distracting themselves by playing a game, but are also starting to engage in *cognitive* emotion

regulation strategies such as positive reappraisal and mental distraction (Band & Weisz, 1988;

Reijntes et al., 2006). Social strategies continue to be important across development. While

infants rely primarily on their parents to help them regulate emotion, older youth and adults

develop more sophisticated communication skills that allow them to engage in social behaviors

with friends and family aimed at modifying or maintaining certain emotions (Gable, Reis, Impett,

& Asher, 2004). However, some youth engage in behaviors that are not particularly effective and

that may even serve to "up-regulate" or increase NA (Garnefski & Kraaj, 2006; Kovacs & Lopez-

Duran, 2010). As youth move into adolescence, their ability to respond to emotions becomes

more advanced and purposeful (Reijntjes et al., 2006). In Silk et al.'s experience sampling study,

adolescents reported using effective strategies (problem solving, acceptance, positive thinking)

more than ineffective strategies (denial, avoidance, rumination) in response to stress (Silk,

Steinberg, & Morris, 2003). As youth move from adolescence into adulthood they rely more and

more on cognitive emotion regulation strategies while continuing to also use behavioral and

social strategies (Garber, Braadfladt, & Weiss, 1995; Garnefski & Kraaj, 2006).

There is some evidence that males are more likely to participate in active, behavioral

strategies for emotion regulation such as exercise in response to anger (Goodwin et al., 2006) In

contrast, females are more likely to utilize methods that involve emotional expression and

ineffective methods such as rumination (Gross, John, 2003; Silk et al., 2003).

Emotion regulation and depression. Studies investigating emotion regulation in youth

often include an association between developmentally immature or ineffective emotion regulation

and psychopathology (Garber, Braadfladt, & Weiss, 1995). Problems associated with poor

emotion regulation include externalizing as well as internalizing problems (Cole et al, 2004).

Research provides ample support for the role of poor regulation of negative emotions (NRE) in

depression. For example, in response to a fight with a friend, youth with depression are less likely

to use problem-solving (an effective emotion regulation strategy) and more likely to engage in

rumination (an ineffective emotion regulation strategy; Garber, Braafladt, & Weiss, 1995;

Garnefski, & Kraaj, 2006; Hilt, McLaughlin, & Nolen-Hoeksema, 2010; Silk, Steinberg, &

Morris, 2003). Youth at risk for depression are more likely to have difficulties with regulation

tasks such as controlling temper, and acting before thinking (Kam et al., 2010; Silk, Steinberg, &

Morris, 2003). Other studies have also shown that inadequate down-regulation of negative

emotions that accompany unpleasant or stressful experiences can result in depression symptoms

(Ehring, Fischer, Schnulle, Bosterling, & Tuschen-Caffier, 2008; Feng et al., 2009; Garber,

Braafladt, & Weiss, 1995; Garnefski, Rieffe, Jellesma, Terwogt & Kraaij, 2007;Reijntjes, Stegge,

Terwogt, & Hurkens, 2006; Silk et al., 2006; Suveg, Hoffman, Zeman, & Thomassin, 2009;

Tamas et al., 2007). This research suggests that one way to help youth at risk for depression may

be to teach them better strategies for coping with negative situations which is consistent with evidence coming from intervention trials (Lenze, Pautsch, & Luby, 2011).

While we are understanding more and more about methods of coping with negative emotions, far less attention has been focused on how youth respond to positive emotions. We know very little about youth's management or regulation of their positive emotions (RPE), especially in responses to positive experiences (Durbin & Shaffir, 2008). Given depression's association with low PA, fuller understanding of how RPE relates to and influences risk for depression in youth is needed to help guide optimally effective prevention and treatment of this prevalent and impairing condition.

The link between individuals' regulation of positive emotions (RPE) and depression has been most often examined in adults. Feldman, Joorman, and Johnston (2008) showed that adults who respond to positive emotions with ineffective RPE strategies such as dampening (i.e., limiting or down-regulating their positive emotions) are more likely to experience depressive symptoms. In adults, depression is also predicted by related constructs such as low participation in pleasurable activities (Peeters et al., 2003). In studies employing PA inductions, adults with depression tend to respond less positively to positive stimuli (Gerhricke & Shapiro, 2000; Reed, Sayette, & Cohn, 2007; Dunn, Dalgleish, Lawrence & Cusack, 2004) suggesting a decreased ability for adults to experience positive emotions.

Though the role of RPE has not been directly tested in youth, studies have investigated related constructs and their association with depression. However, some of this research suggests a slightly different pattern of correlates for depression in youth vs. adults. For example, participation in pleasant activities is not related to depression in youth (Carey et al., 1986; Mullins, Seigle, & Hodges, 1985; Swearington & Cohen, 1985; Weirzbicki & Sayler, 1992).

Depression symptoms are unrelated to the frequency in which youth participate in pleasurable activities (Carey et al., 1986), and are unrelated to youth's reported enjoyment of these activities (Weirzbicki & Sayler, 1992). Studies of youth's responses to affect inductions have also produced inconsistent findings (Sharp, Peterson & Goodyer, 2008). Sharp et al. (2008) found that depressed youth responded to PA inductions with roughly the same PA levels as nondepressed youth. It may be that youth at risk for depression are able to experience PA during pleasurable events, but may be less likely to experience anticipatory PA before a positive event or maintain PA after positive events. Youth with depression symptoms are less likely to expect positive outcomes or expect they will enjoy pleasant activities (Forbes, Shaw, & Dahl, 2007; Muris, van der Heiden, 2006). This might contribute to reduced PA in a child if they are less likely to look forward to a pleasant activity. Importantly, it might also decrease the likelihood that the child will choose to participate in an activity, contributing to withdrawal seen in youth with depression symptoms. Neuroimaging studies with depressed youth have also observed functional differences in areas of the brain related to PA (e.g. reward processing; Forbes & Dahl, 2005; Forbes et al., 2009).

RPE in youth has also been indirectly studied in the broader family context. Parental dampening or invalidating responses of youth's PA has been associated with depression symptoms (Yap, Allen, & Ladouceur, 2008). Alternatively, Luebbe, Bell, Stoppelbein, Young, & Early (2011) found that youth whose families savor positive events by discussing, celebrating, and recalling them are less likely to report depression symptoms. However, no studies have compared youth's individual RPE and risk for depression.

An Emotion Regulation Theory of Depression

The existing literature provides several findings that serve as a foundation for an emotion regulation theory of depression. First, many studies confirm that depression is characterized by two core affective components: high negative affect (NA) and low positive affect (PA). PA and NA are associated depression concurrently and longitudinally (e.g. the combination of low PA and high NA is associated with risk for current and future depression problems.) Although developmentally atypical patterns of affect put youth at risk for a range of psychopathology, it is this specific combination of low PA and high NA seems most relevant for depression (see paths "b" and "e" from Figure 2). Second, youth's ability to regulate their own emotions (ER) is seen as early as infancy and matures by adolescence to include social, behavioral, and cognitive strategies aimed at managing emotional experiences. Several studies indicate that immature or ineffective regulation of negative emotions puts youth at risk for various forms of psychopathology, including depression (see path f). This suggests that inability to manage negative emotions is a characteristic of or risk factor for depression. However, the role of managing positive emotions remains largely unexplored.

Based on this existing theoretical and empirical literature, the current model posits that both ineffective regulation of positive emotions (RPE) and ineffective regulation of negative emotions (RNE) put youth at risk for depression problems (see Figure 2 paths "c" and "f"). The model has several key factors that are consistent with, as well as build upon, existing affective models of youth depression. First, most youth experience a variety of negative emotions on a regular basis; however the model proposes that it is those youth who lack the ability to adequately manage their negative emotions who end up experiencing NA more intensely and frequently (path "d"). Similarly, youth who lack the ability to effectively manage positive emotions may experience less overall PA as a result (path "a"). Over time, this ineffective regulation should

result in problematic patterns of affect for poor regulators. According to the current model, children who are ineffective at both RPE and RNE are more likely to exhibit the pattern of low PA and high NA implicated in depression. In this way, the current model places affect in the role of mediator between emotion regulation and depression. That is, a significant portion of the effect of poor RPE and RNE on depression is mediated by the effect that ER has on affect and subsequently affect's effect on depression (see Figure 2).

The current model guides specific hypotheses about the direction of effects among emotion regulation, affect, and depression. To date, the direction of the link between RPE and depression has not been examined directly. However, the direction of influence between depression and ER more broadly has been discussed within the psychopathology literature. Some argue that poor regulation leads to increased stress and depression, while others argue that having depression decreases the likelihood of someone engaging in effective regulation. Studies employing experimental manipulations of both affect and regulation support both directions of effect (Mor & Winquist, 2006). It may be that regulation and depression have a bidirectional relationship wherein both process influence the other simultaneously. Experimentally testing the direction of effect between ER and depression is beyond the scope of this study. However, by testing the current mediation model we hope to provide evidence that ER does impact affect and depression (though other mechanisms may be operating as well). The direction of effect being tested in the current model is important for at least two reasons. First, such a model helps establish validity for adding a regulation component to the core-component/affect model of depression. Second, support for this model will have implications for depression interventions (e.g. by targeting ER strategies for regulation of both negative and *positive* emotions).

Current Study

Two primary goals of the current study are to (1) develop and validate a measure of youth regulation of positive emotions (RPE) and (2) investigate the role of emotion regulation in the development of youth depression symptoms. Fifth to eighth grade youth completed several measures related to internalizing symptoms, affect, and emotion regulation including a newly developed measure assessing youth's responses to positive emotions (RPE). Youth were tested at three time points over a 6-month period in order to evaluate the influence of emotion regulation on affect and internalizing symptoms over time.

The first goal, to construct and validate a measure of youth's regulation of positive emotions (RPE), fills a notable void in the current literature. To our knowledge, no measure currently exists to assess youth's RPE, but is essential to advancing our understanding of youth's emotion regulation. In constructing this measure, we adapted content from existing measures of youth's regulation of negative emotions, as well as from studies in the social psychology and positive psychology literatures that have examined adult's use of behavioral and cognitive strategies that promote PA.

The current study examined several hypotheses relevant to validation of our newly developed RPE measure (see Table 1). First, a crucial step in validating the measure is to demonstrate RPE's convergent relation to PA and depression symptoms. That is, we expect individuals who report effectively managing and regulating their positive emotions will also report higher levels of PA and lower levels of depression symptoms (Hypothesis 1). Second, to establish discriminant validity of the RPE, the study examines RPE's independence from measures tapping other emotion related constructs. Given the relative independence of PA and

NA (Watson, & Tellegen, 1985), it is expected that RPE will not show a significant relation with

NA. (Hypothesis 2).

After establishing satisfactory psychometric properties of our measure of RPE, the study

will address goal 2 by examining a model in which RPE adds significant and unique information

in predicting youth depression. While RPE has not been previously investigated in youth, other

measures of emotion regulation have shown moderate relations with PA as well as depression

symptoms (Suveg, Hoffman, Zeman, & Thomassin, 2009). However none of these other

measures are designed to comprehensively address the behavioral and cognitive strategies

involved in regulation of PA, therefore we believe that the newly developed measure of RPE will

contribute unique information to our understanding of PA and depression symptoms relative to

other emotion regulation measures (Hypothesis 3).

This study will also test a concurrent mediation model in which PA mediates the relation

between RPE and depression symptoms. In other words, we hypothesize that RPE will be

associated with lower levels of depressive symptoms and this association will be at least partially

explained by level of PA (Hypothesis 4). Using a prospective design we will be able to examine

not only the concurrent relations among RPE, PA, and depression symptoms, but also the

relations among these variables over time. We expect effective RPE to be associated with fewer

depression symptoms in youth after a 6-month follow-up (Hypothsis 5a). We also expected

changes in RPE to be associated with changes in depression symptoms at follow-up (Hypothesis

5b), and we expect changes in PA to partially mediate this association between changes in RPE

and changes in depression symptoms (Hypothesis 5c).

A secondary study goal is to test a broader model which encompasses internalizing

problems more generally (i.e., both depression and anxiety; see Table 2, Figure 3). As lack of PA

is a risk factor shown to be specific to depression, it follows that processes related to PA (e.g. regulation of positive emotion) will predict depression but not anxiety. However NA and regulation of negative emotions (RNE) are likely to influence anxiety as well as depression. Specific hypotheses for this extended model are that: Effective RNE will be negatively associated with NA (Hypothesis 1). Effective RNE will be negatively associated with depression (Hypothesis 2). Anxiety symptoms will be predicted by RNE (Hypothesis 3a) but not RPE (Hypothesis 3b), and NA will mediate the relations between RPE and depression (Hypothesis 4a) and RPE and anxiety (Hypothesis 4b).

Finally, we tested moderating effects of age and gender. Consistent with existing literature, we hypothesize that relations between regulation, affect and depression will be stronger for females than males (Hypothesis 5). We also expect relations to be stronger for older youth (Hypothesis 6).

METHOD

Data collection occurred as part of a larger program of research examining socioemotional and social cognitive predictors of youth depression. For the present study, data were collected in two phases. A preliminary study focused on development and initial psychometric evaluation of the Youth's Responses to Emotion Scale (YRPES), a newly developed measure of regulation of positive emotions. To capitalize on pragmatic advantages of readily available research participants who were suitable to address the research questions, the pilot study used an emerging adult sample. There were two main reasons for using this sample. First, this study allowed for an initial psychometric examination of individual study items before they were administered to a juvenile sample in case lack of clarity or variance suggested items needed to be adjusted or removed. Second, this study allowed for efficient data collection from a large number of participants, a requirement for valid use of exploratory factor analysis (EFA). The findings from the preliminary study were then reexamined and replicated using a youth sample.

The primary study consisted of a longitudinal study of 5th through 8th grade youth aimed at confirming the psychometric properties from the pilot study, validating the YRPES with a youth sample, and testing an emotion regulation model of depression in youth.

Preliminary Study

Participants

Participants were 548 (69.0 % females) recruited from an introductory psychology class. Participation in research studies is one way in which students can fulfills course requirements.

Most participants (84.6 %) were first-year University students and their average age was 18.6 years. The majority of students reported their race to be "Caucasian/White" (81.2 %) "African-American/Black" (7.9 %) or "Biracial/Mixed Race" (3.6 %). Participants' reports of the yearly income from the home where they grew up indicated that the majority were from middle-class backgrounds.

Procedure

Participants completed two online surveys. Once participants signed up for the study they were given a link that directed them to the survey. After reading the consent form, online participants were able to consent via electronic signature or exit the survey. At time 1, participants completed a questionnaire battery containing measures of affect, depression, and regulation of positive and negative emotions. Approximately four weeks after completing the time 1 survey, participants were contacted with an opportunity to complete the same questionnaire battery in a time 2 survey. After participating in each survey, students were awarded the appropriate credits for research participation.

Measures

Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a 20-item measure of affect. For each item, participants rate on a 5 –point Likert scale (from *very slightly or not at all* to *extremely*) how much they have been experiencing a specific emotional state (e.g., happy, sad, worried) for the past few weeks. Summed scores for 10 items assessing positive affect (α = .90) and 10 assessing negative affect (α = .87) are calculated separately (Watson, Clark, & Tellegen,1988). Test-retest correlations for the PANAS have been reported as .68 for PA and .71 for NA. Correlations with measures of psychopathology demonstrate validity (Watson et al., 1988). In the current study, internal reliability for Time 1 was

good for both PA (α = .87) and NA (α = .87).

        <u>Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977)</u>. This measure was used to assess depression symptoms in the emerging adult sample. The CESD consist of 20 items that refer to common depression symptoms (e.g. "I felt lonely, I felt sad, I felt that everything I did was an effort. Participants rate items based on how often they have experienced the symptoms during the past week (1= rarely or none of the time, 4= most or all of the time). Items are summed to form a total score (items 4, 8, 12, and 16 are reverse scored). The CESD demonstrates good internal consistency (α = .85; Radloff, 1977). Test-retest for the CESD is moderate (ranging from r=.45 to < r=.70) with higher correlations for shorter time intervals between testing sessions (Radloff, 1977). In this study, internal consistency for time 1 was good (α = .92).

        <u>Child's Emotion Management Scales (CEMS: Zeman, Shipman, & Penza-Clyve, 2001)</u>. The CEMS was used to measure regulation of negative emotions in the emerging adult sample. Though the CEMS was developed for use with children, it was used in this study so it would be possible to compare results from this sample to the youth sample. There is also no adult equivalent of the CEMS in terms of how negative emotions are treated separately and in terms of the subscales yielded by the measure. The CEMS can be divided into two smaller scales: the Children's Sadness Management Scale (CSMS)-11 items and Children's Anger Management Scale (CAMS)-12 items. Both the CSMS and CAMS are further divided into 3 subscales-inhibition ("I get sad inside but don't show it"), dysregulated expression ("I cry and carry on when I'm sad"), and emotion regulation coping ("When I'm sad, I do something totally different until I calm down"). These subscales were derived from exploratory principle components analysis. Participants respond to items on a Likert scale from 0 (hardly ever), 1 (sometimes), to 2 (often). Test-retest reliability for the individual scales ranges from .61 to .80, while coefficient

alphas range from .62 to .77. In the current study, internal reliability for time 1 was consistent with previous studies, ranging from .45 to .81.

  <u>Youth's Regulation of Positive Emotion Scale (YRPES; Early & Bell, in development)</u>. Previous to this study, no measure existed to assess youth's regulation of positive emotions in the context of positive events. The measure was developed based on existing measures of children's emotion regulation (e.g. CEMS; Zeman, Shipman, & Penza-Clyve, 2001) as well as measures from the adult literature (e.g. Feldman, Joorman, & Johnson, 2008). Twenty-seven items were administered to participants, who rated the items according to a Likert-type scale from 0 (hardly ever), 1 (sometimes), to 2 (often). See the preliminary results section for psychometrics from this measure (Table 4).

Primary Study

Participants

  Participants were 247 youth in 5th–8th grades (56.3% females) recruited from two local area schools as part of a larger study of youth's social and emotional functioning. Recruitment involved speaking to students during class to inform them of the study and sending information letters and permission forms home for students to share with their parents. Only students who brought back parent-signed permission forms were allowed to complete the study. Students received a small prize (such as candy or a pencil) for returning the permission forms regardless of whether a parent gave permission for them to participate.

Power Analysis

  Power analyses suggest that 150 participants would be sufficient to adequately examine

relations using correlational and regression analyses (assuming moderate effect sizes of .25 to .50). However, estimating the adequate sample size to adequately test the proposed structural equation models is a bit more complex. N of 200 participants is a typical sample size in published studies in which SEM results are reported (Kline, 2011). Another "rule of thumb" suggests that the ratio of participants to estimated parameters should be 10 to 20 participants per parameter (Jackson, 2003). The proposed measurement models have 14 and 20 parameters for Figures 4 and 5 respectively. For the most complex model this suggests a minimum sample size of 200. Given that in this study n = 256 there should be enough power to adequately test the mediation models.

Procedure

Data were collected at two time points during group administrations at area schools (see Table 3). Children received the same measures at both time points. At time 1, children were first presented with information about the study and signed assent forms. Once participants had completed assent forms they were presented with packets consisting of study measures. For 5th grade students, study instructions and measure items were read aloud by a research assistant while participants responded to their questionnaires. For 6th–8th grade students, classroom teachers read instructions but allowed students to complete study items on their own. Research assistants were available if participants needed extra help or item clarification. After participating, students were presented with a small prize such as a pencil or small snack. Time 3 was gathered in the same manner. At the end of the study, each school was compensated $12 per participant to be used for school supplies or events.

Measures

Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999). The PANAS-C was used to measure affect. For each item, children rate on a 5-point Likert scale

(from *very slightly or not at all* to *extremely*) how much they have been experiencing a specific

emotional state (e.g., happy, sad, worried) for the past two weeks. Summed scores for 12 items

assessing positive affect (α = .87) and 15 assessing negative affect (α = .92) in the past few weeks

are calculated separately (Laurent et al., 1999). Correlations with measures of anxiety and

depression demonstrate good convergent and discriminant validity (Laurent et al., 1999). Internal

reliability for Time 1 was good for both PA (α = .85) and NA (α = .86).

Youth's Regulation of Positive Emotion Scale (YRPES; Early & Bell, in development).

This newly developed measure was designed to assess children's regulation of positive emotions

in a manner similar to the CEMS's assessment of children's regulation of negative emotions. The

initial version of the YRPES consisted of 27 items. Children respond to items on a Likert scale

from 0 (hardly ever), 1 (sometimes), to 2 (often). Consistent with the pilot study, the YRPES

yields three subcales: Happiness Coping indicates a youth's tendency to savor and effectively

manage feelings of positive emotion, Happiness Inhibition indicates a youth's tendency to hide or

dampen feelings of PA, and Happiness Dysregulation indicates a youth's tendency to express PA

in an uncontrolled manner. Psychometric properties will be evaluated as part of the reported

results.

Child's Emotion Management Scales (CEMS: Zeman, Shipman, & Penza-Clyve, 2001).

The CEMS assesses youth's regulation of negative emotions. The CEMS can be divided into two

smaller scales: the 11-item Children's Sadness Management Scale (CSMS and the 12-item

Children's Anger Management Scale (CAMS. Both the CSMS and CAMS are further divided

into 3 subscales- inhibition ("I get sad inside but don't show it"), dysregulated expression ("I cry

and carry on when I'm sad"), and emotion regulation coping ("When I'm sad, I do something

totally different until I calm down"). Children respond to items on a Likert scale from 0 (hardly

ever), 1 (sometimes), to 2 (often). Test-retest reliability for the individual scales range from .61 to

.80, while coefficient alphas range from .62 to .77 (Zeman, Shipman, & Penza-Clyve, 2001). In the current study, internal reliability for Time 1 was consistent with previous studies, ranging from .59 to .81. The CSMS and CAMS were administered at Time 1 and Time 3. The Children's Worry Management Scale (CWMS) only recently became available and was used only at the Time 3 assessment (Zeman, Cassano, Suveg, & Shipman, 2009).

Children's Depression Inventory – Short Form (CDI - S; Kovacs, 1992). The CDI is the most widely-used and psychometrically supported measure of childhood depressive symptoms (Sitarenios & Kovacs, 1999). Participants endorse one of three statements about their feelings in the past two weeks (e.g., "I hate myself," "I do not like myself," "I like myself"). Items are scored from 0-2 and summed to provide a total score; higher scores indicate more severe symptoms. Published literature has established the CDI's satisfactory reliability, with internal consistency ranging from .71 -.94 (Kovaks, 1983; Marien & Bell, 2004; Saylor et al., 1984) and test-retest reliability ranging from .66-.82 over spans of up to 6 weeks (Finch et al, 1987). A 10-item short-form was developed for more time-efficient assessment. The long and short forms are highly correlated ($r = .89$; Kovacs, 1992). In this study, internal consistency for the CDI-S at Time 1 was .87. Two week test-retest reliability based on a sub-sample of 56 5th grade children indicated good stability over time ($r = .87$).

State Trait Anxiety Inventory for Children- Trait Form (STAIC; Spielberger, 1973). The STAIC is a widely used measure used to assess the somatic, behavioral, affective, and cognitive aspects of a child's experience of anxiety. Respondents rate whether each item (e.g. "I worry about making mistakes") is "hardly ever true," "sometimes true," or "often true" for the child. The 20 items are summed to provide a total score, with higher scores indicating higher trait anxiety.

Acceptable reliability has been demonstrated in similarly aged samples (e.g. late elementary) with coefficient alphas of approximately .80 or higher (Crowley & Emerson, 1996; Spielberger, 1973). Six-week test-retest reliability estimates range from .65-.75 suggesting children's responses are fairly stable over time (Spielberger, 1973). The STAIC correlates with other measures of children's general anxiety demonstrating convergent validity (Crowley & Emerson, 1996; Engel, Rodrigue, & Geffken, 1994). Studies have documented the discriminant validity of the STAIC (Hodges, 1990; Ruggiero et al., 1999; Spielberger, 1973) though like other measures of anxiety it tends to correlate fairly highly with measures of depression symptoms (Marien & Bell, 2004; Ruggiero et al., 1999). In this study alphas indicated strong internal consistency (α = .90).

RESULTS

Data Analysis Plan

Before Hypothesis testing can occur, psychometric properties from the YRPES must be evaluated using confirmatory factor analysis. The YRPES is expected to yield three subscales based on the results from the preliminary study and the parallel scales from the CEMS. The appropriateness of this structure will be tested and modifications made if necessary.

Primary Aims. Correlational analyses comparing the YRPES with the PANAS-C will be used to test Hypotheses 1 and 2 (relations between RPE, affect and depression). Hierarchical regression analyses predicting PANAS-C positive affect will be used to test the incremental validity of the YRPES for Hypotheses 3. Subscales from the CEMS will be included in the first step and the YPRES will be subsequently added to the model to see if this addition explains significantly more variance (e.g. R^2 than the model from the first step).

Structural equation modeling will be used to investigate the partial mediation model of RPE, affect, and depression symptoms (see Figure 4). First, a measurement model will be fit to the data to create latent variables. Modifications will be made as necessary to produce the best fitting measurement model. Second, a models of mediation will be fit in order to test direct and indirect effects. In light of recommendations by Hu and Bentler (1999), several measures of fit will be used for model testing including chi-square, the Root Mean Square Error of Approximation (Steiger, 1989; McDonald & Ho, 2002), and the non-normed fit index (sometimes referred to as the Tucker-Lewis Index or TLI). Hypothesis 5b and 5c will be tested using a similar approach using latent change scores rather than concurrent variable scores.

Secondary Aims. Correlational analyses will be used to test Hypotheses 1-3b. Hypotheses 4a and 4b will be tested using SEM in a manner similar to those described above (see

Figure 5) with anxiety and its corresponding paths added to the model. Moderation hypotheses 5 and 6 will be tested using hierarchical regressions testing the main effects of study variables, gender, and their interaction.

Preliminary Study Results

      YRPES development in emerging adult sample. The primary goal of the preliminary study was to explore the psychometric properties of the Youth Regulation of Positive Emotions Scale (YRPES). The YRPES was created by adapting items from the Children's Emotion Management Scale (e.g. CEMS; Zeman, Shipman, & Penza-Clyve, 2001) as well as measures from the adult literature (e.g. Feldman, Joorman, & Johnson, 2008), and, with the assistance of four experts in child psychology and positive psychology, by generating novel items relevant to *positive emotion regulation*. Table 1 displays the newly-created Youth Regulation of Positive Emotions, Preliminary Scale. Initially, 27 pilot items were created. Each item consisted of a statement intended to reflect aspects of positive emotion regulation that mirrored aspects of negative emotion regulation assessed in the CEMS (i.e., items that assess discreet emotions such as sadness, anger, worry, and in this case happiness; items that assess effective emotional coping strategies (e.g. coping) as well as behaviors that inhibit emotional expression and experience (e.g. inhibition), and finally items that assess behaviors associated with inability to control specific emotions (e.g., dysregulation). Participants rated the frequency with which they experienced the emotion or behavior described in the item using a 3-point Likert-type scale (0 = hardly ever, 1 = sometimes, 2 = often). Initially, the measure was administered to 548 emerging adult participants. Item mean scores and standard deviations were examined to ensure sufficient stability (all item ranges were 0-2; see Table 4). Although one item demonstrated less than ideal variability (i.e. item 27) it was not removed at this point in the development process in case it performed differently in the child sample.

Factor structure. The factor structure of the newly-created YRPES was examined

initially in the sample of emerging adults. Several procedures exist for determining the number of

factors in an exploratory factor analysis (EFA), but two of the most widely used and acceptable

approaches include Velicer's minimum average partial (MAP) test and parallel analysis

procedures (see O'Connor, 2000). Correlation matrices of YRPES items for the emerging adult

sample were submitted to these procedures using SPSS procedures (see O'Connor, 2000) to

determine likely number of factors underlying the data. Both procedures suggested a 3-factor

model fit the data best.

A three-factor model using maximum likelihood extraction with promax rotation best fit

the emerging adult data. Items with factor loadings greater than or equal to .40 were retained for

three subscales: (1) *coping with positive emotions* (effective regulation of positive emotions;

Coping), (2) *inhibiting positive emotions* (Inhibition), and (3) *exhibiting dysregulation of positive*

emotions (Dysregulation). These labels were used to correspond with Zeman's Children's

Emotion Management Scales. Of the initial 27 items, 22 items loaded on one of the three factors,

with no items cross-loading on both. Items 2, 12, 23, 24, and 27 failed to load on any factor. To

increase utility of the YRPES and because factor loadings are sample-specific, subscale scores

were calculated as the mean score of items comprising each subscale. Table 5 contains individual

item loadings the three subscales (i.e. bivariate correlations of each individual item with the 3

scale scores).

Reliability. All subscales were internally consistent, *coping* ($\alpha = .68$), *inhibition* ($\alpha = .83$),

dysregulation ($\alpha = .78$). *Coping* and *inhibition* were moderately negatively correlated while

coping and *dysregulation* were moderately positively correlated. *Inhibition* and *dysregulation*

were not significantly correlated (see Table 3). Six-week test-retest correlations for the *coping,*

inhibiting, and dysregulated subscales were rs = .48, .53, and .57 respectively. The test-retest

results suggest that though the scales evidence some stability over time, there is also a significant degree of change over time.

Though the factor analysis of the YRPES indicated a 3-factor structure, we were primarily conceptually interested in the *coping* subscale. While we feel that the *inhibition* and *dysregulation* subscales will likely shed light on the ability of children to effectively manage positive emotions, it is beyond the scope of this dissertation study to examine how all three of these subscales might influence affect and depression and also how they might work together.

Convergent and discriminant validity of YRPES in emerging adult sample. For the purposes of examining our hypotheses further in the emerging adult sample as well as in the youth sample in the most clear and expedient way possible, the majority of the remaining analyses focused primarily on the *coping* scale, as this subscale is conceptually most consistent with our working definition of emotion regulation (e.g. "*effortful abilities or strategies that contribute to management of an individual's emotional experience")*. Preliminary examinations of the convergent and discriminant validity of the YRPES in the emerging adult sample were conducted be examining correlations of the YRPES Coping scale with PA and NA from the PANAS, and Depression from the CESD (see Table 6). Consistent with the hypothesis that effective regulation of positive affect is associated with higher positive affect and less depression, convergent validity was demonstrated with the Coping scale's significant positive correlation with PA and negative correlation with Depression. With regard to discriminant validity, it was expected that the Coping subscale would be unrelated to NA; however there was a small but significant negative correlation between the Coping subscale and NA. It is also notable that PA and NA were significantly negatively correlated in this sample. This is inconsistent with some prominent theories of affect (e.g. tripartite model), however similar small correlations PA and NA have been found in other studies, (Denollet & De Vries, 2006; Molnar, Reker, Culp, Sadava, &

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DeCourville, 2006). In general, the results from the preliminary study do not support a model of complete independence of positive and negative constructs. However, these results do lend support to RPE as a positive construct.

Results- Primary Study Aims

      YRPES development with youth sample. Confirmatory factor analyses were conducted for the youth sample to test the three-factor model extracted from the emerging adult sample EFA. Initial three-solution models did not fit the data well. Allowing certain error variances (i.e., residuals) to correlate, however, improved model fit to acceptable levels, and all items loaded significantly on their respective factors (see Table 5). We also wanted to see if items dropped from the original YRPES during the preliminary analyses with the adult sample would load on the factors in the youth sample. Only 1 of the 5 items that did not load onto any factors in the emerging adult sample loaded significantly in the youth sample. Item 27 (e.g. the "I think feeling good is important") loaded on the Coping subscale. Given that this item was associated with the Coping scale both statistically and conceptually it was added to the total Coping score for the remainder of the analyses. The 4 items that did not load for either the emerging adult or youth samples were excluded from all further analyses and are not included in the final version of the YRPES.

      Reliability. As with the emerging adult sample, the three YRPES subscales were internally consistent, Coping (α = .74), Inhibition (α = .85), Dysregulation (α = .78) . Four-week test-retest reliability for the Coping, Inhibition, and Dysregulation subscales were rs = .58, .74, and .54 respectively. As with the emerging adult sample, the test-retest results suggest that although the scales evidence some stability over time, there is also significant degree of change over time. Coping and Inhibition were moderately negatively correlated with one another while

Coping and Dysregulation were fairly strongly positively correlated. Inhibition and dysregulation were not significantly correlated (see Table 6). As in the emerging adult sample, the Coping subscale was the focus of further hypothesis testing, and Inhibition and Dysregulation were not included in the following analyses.

Convergent and discrimant validity of the YRPES in youth sample. In order to examine the convergent validity of the YRPES Coping scale, we examined whether effective management of positive emotions (e.g. regulation of positive emotions) was associated with higher levels of positive affect assessed using the PANAS-C and lower levels of depression assessed using the CDI. Correlational analyses support Hypothesis 1a and 1b as RPE was moderately correlated with both PA and Depression (see Table 7). RPE also demonstrated discriminant validity in that it was not significantly associated with levels of NA consistent with Hypothesis 2. These results provide initial support for the notion that there may be separate regulation processes that influence overall levels of PA vs. levels of NA.

Incremental Validity. For Hypothesis 3a and 3b, we were interested in whether YRPES Coping scale contributed uniquely to prediction of children's PA and depression, beyond other measures of emotion regulation, in particular regulation of negative emotions (RNE). There exist in the literature several scales that examine emotion regulation and some of these scales have been shown to predict both depression and PA. We wanted to see if the YRPES Coping scale would predict Depression and PA above and beyond established measures of RNE (i.e. CEMS Sadness and Anger Coping scales). Two hierarchical regressions were performed in which YRPES Happy Coping, CEMS Sadness Coping, and CEMS Anger Coping predicted PA and depression, respectively. From this point on the YRPES Coping scale will be referred to as "RPE", while the CEMS – Sadness Coping and Anger Coping will be referred to as "RNE" in order to provide a similar naming convention for these similar constructs. The RNE subscales

were entered as predictors in the first step and the RPE scale was entered in the second step. The

regressions showed that while CEMS Sadness and Anger coping scale did significantly predict

PA and Depression, YRPES Coping predicted a significant additional amount of variance in both

PA and Depression (see Table 8).

RPE predicts PA, and depression in concurrent mediation model. In addition to

showing that RPE is a significant aspect of the experience of PA and Depression in youth, this

study also examined one possible mechanism by which emotion regulation influences depression.

We proposed a concurrent meditational model in which PA would mediate the association

between RPE and Depression. Structural equation modeling (SEM) was used to test for indirect

effect of RPE to Depression through PA (see Hypothesis 4; Figure 4). SEM was done using

MPLUS (Muthen & Muthen, 20xx). Latent variables were created for RPE (YRPES Coping), PA

(PANAS), and Depression (CDI). First the measurement model was tested which fit the data well

(CFI=.97, TLI=.96, RMSEA = .046; Chi Square = 95.82, $p < .01$). The mediation model

indicated that Depression was significantly predicted by both PA and RPE and PA was

significantly predicted by RPE. The indirect effect of RPE on Depression mediated by PA was

significant (u=-.11; Tofighi & Mackinnon, 2001). The results of the mediation analyses indicate

that the relationship between RPE and Depression is partially explained by an indirect effect

through PA. In other words, children who are better at managing their positive emotion also

experience more PA, and these children report fewer depression symptoms.

Longitudinal prediction of depression. For Hypothesis 5a in order to test whether RPE

was associated with depression over time, we examined data from the second round of data

collection which occurred 6 months following the initial data collection. While Time 1 RPE was

significantly correlated with Time 2 depression symptoms, this relationship was small in size (r

=-.13). Further, when regression analyses were performed to control for levels of initial

depression, the association between RPE and depression was no longer significant (see Table 7).

   Latent change mediation model. Though RPE did not directly predict levels of Time 2

Depression (controlling for Time 1 depression), we wanted to investigate whether changes in

RPE were associated with changes in depression symptoms; and further if this association exists

whether their might also be a moderating effect of change in PA (see Hypothesis 5b and 5c). In

order to take advantage of having each variable assessed at both time points, SEM utilizing latent

change scores was conducted. Figure 3 depicts a conceptual model of latent change scores.

Traditional change scores are calculated by subtracting initial scores from later scores resulting in

a value that represents change in one variable during the time period of interest. Latent change

scores work in a similar manner, however by using a SEM approach a *latent change score* is

created which represents the change in the Time 2 variable *NOT* explained by the Time 1

variable. This approach is considered more powerful and allows a test of mediation to be done

with the change scores themselves (McArdle, 2009). Figure 5 and 6 depicts the latent change

SEM model for testing Hypothesis 5b and 5c. This model fit the data well (CFI=.97, TLI=.97,

RMSEA = .037; Chi Square = 304.50, $p < .01$). The results of this model show that all the change

scores were significantly correlated with one another. More specifically the model supported

Hypothesis 5b in that changes in RPE were significantly associated with changes in depression

symptoms. Further the indirect effect of RPE change to Depression change through PA change

was significant (u = -.12, $p < .05$) which support Hypthesis 5c. These results show that children

who showed an increase in their RPE scores also showed an increase in their levels of PA and a

decrease in their level of depression symptoms.

Results – Secondary Study Aims

Regulation of Negative Emotion RNE. Thus far, analyses have focused primarily on positive emotions and how their regulation influences depression. Given that most of the depression literature tends to focus on negative emotional processes, we felt an examination of positive emotion regulation processes would fill an important gap in our understanding of depression. However, a secondary aim of the study was to examine processes related to regulating negative emotions (RNE) and how RPE fits into a more comprehensive emotion regulation model of depression. Initially, we investigated influences of RNE by examining bivariate corrections of RNE with specific variables of interest (i.e. negative affect (NA), positive affect (PA), and depression). We hypothesized that RNE would be negatively associated with NA and depression, and unrelated to PA. We used the CEMS Sadness Coping Scale and the CEMS Anger Coping scale to measure effective regulation of two negative emotions (e.g. sadness and anger). As expected, regulation of sadness was negatively associated with NA ($r = -.11$) and depression ($r = -.20$; see Table 7). Surprisingly, regulation of sadness was also negatively associated with PA ($r = .20$). Regulation of anger was negatively associated with NA (r= -.26) and depression ($r = -.28$) and unrelated to PA ($r = .09$; see Table 5).

Comprehensive Mediation Model of Affect. SEM was used to examine a comprehensive mediation model in which RPE, RNE, PA, and NA, predicted concurrent depression. The model was structured in such a way as to examine the possible mediating effects of PA and NA in the relationships between RPE and depression as well as RNE and depression. The results of the model are depicted in Figure 4. RNE was modeled as a latent variable comprised of CEMS Sadness Coping and CEMS Anger Coping scales. The model fit the data well (CFI=.96, TLI=.96, RMSEA = .046; Chi Square = 193.82, $p < .001$). Depression was predicted by NA, PA, and RNE. The direct path from RPE to depression was nonsignifiant. PA

was predicted by RPE and NA was predicted by RNE. The path from RPE to NA was nonsignificant as was the parallel path from RNE to PA. The lack of significance on these cross paths indicates that when modeled together, the positive constructs were fairly independent of the negative constructs.

In order to test mediation, Sobel's test and Prodclin were used to test the indirect effects of RNE and RPE with depression (Barron & Kenny, 1986; Preacher & Hayes, 2004; Tofighi,& MacKinnon, 2011). The indirect effect of RPE and depression through PA was significant (Sobel's test = -2.03, p>.05; μ=-.05, p>.05) as was the indirect effect between RNE and depression through NA (Sobel's test = -3.28, $p > .01$; $\mu = -.19, p > .01$). These results support a concurrent mediation model in which emotion regulation processes (i.e., RPE and RNE) are mediated by affect (PA and NA) in order to predict depression.

Anxiety. In order to better understand the specificity of RPE as a possible risk factor for depression vs. other affect constructs, we examined relationships of positive and negative affect and emotion regulation to anxiety. Anxiety shares considerable overlap with depression (Brady & Kendall, 1992; Jacques & Mash, 2004). In our sample, the correlation between depression and anxiety was large, $r = .64, p < .001$. However, the literature suggests that the overlap between anxiety and depression tends to be in those symptoms related to NA rather than PA, which is often found to be unique to depression (Jacques & Mash, 2004; Chorpita et al., 2000). Therefore, we expected anxiety to be related to constructs related to NA (e.g. NA and RPE) but unrelated to constructs related to PA (e.g., PA and RPE). Correlational analyses revealed anxiety to be strongly related to NA ($r = .62$; $p < .001$; see Table 10) but also showed a small and significant negative correlation with PA ($r = -21$; $p < .01$). As predicted, anxiety was not correlated with RPE ($r = .05$; $p > .05$) but was related to one of the measures of RNE (e.g. Regulation of Anger; $r = -$

.20; $p < .01$). Anxiety was not correlated with the other measure of RNE (e.g. Regulation of Sadness; $r = -.09$; $p > .05$).

Anxiety Mediation Model. To comprehensively examine relationships of affect and emotion regulation to both anxiety and depression, used SEM to test a model in which the variables of interest were considered simultaneously in the same model (see Figure 8). In this model, the latent variables for depression and anxiety were regressed on the latent variables for PA, NA, RPE, and RNE. Additionally PA and NA were regressed on RPE and RNE in order to look at indirect effects as well as direct effects. As expected, depression was predicted by both PA and NA. There was also a significant direct effect between RNE and depression, and the path from RPE to depression was nonsignificant. Consistent with the correlational analyses, anxiety was predicted by NA and PA. The path from RNE to anxiety was not significant. Surprisingly, the path from RPE to anxiety was not only significant but positive. This indicates that children who endorsed more effective strategies for managing PA were also reporting more symptoms of anxiety. This finding is inconsistent from the correlational analyses in which RPE and anxiety were unrelated and likely indicates statistical suppression. Further implications of this unexpected finding will be addressed in the discussion section.

RPE and RNE significantly predicted PA and NA, respectively, in the expected direction. As with the previous model, the paths from RPE to NA and RNE to PA were not significant. Also similar to the previous model, the indirect effect of RPE on depression through PA was significant (Sobel's test = -2.02, $p < .05$; $\mu = -.05$, $p < .05$) as was the indirect effect of RNE on depression through NA (Sobel's test = -3.40, $p < .01$; $\mu = -.19$, $p < .01$). The indirect effect of RPE on anxiety through PA was also significant (Sobel's test = -2.83, $p < .01$; $\mu = -.09$, $p < .05$) as was the indirect effect between RNE and anxiety through NA (Sobel's test = -3.44, $p < .01$; $\mu = -.22$, $p < .01$).

Moderating Effects of Gender and Grade. Our final analyses focused on the possible moderating effects of developmental variables (e.g. gender and age). We used grade as a proxy for age as we had a significant amount of missing birth date information. Initial correlation analyses (see Table 11) indicated that being a girl was associated with more depression and anxiety, which is consistent with the literature on internalizing problems in which girls are general at increased risk for these problems than boys. Girls also endorsed engaging in more RPE strategies. Gender was not associated with PA, NA, or either of the RNE variables. Grade was not associated with any of the variables of interest.

Hierarchical multiple regression analyses were used to test whether gender or age moderated the relationships between emotion regulation, affect, and depression. For example, to test the potential moderating effects of gender on the relation between RPE and depression, we ran a regression with RPE and gender entered in the first step and their interaction entered in the second step. In total, we ran 6 regressions (see Table 12): 3 with emotion regulation (e.g. RPE-Coping, RNE Sadness Coping, RNE Anger Coping) predicting depression and 3 with emotion regulation predicting affect (e.g. PA for RPE and NA for RNE). Of these 6 regression models, the interaction term was significant in 3 of the models (see Figure X). One of these interactions was significant in predicting depression. There was an interaction between gender and RPE such that the relationship between RPE and depression was significant for girls but not boys. There were two significant interactions predicting NA. The interaction between RNE Sadness Coping and gender was significant such that RNE Sadness Coping significantly predicted depression for girls but not boys. Similarly, the interaction between RNE Anger Coping and gender was significant such that RNE Anger Coping predicted depression for girls but not boys. Overall these results are consistent with Secondary Hypothesis 5 in that relation between emotion regulation, affect, and depression symptom were significant more often for girls than they were for boys.

Similar hierarchical regressions tested the moderating effects of age (e.g. grade) on the relations of emotion regulation to depression and affect (see Table 13). Before the interaction terms could be created, we first centered the grade variable to avoid collinearity. Inconsistent with Secondary Hypothesis 6, none of the interaction terms involving grade were significant in predicting depression or affect.

DISCUSSION

Study Goals and Contributions

The main goal of the current study was to investigate the role of Regulation of Positive Emotions (RPE) in the risk for depression development in youth. Previous research has shown that lack of positive affect is associated with risk for depression in children and adolescents. However, little research had investigated possible emotional processes responsible for youth's lack of PA. A major strength of this study was the investigation of the newly developed construct of regulation of positive emotions (RPE) or "ability to manage responses to positive emotions". The overarching hypothesis for this study was that children with less effective management of positive emotions would experience less PA and more depression symptoms. In order to accomplish this goal it was first necessary to develop a measure of RPE as prior to this study there were no assessments aptly suited to measure this construct. Thus, development and validation of a new self-report measure of RPE (i.e. the Youth Regulation of Positive Emotions Scale; YRPES) was a preliminary goal of this study as well. The development of YRPES is another important contribution to the literature. This newly developed scale will allow other researchers to include RPE in studies investigating variables that influence risk for depression. Further, this study went beyond the primary goal of investigating emotion regulation processes related to PA in order to examine a broader model of the relationships of emotion regulation and affect to depression and other internalizing problems. This broader model included both positive and negative affect, as well as RPE and Regulation of Negative Emotions (RNE). Finally, we also examined the role of developmental factors such as year in school and gender as possible moderators of our findings.

Validity of the RPE Construct

Our findings supported several study hypotheses. Initial analyses were aimed at examining validity for the construct of RPE. Higher endorsement of RPE strategies was associated with higher levels of PA and lower levels of depression symptoms in our youth sample. However, as we hypothesized, RPE was not associated with NA. Regression analyses demonstrated the incremental validity of RPE in predicting PA and depression above and beyond other measures of emotion regulation. These concurrent analyses provided support for RPE as unique and useful construct our understanding of youth depression.

RPE's Role in Predicting Depression and Anxiety

Our next step was to investigate the relations among RPE, PA, and depression further by testing a hypothesized model in which the relationship between RPE and depression would be mediated by PA. Both regression and SEM analyses supported this hypothesis. Children who endorsed more effective RPE tended to have higher PA scores and these high PA scores were associated with fewer depression symptoms. This mediation effect was partial indicating that while some aspects of the relationship between RPE and depression could be explained by some children having more or less PA, levels of PA did not fully explain RPE's association with depression.

We also investigated this mediation model over time. Regression analyses indicated that RPE did not predict depression symptoms at 6 month follow-up after controlling for initial depression symptoms. Our next step was to investigate changes in RPE and depression symptoms over time to see if changes in children's RPE would be associated with similar changes in their depression symptom. We used a method of SEM that utilizes latent change scores to model change over time. This method yields a more precise change variable because any variance in the

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variable at Time 2 that is not explained by that variable at Time 1 is represented as a latent variable. This method allowed us to examine the changes in RPE, PA, and depression after 6 months. The results indicated that changes in RPE, PA, and depression were all significantly associated with one another and that there was a significant indirect effect between RPE and depression through PA. These results paralleled the concurrent mediation results, indicating that part of the association between changes in RPE and changes in depression are explained by changes in PA. However, there are also aspects of the association between RPE change and depression change that are not explained by PA changes.

In order to better understand how RPE fits into a broader model of depression risk we used SEM to investigate the simultaneous influences of RPE, PA, RNE, and NA on youth's depression symptoms. The results generally supported an emotion regulation model of depression in which the relationships between regulation of emotion (e.g. RPE and RNE) and depressive symptoms are mediated by their respective affects (e.g. PA for RPE, NA for RNE). This model also supported the idea that there may be unique strategies and skills responsible for regulating positive vs. negative emotions and that children's proficiency with these skills are differentially associated with PA and NA.

This model of risk was broadened further to include other internalizing symptoms (anxiety) in addition to depression. Previous research has shown that constructs related to NA are related to both depression and anxiety whereas constructs related to PA tend to be uniquely related to depression and unrelated to anxiety. We wanted to see if this pattern would be supported in an emotion regulation model of internalizing symptoms. We again used SEM to investigate the variables of interest simultaneously. Support of our hypotheses was mixed. Although depression and anxiety were both predicted by NA as expected, they were also, to a

lesser extent, predicted by PA as well. Similarly, there were indirect effects of RPE and RNE on both depression and anxiety. These results are contrary to our hypotheses, but they are not altogether surprising. Similar results have been found in other studies demonstrating consistent relationships of NA with internalizing symptoms, and smaller but significant relationships of PA, to both depression and anxiety (Bell et al., 2009; De Bolle & De Fruyt, 2010; Joiner, Catanzaro, & Laurent; 1996). Taken with the results from these other studies, our findings suggest PA may not be as unique to depression as was previously thought and that interventions for children with other disorders (e.g. anxiety) may also need to consider the role of PA.

We were also surprised that our model showed a positive correlation between RPE and anxiety. It is possible this is a suppressor effect which occurs when models incorporate both positive and negative valenced paths. One possible theoretical explanation for this is that in community samples, children endorsing high anxiety may also be children who are high achieving. High achieving children may have more chances to engage in activities like sharing or celebrating after a good grade or may spend more time looking toward future events. Given the unexpectedness of this result, future investigation of this result is necessary before more conclusive explanations are warranted.

Lastly, we examined possible developmental moderators of the relationships among emotion regulation, affect, and internalizing symptoms. Grade in school had no direct or moderating effects on our variables of interest. It may be that we did not have enough variability in grade to find significant effects. In contrast, gender did have both direct and moderating effects. Girls were more likely to endorse anxiety and depression symptoms and were more likely to report engaging in effective RPE. Moderation analyses revealed that some of the relations among emotion regulation, affect, and depression differed based on gender. In particular, low

RPE was associated with more depression symptoms for girls but not boys. Low RNE was associated with more NA for girls but not boys. These findings suggest that although girls are perhaps more likely to engage in emotion regulation overall (especially regulation of positive emotions), those girls who struggle with RPE and RNE are at increased risk of depression and NA relative to boys. This may help explain why we see the gender differences in depression that increase in adolescence. In addition this has implications for developmental theories of the development of emotion regulation and depression in youth. Further research could examine possible genetic and environmental factors that make girls more predisposed to increased regulation of positive emotions without necessarily having higher levels of PA.

Limitations

There were several methodological and measurement constraints that limit our ability to draw some conclusions from this study. One important consideration is that this was a correlational study and thus no conclusions can be made about the direction of effect or causal relationship between emotion regulation and depression. We tested affect as one possible mechanism for the relationship between emotion regulation and depression. However, there are other possible relationships among these variables as well; for example, PA and depression may result in less effective emotion regulation. Though we did not test this possibility in our study, other research provides some support for these alternative models (Mor & Winquist, 2002), or suggests that many of these relationships may be bidirectional in nature (De Bolle & De Fruyt, 2010; Mor & Winquist, 2002). Future studies utilizing an experimental design (either laboratory based, or treatment effectiveness studies) would be better suited to understanding how emotion regulation influences affect and depression and vice versa.

Another limitation was our reliance on child self-report. While we were interested in children's own experiences of affect and depression, our participants were at an age where parent and teacher report measures are still frequently used. More objective measures such as direct observation, neuroimaging, and physiological measure have also been used to measure similar constructs. Our lack of variability in assessment methods puts our study at risk for monomethod bias with may inflate some of the associations we found. That being said, we felt that youth self-report was the most appropriate place to start given that the internalizing constructs we were most interested in. Future studies adding other reports and methods could help expand our understanding of emotion regulation and depression in children's own experiences. However, our results do warrant further investigation which at one point might include both parent-report as well as observational measures.

The scope of this study was large enough for us to begin to test a comprehensive model of an emotion regulation model of depression risk, however, there are other aspects of emotion regulation that were not investigated. Among these are inhibited and dysregulated positive emotions. For example, it is likely that inhibiting positive emotions also plays a role in depression risk, and indeed there is some correlational evidence for this possibility in our preliminary results. Youth with dysregulated positive emotion (e.g. not able to reign in their positive emotions even when the situation requires it) also show higher levels for depression risk. We are also interested to see if dysregulated positive emotions might be a risk factor for other disorders as well (i.e., bipolar or externalizing disorders). These constructs have the potential to add even more to our understanding of affect and depression risk and should be investigated in future studies.

Implications for Clinical Practice

These findings support the importance of addressing youths' regulation of positive emotions in the treatment of youth depression symptoms. The Youth Regulation of Positive Emotions Scale (YRPES) has proven to be a valuable research tool but may also be a tool for use in assessment and therapy for clients experiencing particular difficulties in emotion regulation. For example, the YRPRES could be incorporated into assessment for youth presenting with depression, to identify possible deficits in emotion regulation that might be targeted in treatment. Items used to assess RPE lend themselves naturally to incorporation into interventions (e.g. sharing and celebrating positive events, reminiscing and anticipating, and focusing on accomplishment of goals).

Despite the theoretical independence of positive affect and anxiety, our findings also suggest that attention to RPE may be indicated for youth presenting with anxiety symptoms. One reason for this is the comorbidity common in clinical populations where children with depressive disorders are also experiencing anxiety disorders and vice versa. Youth with anxiety disorders who are overly focused on external stimuli (e.g., threat, social presentation, or personal accomplishment) may have difficulty disengaging their focus and simply enjoying themselves or enjoying the moment. Thus the importance of understanding that RPE, while perhaps less strongly associated with anxiety than with depression, may still be problematic for anxiety.

Though not specifically addressed in this study, positive emotion regulation in youth is also likely to have other benefits related to high levels of PA such as self-esteem, optimism, cognitive flexibility, behavioral approach, and health promotion (Durbin & Shafir, 2008, Forgas, 2003; Gray, 1987; Mineka, Rafaeli, & Yovel, 2003; Ryff & Singer, 2003).

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APPENDIX

Table 1

Primary Study Hypotheses

Hypothesis	Description
Goal 1	
Hypothesis 1a	Effective regulation of positive emotions (RPE) will be associated with higher levels of positive affect (PA).
Hypothesis 1b	Effective RPE will be associated with lower levels of depression.
Hypothesis 2	Effective RPE will be unrelated to levels of negative affect (NA).
Goal 2	
Hypothesis 3a	Effective RPE will contribute unique information about PA over and above other measures of emotion regulation.
Hypothesis 3b	Effective RPE will contribute unique information about depression over and above other measures of emotion regulation.
Hypothesis 4	PA will partially mediate the concurrent relation between RPE and depression symptoms.
Hypothesis 5a	Effective RPE will be associated with fewer depression symptoms in children at a 6-month follow-up.
Hypothesis 5b	Longitudinal changes in RPE will be associated with changes in depression symptoms over 6-month follow-up.
Hypothesis 5c	Longitudinal changes in PA will partially mediate the longitudinal relation between changes in RPE and changes in depression symptoms over a 6-month follow-up.

Table 2

Secondary Study Hypotheses

Hypothesis	Description
Goal 1	
Hypothesis 1	Effective regulation of negative emotions (RNE) will be negatively associated with negative affect (NA).
Hypothesis 2	Effective RNE will be negatively associated with depression symptoms.
Hypothesis 2	Effective RNE will be negatively associated with anxiety symptoms.
Hypothesis 3a	Effective RPE will be unrelated to anxiety symptoms.
Hypothesis 3b	NA will mediate the relation between RNE and depression symptoms.
Hypothesis 4a	NA will mediate the relation between RNE and anxiety symptoms.
Hypothesis 4b	Effective regulation of negative emotions (RNE) will be negatively associated with negative affect (NA).
Goal 2	
Hypothesis 5b	Relations between RNE, RPE, PA, NA, and depression symptoms will be stronger for females than males.
Hypothesis 5c	Relations between RNE, RPE, PA, NA, and depression symptoms will be stronger for older youths.

Table 3

Study Timeline

Wave 1: Data Collected in October 2010

Construct Measured	**Measure Used**
Affect	PANAS-C
Depression	CDI-SF
Anxiety	STAIC
Regulation of Negative Affect	CEMS (including CSMS and CAMS)
Regulation of Positive Affect	YRPES

Wave 2: Data Collected in May 2011

Construct Measured	**Measure Used**
Affect	PANAS-C
Depression	CDI-SF
Anxiety	STAIC
Regulation of Negative Affect	CEMS (including CSMS, CAMS, and CWMS)
Regulation of Positive Affect	YRPES

Table 4

Item Descriptive Statistics for YPRES in Emerging Adult (N=548) and Youth (N=254)

	Emerging Adult M (SD)	Youth M (SD)
1. I feel good when I think about good times with others.	0.46 (.63)	1.77 (.49)
2. When something good happens I can control how excited I get.	1.24 (.61)	1.22 (.75)
3. When I am feeling excited I can't focus on what I am doing.	1.59 (.56)	1.10 (.71)
4. I carry on too much to others about how happy I am.	0.20 (.45)	0.66 (.65)
5. When something good happens I focus only on the negatives.	0.44 (.61)	0.32 (.57)
6. When I am feeling good I get too excited to control myself.	1.27 (.61)	0.67 (67)
7. When I am happy or excited I can't stop talking about it.	1.73 (.47)	0.93 (.71)
8. I hold my happy feelings in.	1.60 (56)	0.43 (.62)
9. When I am happy I am not able to hang onto the good feelings.	0.81 (.65)	0.42 (.65)
10. When I am happy I brag to others about it.	0.88 (.66)	0.50 (.63)
11. I like to celebrate when I feel good	0.99 (.64)	1.24 (.67)
12. I try to control my good feelings to keep from getting too excited.	0.28 (.52)	0.94 (.68)
13. When I am happy I like to share about it with others.	1.07 (.71)	1.25 (.67)
14. I get happy about positive events before they occur.	0.37 (.56)	1.36 (.69)
15. I keep my happiness to myself.	1.60 (.53)	0.48 (.61)
16. When something good happens I am able to enjoy it to the fullest	0.30 (.52)	1.56 (.59)
17. I try to hide my happiness.	0.55 (.65)	0.24 (.51)
18. When I am feeling good I get too excited to sit still.	0.70 (.70)	0.93 (.73)
19. When I am in a good mood I feel like I am jumping off the walls.	1.55 (.58)	1.02 (.75)
20. I am afraid to show others my happiness.	0.22 (.47)	0.23 (.48)
21. A lot of times I don't notice when I am feeling good.	1.07 (.69)	0.51 (.64)
22. When I am happy I do things to try to keep the good feelings going as long as possible.	1.50 (.61)	1.27 (.70)
23. When I am happy I can't keep from smiling or laughing.	0.48 (.64)	1.41 (.64)
24. I can stop myself from getting too excited	1.11 (.67)	1.06 (.74)
25. When I feel good I focus on how I was able to accomplish my goal.	0.64 (.66)	1.05 (.66)
26. I get happy inside but don't show it.	1.54 (.58)	0.36 (.57)
27. I think feeling good is important.	1.88 (.34)	1.65 (.58)

Table 5

Preliminary Factor Loadings for YPRES Scales in Emerging Adult (N=548) and Youth (N=254)

| | Factor Loadings | | | | | |
| | Coping | | Inhibition | | Dysregulation | |
YPRES Item	EA	Youth	EA	Youth	EA	Youth
Share with others	.66	.71	-.34	-.21	.32	.51
Celebrate	.65	.64	-.26	-.15	.33	.47
Keep good feelings going	.54	.65	-.14	-.12	.32	.36
Focus on accomplishment	.60	--	-.05	--	.13	--
Reminisce	.54	.66	-.20	-.20	.17	.34
Enjoy to the fullest	.54	.65	-.41	-.35	.15	.25
Anticipate positive events	.53	.68	-.14	-.15	.24	.42
Feeling good is important	--	.71	--	-.27	--	.32
Hold in happiness	-.27	-.35	.74	.72	-.50	-.16
Keep happiness to myself	-.31	-.24	.74	.70	-.13	-.14
Don't show happiness	-.32	-.16	.73	.71	-.11	.05
Afraid to show	-.28	-.20	.72	.68	.01	.06
Hide happiness	-.23	-.31	.69	.75	-.01	-.12
Focus on negatives	-.26	-.18	.65	.69	.03	.82
Don't notice feeling good	-.18	-.11	.60	.65	.07	.17
Can't hang on to good	-.14	-.16	.58	.69	.06	.13
Can't stop talking	.27	.37	-.11	.02	.69	.71
Carry-on too much	.18	.35	.13	.09	.69	.63
Can't control self	.19	.26	.11	.13	.68	.70
Can't sit still	.26	.35	.03	-.05	.65	.67
Jumping off walls	.37	.44	-.09	-.03	.63	.71
Brag	.18	.23	.06	.12	.65	.53
Can't focus	.16	.29	.11	-.03	.55	.51

Note: All factor loadings > 0.07 are significant at *p* < .05. Indicators of model fit are reported in the text.

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Table 6

Intercorrelations Between and Descriptive Statistics for Depression, Affect, and Emotion

Regulation in Emerging Adult Sample (N=548) and Youth Sample (N=254)

Sample and Variable	1	2	3	4	5	6
Emerging Adults						
1. Depression	--	--	--	--	--	--
2. PA	-.35**	--	--	--	--	--
3. NA	.71**	-.22**	--	--	--	--
4. RPE – Coping	-.27**	.31**	-.13*	--	--	--
5. RPE – Inhibition	.44**	-.22**	.34**	-.37**	--	--
6. RPE – Dysregulation	.12*	.16*	.14*	.36**	.04	--
Mean	1.39	3.56	1.37	0.34	0.84	1.48
Standard Deviation	0.57	0.65	0.78	0.35	0.37	0.44
Minimum	0.60	1.50	1.00	0.00	0.00	0.29
Maximum	3.55	5.00	4.90	2.00	2.00	2.00
Youth	1	2	3	4	5	6
1. Depression	--	--	--	--	--	--
2. PA	-.31**	--	--	--	--	--
3. NA	.60**	-.13*	--	--	--	--
4. RPE – Coping	-.27**	.37**	-.12	--	--	--
5. RPE – Inhibition	-.48**	-.27**	.44**	-.31**	--	--
6. RPE – Dysregulation	.08	.21**	.23**	.57**	.02	--
Mean	0.26	3.43	1.77	1.44	0.37	0.90
Standard Deviation	0.34	0.60	0.58	0.42	0.41	0.43
Minimum	0.00	1.60	1.00	0.00	0.00	0.00
Maximum	1.70	4.80	4.07	2.00	2.00	2.00

* $p < .05$. ** $p < .01$.

Table 7

Intercorrelations Between and Descriptive Statistics for Depression, Affect, and Emotion Regulation in Youth Sample (N =254) at Time 1 and Time 2 (N = 253)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. T₁ Depression	--											
2. T₁ PA	-.30	--										
3. T₁ NA	.60	-.13	--									
4. T₁ RPE – Happiness Coping	-.27	.37	-.12	--								
5. T₁ RNE – Sadness Coping	-.24	.20	-.11	.20	--							
6. T₁ RNE – Anger Coping	-.28	.09	-.26	.12	.45	--						
7. T₂ Depression	.49	-.24	.33	-.15	-.28	-.20	--					
8. T₂ PA	-.21	.49	-.12	.30	.19	.14	-.39	--				
9. T₂ NA	.40	-.10	.47	-.09	-.13	-.29	.62	-.25	--			
10. T₂ RPE – Happiness Coping	-.22	.39	-.13	.54	.15	.07	-.27	.44	-.09	--		
11. T₂ RNE – Sadness Coping	-.24	.18	-.20	.11	.39	.29	-.29	.24	-.19	.19	--	
12. T₂ RNE – Anger Coping	-.30	.15	-.25	.13	.35	.64	-.27	.23	-.29	.21	.38	--
Mean	0.26	3.43	1.77	1.44	1.10	1.10	0.30	3.42	1.82	1.43	1.12	1.14
Standard Deviation	0.34	0.60	0.58	0.42	0.45	0.58	0.41	0.70	0.66	0.47	0.50	0.55
Minimum	0.00	1.60	1.00	0.00	0.00	0.00	0.00	1.21	1.00	0.00	0.00	0.00
Maximum	1.70	4.80	4.07	2.00	2.00	2.00	2.00	5.00	4.73	2.00	2.00	2.00

Note: All values > 0.12 are significant $p < .05$. All values > 0.15 are significant $p < .01$.

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Table 8

Regression Analysis for Variables at Time 1 Predicting Positive Affect and Depression (N = 248)

Variable	Positive Affect			Depression		
	B	*SE B*	*β*	*B*	*SE B*	*β*
T$_1$ RPE – Happiness Coping	0.47	0.08	.34***	-0.19	0.05	-.23***
T$_1$ RNE – Sadness Coping	0.18	0.09	.14*	-0.07	0.05	-.10
T$_1$ RNE – Anger Coping	-0.02	0.07	-0.02	-0.12	0.04	-.21**
R^2		0.15			0.15	
F for model		14.53***			14.03***	

* *p* < .05. ** p < .01. *** *p* < .001.

Table 9

Time 1 RPE Predicting Time 2 Depression Controlling for Time 1 Depression

Variable	T$_2$ Depression		
	B	*SE B*	*β*
T$_1$ Depression	.58	.07	.47***
T$_1$ RPE – Happiness Coping	-.02	.06	-.02
R^2		.24	
F for model		39.50***	

*** $p < .001$.

Table 10

Correlations of Affect and Emotion Regulation to Time 1 Depression (N=253) and Time 1

Anxiety (N=254)

Variable	T_1 Depression	T_1 Anxiety
T_1 PA	-.30**	-.21**
T_1 NA	.60**	.62**
T_1 RPE – Happiness Coping	-.27**	.06
T_1 RNE – Sadness Coping	-.24**	-.10
T_1 RNE – Angry Coping	-.28**	-.20**

** $p < .01$ (2-tailed).

Table 11

Correlations of Gender (N = 245) and Grade (N = 244) to Depression, Anxiety, Affect, and

Emotion Regulation

Variable	Gender	Grade
T_1 Depression	.14**	-.03
T_1 STAIC	.23**	-.05
T_1 PA	.22	.10
T_1 NA	.33	.71
T_1 RPE – Happiness Coping	.23**	.12
T_1 RNE – Sadness Coping	.42	.81
T_1 RNE – Angry Coping	.04	.07

** $p < .01$ (2-tailed)

Table 12

Emotion Regulation, Gender, and their Interaction Predict Depression and Affect

	Depression			Affect		
Model 1	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Step 1						
RPE – Happiness Coping	-.25	.05	-.31***	.52	.09	.37***
Gender	.15	.04	.21**	-.02	.08	-.02
R^2		.11			.13	
F for model		15.49*** (2, 242)			18.45*** (2, 241)	
Step 2						
Happiness Coping * Gender	-.36	.10	-.85***	.01	.18	.19
Change in R^2 from Step 1		.05			.00	
F for change in R^2		13.41*** (1, 241)			.64 (1, 240)	
Model 2	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Step 1						
RNE – Sadness Coping	-.17	.05	-.23***	-.13	.09	-.10
Gender	.09	.04	.13*	.06	.05	.05
R^2		.07			.01	
F for model		9.05*** (2, 242)			1.62 (2, 241)	
Step 2						
Sadness Coping * Gender	-.11	.10	-.20	-.41	.17	-.44*
Change in R^2 from Step 1		.01			.02	
F for change in R^2		1.23 (1,241)			5.68* (1, 240)	
Model 3	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Step 1						
RNE – Anger Coping	-.17	.04	-.28***	-.25	.06	-.25
Gender	.11	.04	.16*	.08	.07	.07
R^2		.09			.06	
F for model		13.51*** (2, 242)			8.28*** (2, 241)	
Step 2						
Anger Coping * Gender	-.04	.07	-.07	-.31	.13	-.39*
Change in R^2 from Step 1		.05			.00	
F for change in R^2		.23 (1, 241)			6.23* (1, 240)	

* $p < .05$. *** $p < .001$. Subsequent probing and examination of effects is listed in text.

Table 13

Emotion Regulation, Grade, and their Interaction Predict Depression and Affect

	Depression			Affect		
Model 1	B	$SE\ B$	β	B	$SE\ B$	β
Step 1						
RPE – Happiness Coping	-.21	.52	.52	.50	.09	.36***
Grade	.00	-.02	-.02	.04	.03	.07
R^2		.06			.14	
F for model		9.04** (2, 241)			19.26*** (2, 240)	
Step 2						
Happiness Coping * Grade	-.36	.01	.01	-.06	(.08)	-.16
Change in R^2 from Step 1		.00			.00	
F for change in R^2		.33 (1, 240)			.57 (1, 239)	
Model 2	B	$SE\ B$	β	B	$SE\ B$	β
Step 1						
RNE – Sadness Coping	-.19	-.13	-.13	-.16	.09	-.12
Grade	.01	.06	.06	-.01	.04	-.02
R^2		.05			.01	
F for model		7.40** (2, 240)			1.74 (2, 240)	
Step 2						
Sadness Coping * Grade	.05	-.41	-.41	.07	.08	.15
Change in R^2 from Step 1		.01			.00	
F for change in R^2		1.31 (1, 239)			.76 (1, 239)	
Model 3	B	$SE\ B$	β	B	$SE\ B$	β
Step 1						
RNE – Anger Coping	-.17	-.25	-.25	-.25	.06	-.25
Grade	.01	.08	.08	-.00	.03	-.01
R^2		.08			.06	
F for model		10.02*** (2, 241)			8.09*** (2, 240)	
Step 2						
Anger Coping * Grade	.03	-.31	-.31	.05	.06	-.11
Change in R^2 from Step 1		.00			.00	
F for change in R^2		.54 (1, 240)			.63 (1, 239)	

* $p < .05$. *** $p < .001$. Subsequent probing and examination of effects is listed in text.

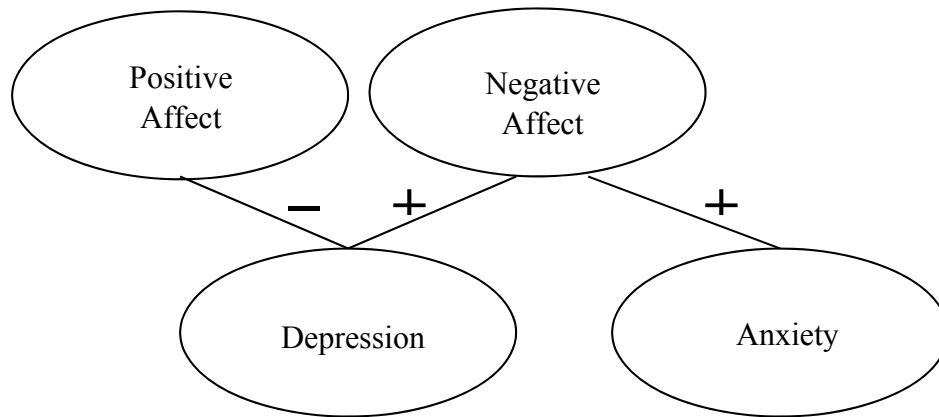Figure 1. *Clark and Watson's (1991) Tripartite Model.*
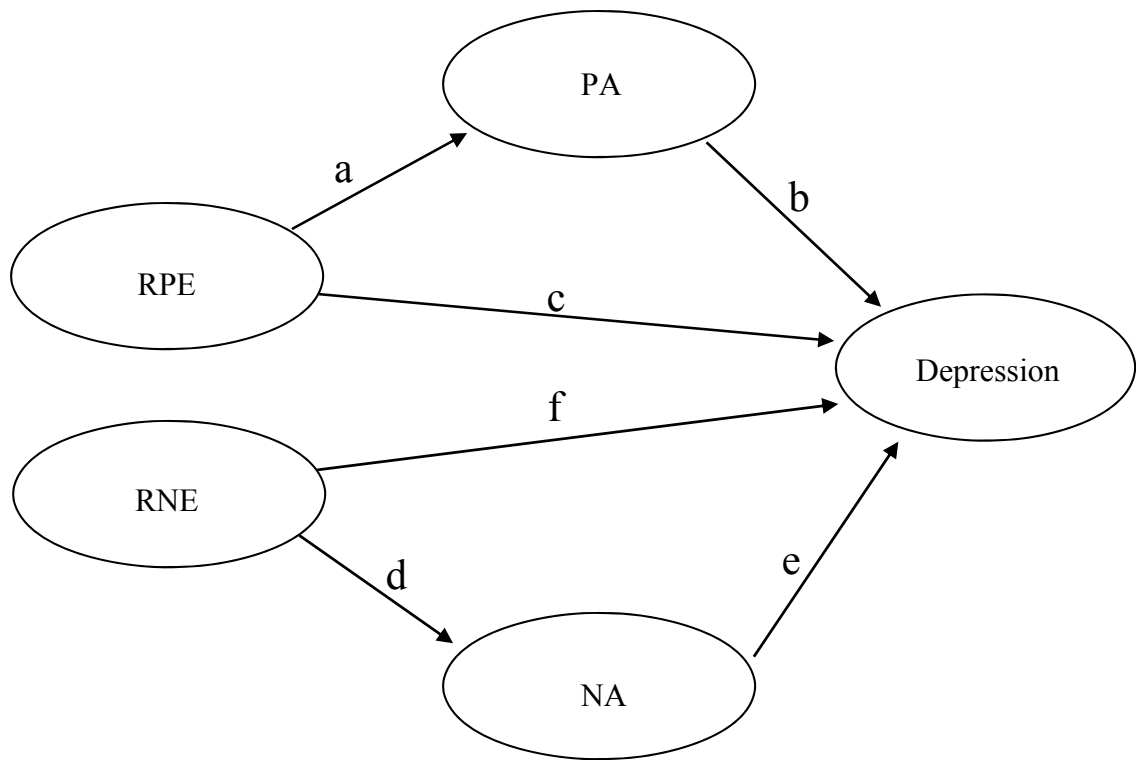
Figure 2. *Emotion Regulation Model of Depression.*

Figure 3. *Emotion Regulation Model of Depression and Anxiety.*
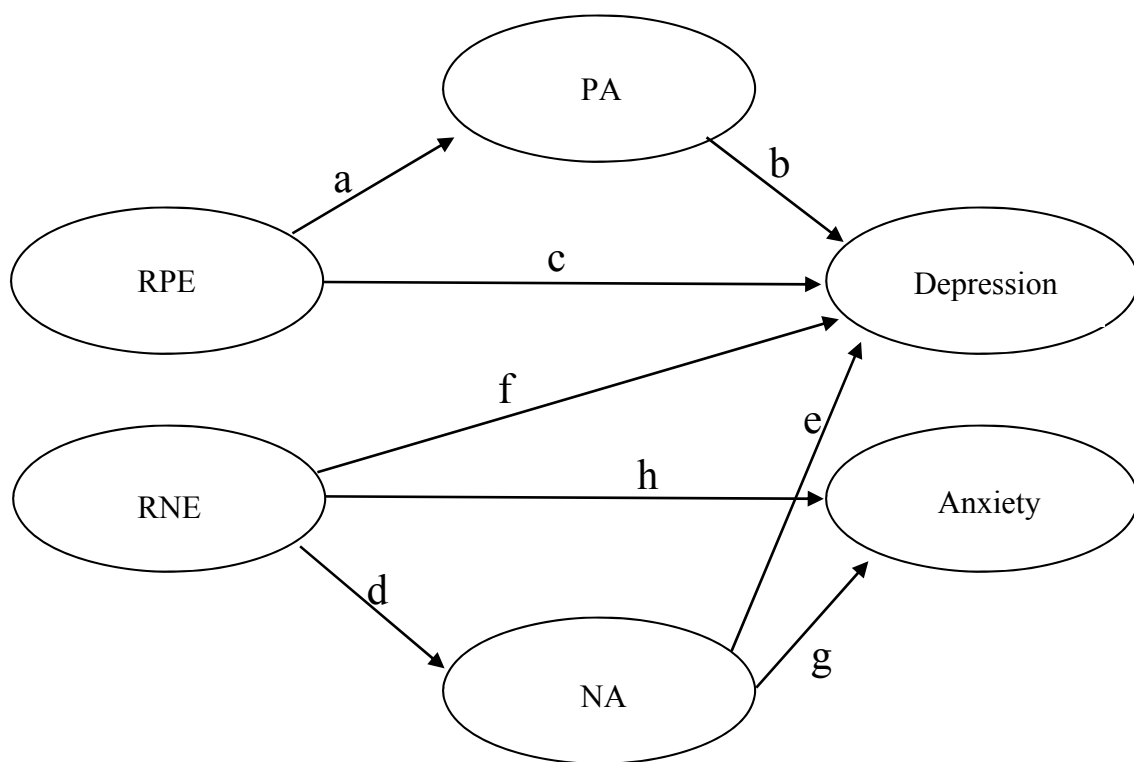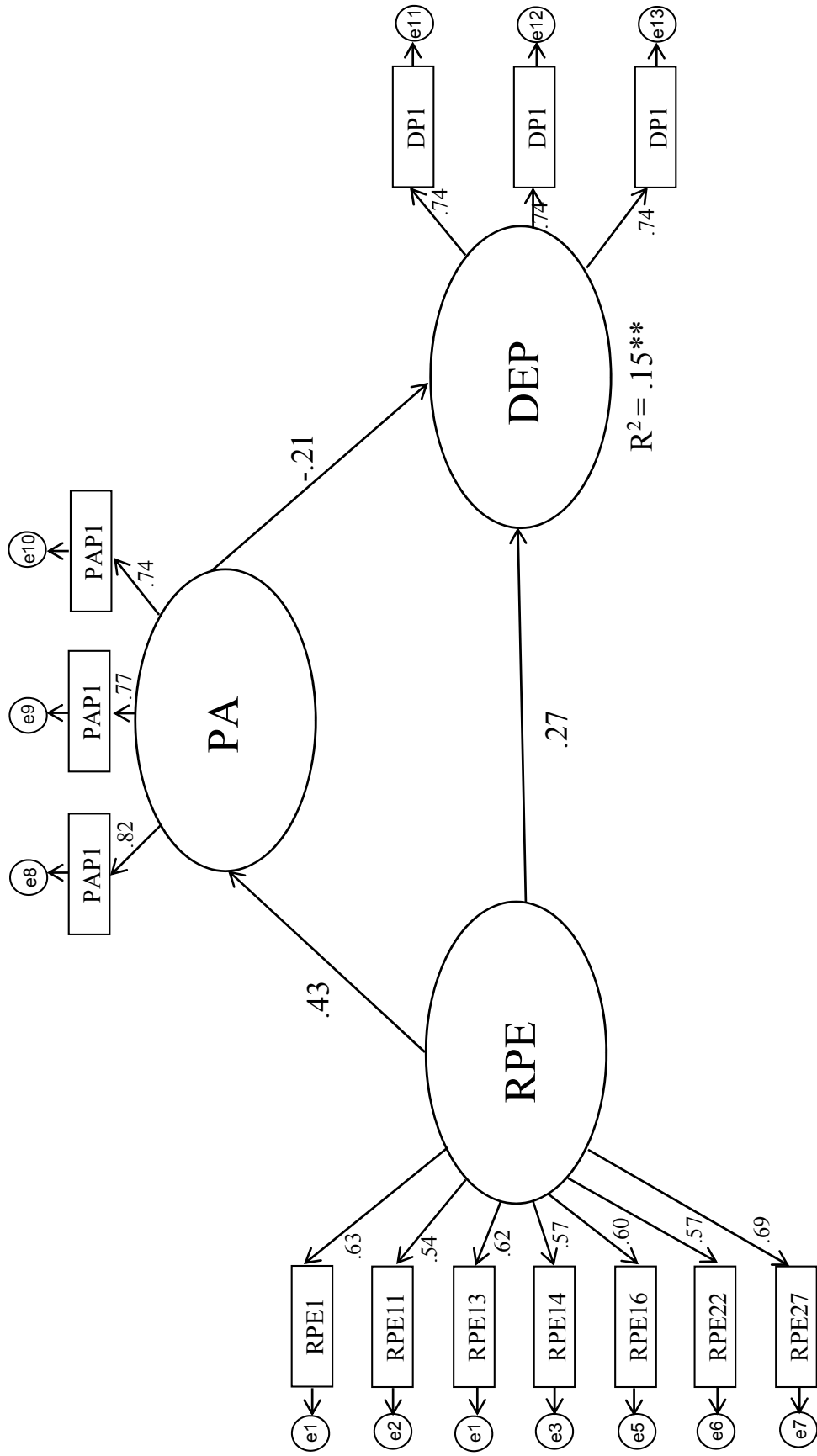
Figure 4. *Concurrent SEM Mediation*. PA partially mediates association of RPE and Depression.

Note: All paths significant $p < .05$.

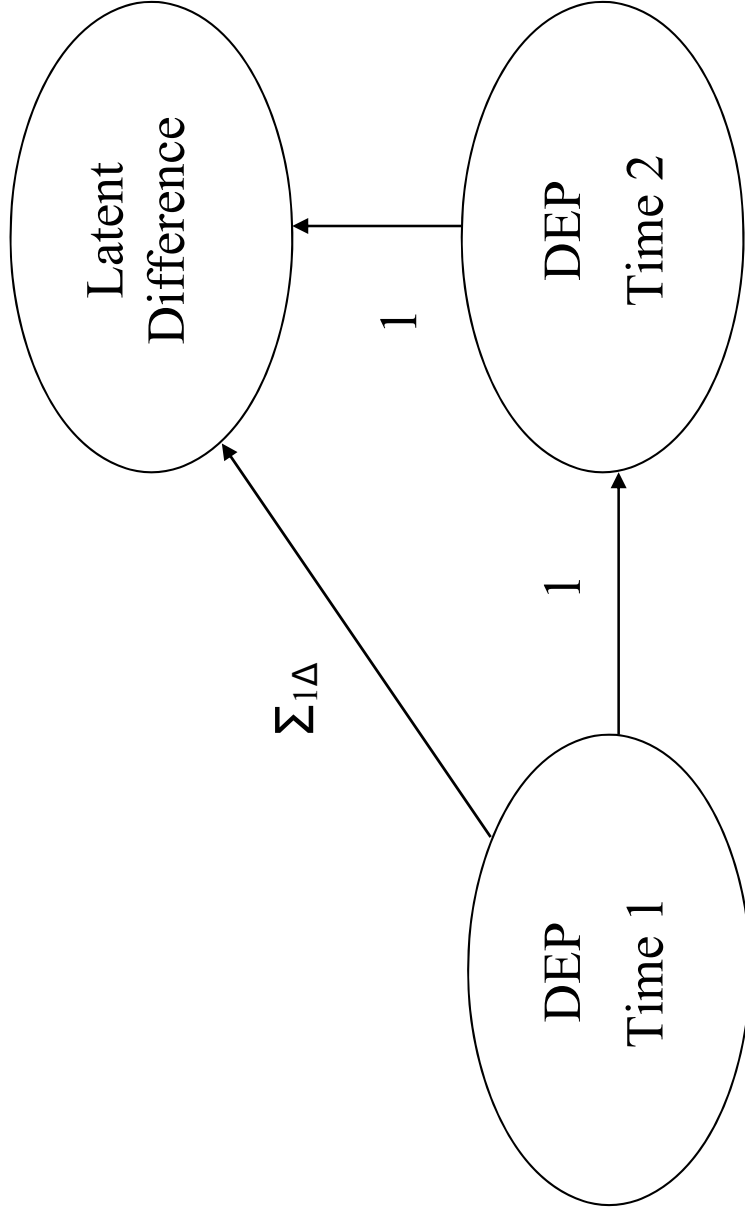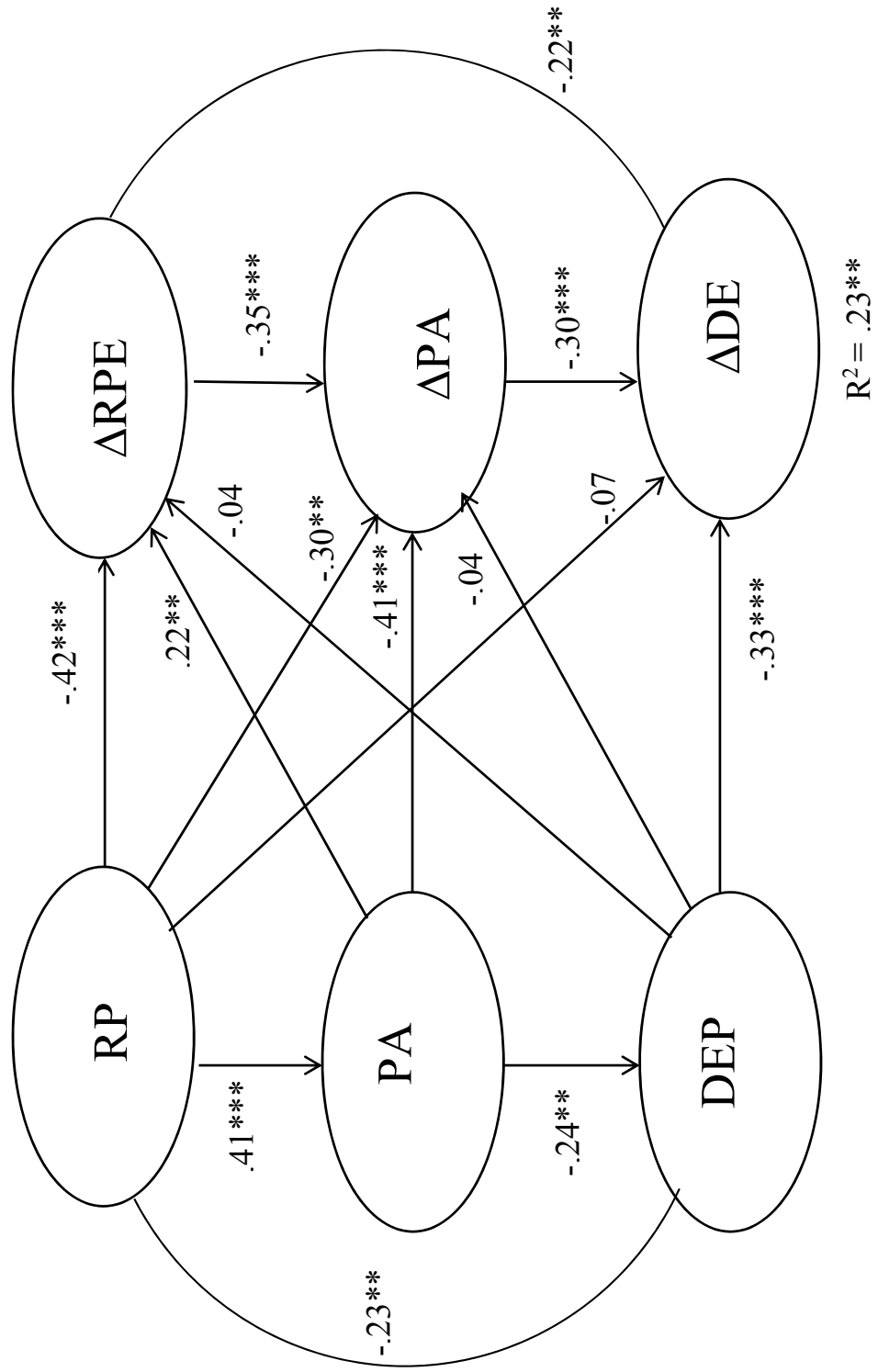Figure 5. *Conceptual Model for Latent Difference Score.*

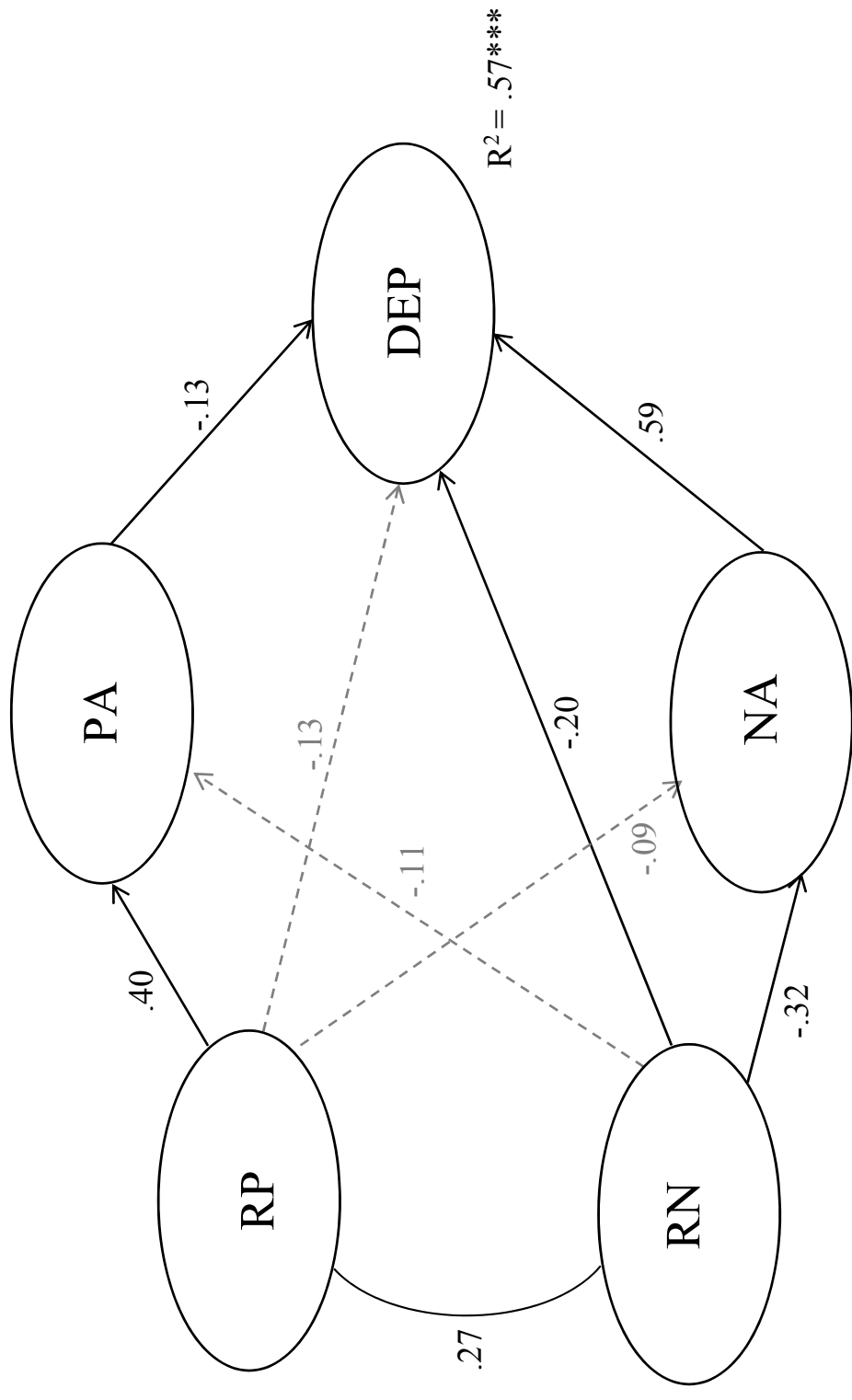Figure 6. *SEM Latent Change Model.* Change in RPE predicts change in depression symptoms moderated by PA.

Figure 7. *SEM Mediation Model*. PA and NA partially mediates association of RPE and RNE and Depression.

Note: All bolded paths significant p < .05; paths with dotted lines are nonsignificant.

Figure 8. *SEM Mediation Model.* PA and NA partially mediates association of RPE and RNE and Depression and Anxiety.
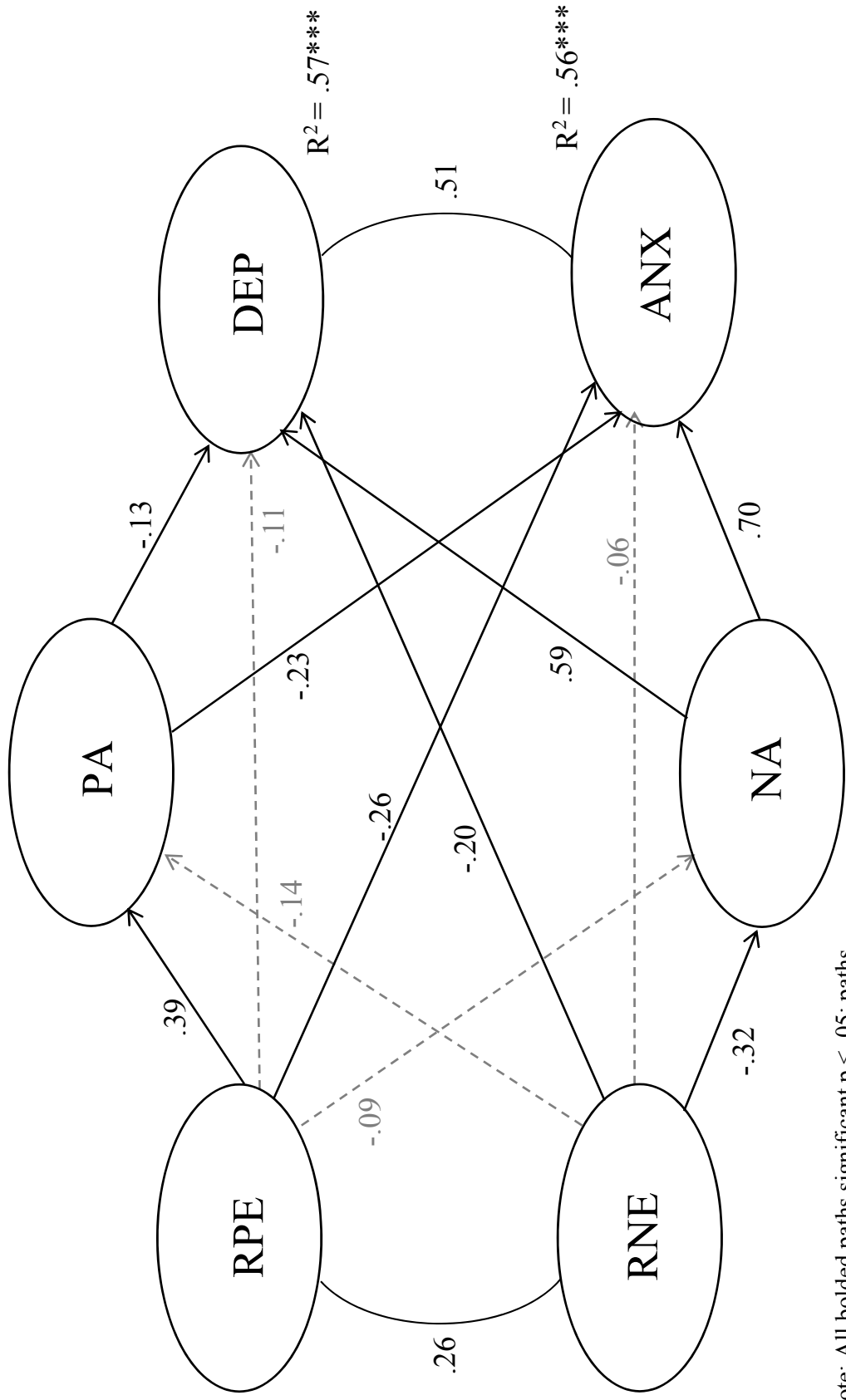
Note: All bolded paths significant p < .05; paths with dotted lines are nonsignificant.

Preliminary Youth Regulation of Positive Emotions Scale Measure (YPRES)

Please choose the response that best describes your behavior when you are feeling HAPPY.

1. I feel good when I think about good times with others.
2. When something good happens I can control how excited I get.
3. When I am feeling excited I can't focus on what I am doing.
4. I carry on too much to others about how happy I am.
5. When something good happens I focus only on the negatives.
6. When I am feeling good I get too excited to control myself.
7. When I am happy or excited I can't stop talking about it.
8. I hold my happy feelings in.
9. When I am happy I am not able to hang onto the good feelings.
10. When I am happy I brag to others about it.
11. I like to celebrate when I feel good.
12. I try to control my good feelings to keep from getting too excited.
13. When I am happy I like to share about it with others.
14. I get happy about positive events before they occur.
15. I keep my happiness to myself.
16. When something good happens I am able to enjoy it to the fullest
17. I try to hide my happiness.
18. When I am feeling good I get too excited to sit still.
19. When I am in a good mood I feel like I am jumping off the walls.
20. I am afraid to show others my happiness.
21. A lot of times I don't notice when I am feeling good.
22. When I am happy I do things to try to keep the good feelings going as long as possible.
23. When I am happy I can't keep from smiling or laughing.
24. I can stop myself from getting too excited
25. When I feel good I focus on how I was able to accomplish my goal.
26. I get happy inside but don't show it.
27. I think feeling good is important.

Note: The scale used for all items is "hardly ever," "sometimes," and "often."

VITA

Martha Christine Early was born in Des Moines, IA, on August 2, 1981 to Jennifer and Richard Early. She graduated from Roosevelt High School in 1999. Martha then studied psychology at the University of Iowa in Iowa City, IA, and graduated with Distinction and Honors in Psychology in May, 2003. Martha worked as a research assistant at the Kennedy Krieger Institute at Johns Hopkins University before starting her graduate career at the University of Missouri-Columbia in August 2005. Martha earned her Master of Arts degree in clinical child and developmental psychology in August, 2008, from the University of Missouri – Columbia. Subsequently, she began work on his Doctor of Philosophy degree with a dual emphasis in clinical child and developmental psychology at the University of Missouri. She completed her pre-doctoral internship at the University of Missouri Health Science Consortium in October 2013. She will continue her career in child clinical psychology practice and research at Mayo Clinic in Rochester, MN as a post-doctoral fellow.