Adolescent Social Relationships and the Development of Early Adult Emotion Regulation

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Abstract

This study used longitudinal survey, observational, and functional neuroimaging, data in a community sample to examine how social relationships during adolescence predict individuals' difficulties with emotion regulation abilities, use of emotion regulation strategies and their social regulation of emotion in early adulthood. Additionally, this study examined prospective links between young adults' difficulties with emotion regulation abilities and use of emotion regulation strategies and their concurrent psychological adjustment (i.e. internalizing symptoms and problems due to substance abuse). In regards to difficulties with emotion regulation abilities, with a few exceptions, no measures of adolescent peer and romantic relationships were found to predict overall difficulties with emotion regulation abilities or most of the specific difficulties with emotion regulation abilities. However, a number of aspects of adolescent peer and romantic relationships—as measured by survey and observational methods—were found to predict lack of emotional awareness in early adulthood. Many of these associations were moderated by participant income or gender. Overall, it appears that young adult lack of emotional awareness may be more strongly predicted by aspects of peer and romantic relationships in early adulthood than overall difficulties with emotion regulation abilities, or any other specific sub-abilities.

In terms of use of specific emotion regulation strategies, adolescent peer and romantic relationships were mostly not found to predict use of cognitive reappraisal. The only exceptions to this were for dyadic behaviors promoting and undermining autonomy and the relationship with the romantic partner. For both of these predictors, moderations by gender were found predicting males differential use of cognitive reappraisal in adulthood, suggesting that more dyadic behaviors promoting and fewer dyadic behaviors undermining autonomy and relatedness in adolescence predicted greater use of cognitive reappraisal for males in early adulthood. In

contrast, aspects of both adolescent peer and romantic relationships as measured by survey and observational methods were found to predict use of expressive suppression in early adulthood. Again, some of these associations were moderated by income or gender.

A number of results predicting self-reported emotion regulation outcomes from aspects of romantic relationships were moderated by gender. In all but a few findings, the associations between adolescent romantic relationships and adult emotion regulation outcomes were stronger for males than for females. This may suggest that boys, more so than girls, rely on their romantic partners for support or encouragement of their emotional expression.

With regards to the social regulation of emotional reactivity as indexed by threat-related neural activation, limited evidence indicated that one specific aspect of adolescent peer and romantic relationships—dyadic supportive behavior—predicted differences in social regulation of emotion in young adults. Specifically, it was found that greater dyadic supportive behavior in interactions with the close peer at ages 15-17 and romantic partner at ages 17-19 corresponded with less threat-related activation during partner hand holding relative to the alone condition. These effects were found in the anterior cingulate cortex, in regards to peer relationships, and the orbitofrontal cortex, in regards to romantic relationships—as assessed using functional neuroimaging methodology. No other effects were found predicting young adult social regulation of emotional reactivity from adolescent peer or romantic relationships.

In regards to emotion regulation predicting concurrent psychopathology, no results were found for early adulthood emotional awareness, cognitive reappraisal, or expressive suppression predicting concurrent depression and anxiety, problems due to alcohol, or ever having experimented with hard drugs. Similarly, overall difficulties with emotion regulation abilities were not found to significantly predict concurrent depression and anxiety symptoms, but they

were found to predict total problems due to alcohol and having experimented with hard drugs. The importance of expanding the understanding of how aspects of adolescent peer and romantic relationships may contribute to subsequent emotion regulation is highlighted and explored.

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Adolescent Social Relationships and the Development of Early Adult Emotion Regulation

Emotions are an almost ubiquitous aspect of every day human functioning. They play a role in decision making, in communication, and even in warning us of potential threats (Bechara, 2004; Tronick, 1989; Öhman, Flykt, & Esteves, 2001). It is because of this role that our ability to have some influence over our emotional reactions is so important. Without the ability to modulate or regulate our emotional experiences, humans would likely be overrun by emotions. The well-established association between difficulties with emotion regulation and a wide variety of mental health disorders is a good example of that very concern (Gross, & Muñoz, 1995).

Despite the importance of emotion regulation and the wealth of research attention that has been lavished on emotions themselves (Barrett, L. F. 2006; Scherer, 2000), research on emotion regulation is, by comparison, in its toddlerhood (Gross, 2011). Broadly speaking, emotion regulation can be defined as the process by which humans act upon their emotions in order to influence which emotions are experienced, the timing of these experiences—both in terms of onset and duration—as well as the intensity of these experiences (Gross, 1998). As this definition implies, emotion regulation is multifaceted, and the research in this field addresses everything from how emotion regulation develops to the implications of various intrapsychic emotion regulation strategies (Butler et. al, 2003; Cole, Michel, & Teti, 1994, Gross & John, 2003).

Emotion Regulation and Maladaptive Functioning

As its multifaceted nature might suggest, there are many different aspects to emotion regulation research, including work considering what types of difficulties with emotion regulation abilities exist, what strategies are the most effective, and even how social relationships might affect emotion regulation (Gratz, & Roemer, 2008, Gross, 1998a; Lopes, Salovey, Côté,

Beers, & Petty, 2005). Though these different ways of considering emotion regulation may at first glance seem disjointed, it makes sense that this ability has been studied from many different vantage points when one considers its far-reaching implications. Given the broad impact on functioning, discussed below, considering these disjointed aspects in concert might help elucidate greater understanding of emotion regulation, and the associated maladaptive outcomes.

Emotion dysregulation has been implicated in a wide variety of psychopathology including anxiety disorders, post-traumatic stress disorder, substance abuse disorders, self-injury, and aggressive behavior (e.g., Amstadter, 2008; Axelrod, Perepletchikova, Holtzman, & Sinha, 2011; Gratz & Roemer, 2008). In fact, in the newest version of the "Diagnostic and Statistical Manual of Mental Disorders" (American Psychiatric Association, 2013), there were many attempts to add more language about emotion regulation or dysregulation into this manual, including a call for Borderline Personality Disorder to be renamed to reflect its roots in emotion dysregulation (Paris, Silk, Gunderson, Links, & Zanarini, 2009; Tyrer, et. al,. 2005), and a successful call for the inclusion of a Disruptive Mood Dysregulation Disorder amongst the depressive disorders (American Psychiatric Association, 2013). As research on emotion regulation moves forward, it will be imperative that as we broaden our understanding of this ability we continue to tie it in to our understanding of the underpinnings of various forms of psychopathology.

A review of the relevant research suggests that difficulties with emotion regulation may play a role in a number of the most common forms of mental illnesses, including internalizing disorders such as anxiety and depression, and externalizing disorders such as substance use disorders. Anxiety disorders are the most common mental health disorder in the United States, and perhaps worldwide, and though there are many types of anxiety disorders, they all involve

either the failure to adaptively respond to, or actively maladaptive responses to emotional arousal (Amstadter, 2008). There has been some research demonstrating associations between anxiety symptoms and the use of specific emotion regulation strategies; in particular, the avoidance that is seen as a common component of many anxiety disorders may be indicative of a broader non-acceptance of emotional experiences, though this possibility remains untested (Kashdan, Barrios, Forsyth, & Steger, 2006).

Like anxiety, depressive disorders have a high prevalence rate (Kessler, Chiu, Demler, & Walters, 2005), and may have their basis in emotion dysregulation (Garnefski, & Kraaij, 2006; Joormann, & Gotlib 2010). Depression is marked by the persistent presence of negative affect (feeling sad or down), and absence of positive affect (loss of interest or pleasure), both symptoms indicative of difficulties with emotion regulation abilities (American Psychiatric Association, 2013; Gross, & Muñoz,1995; Joormann & Gotlib, 2010). Various studies have looked at the relationship between emotion regulation abilities and strategies, and found associations with depression, although this work has not been well integrated, leaving questions as to whether particular aspects of emotion regulation may be more strongly associated with depression symptoms than others (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Dennis, 2007; Garnefski, & Kraaij, 2006).

In addition to internalizing difficulties such as depression and anxiety, emotion dysregulation also is believed to play a role in externalizing difficulties, such as aggression and substance use. In some young children, emotion dysregulation has been found to be associated with long-term difficulties with externalizing symptoms, (Hill, Degnan, Calkins, & Keane, 2007). Emotion regulation is increasingly being recognized as playing a role in externalizing difficulties later in childhood, and even into adolescence (Mullin & Hinshaw, 2007). Multiple

forms of aggression are seen as highly related to emotion dysregulation, from early childhood through adolescence, with some research suggesting that dysfunctional neural circuitry involved in emotion regulation may predispose certain individuals to aggression across the lifespan, (Beauchaine, Gatzke-Kopp, & Mead, 2007; Chang, Schwartz, Dodge, & McBride-Chang, 2003; Davidson, Putnam, & Larson, 2000). Additionally, some research suggests that emotion regulation may play a role in some forms of substance abuse difficulties (Cooper, Frone, Russell, & Mudar, 1995), as individuals may use substances to influence their experience of emotions.

Although emotion regulation has been linked to a wide variety of mental health difficulties, some of this work focuses on overall emotion dysregulation and mental health, whereas other parts of the literature focuses more on specific emotion regulation strategies, and mental health outcomes. Less is known about how mental health outcomes are associated with specific aspects of emotion regulation abilities or heightened emotional reactivity. As the field of emotion regulation research expands, heightened interest in the contribution of various aspects of emotion regulation to mental health is an important area for further clarity, as understanding this can aid in the development of treatment and prevention efforts.

In addition to psychopathology, emotion regulation is known to affect a variety of other aspects of daily functioning. This includes broad social consequences, including associations with received social support, how well-liked individuals are, the closeness of social relationships, children's status as bullies and victims in playground relationships, and the quality of subsequent relationships over the course of adolescent development (Gross, 2002; Gross & John, 2003; Hessel, Loeb, Szwedo, Allen, In Press; Schwartz, 2000). Cognitive consequences for emotion regulation are also apparent. Use of specific emotion regulation strategies have been linked with impairments in both memory and problem solving abilities (Gross, 2002; Richards, 2004;

Richards, Butler, & Gross, 2003). In short, emotion regulation appears to be crucial contributor to daily functioning, and more importantly, difficulties with emotion regulation and reactivity seem to have a substantial and negative impact on various aspects of well-being.

Difficulties with Emotion Regulation Abilities

One of the most fundamental questions in emotion regulation research is the question of what do difficulties with emotion regulation abilities look like, or, what falls under this domain. Oftentimes, the focus is on the overall inability to control emotions, or inability to use specific emotion regulation strategies (Moore, Zoellner, & Mollenholt, 2008; Shields, & Cicchetti, 2001), however—though important—separately those are only pieces of a larger puzzle. The full answer is more complex, as difficulties with emotion regulation abilities can manifest in a variety of ways having to do not only with control over emotions, but also emotional functioning (Thompson, 1994). For example, individuals may have a hard time accessing their emotions—they may be unaware of or lacking clarity as to which emotions they are experiencing (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). Similarly an inability or unwillingness to accept one's emotional experiences may be indicative of problematic emotional functioning (Richards, 2004, Gross, 2002). Problems may also manifest if individuals' emotions interfere with their behavior or efficacy, such as by interfering with impulse control or goal pursuit (Linehan, 1993; Melnick, & Hinshaw, 2000). Finally, an inability to flexibly access a variety of emotion regulation strategies is another type of emotion regulation difficulty (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Gratz & Roemer, 2004).

Very important to emotional functioning are the abilities to recognize, attend to and interpret one's emotional experience (Gratz & Roemer, 2004). Emotional awareness, an integral component of emotional intelligence, is the ability to acknowledge and attend to one's emotions,

and the impact those emotions may be having on one's experience of the world (Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990). Emotional awareness has long been associated with mental health (Reik, 1952), and the ability to recognize ones emotions is important furthermore for interpersonal functioning, as being aware of emotions helps with recognition of emotions in others—key to successful communication (Mayer & Geher, 1996). Moreover, it stands to reason that to successfully manage or modulate one's emotional experience, awareness of that experience may be an important precondition. The existing research on the development of this ability focuses on young children, and suggests that socialization processes, for example, parent's emotional expressivity, discussing emotions with their children, and their reactions to their children's emotions, appear to be influential, with the potential to both promote and inhibit children's emotional awareness (Bajgar, Ciarrochi, Lane, & Deane, 2005; Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997; Warren, & Stifter, 2008).

Similar to awareness is emotional clarity, which can be thought of as the ability to accurately distinguish between and interpret one's feelings (Gratz & Roemer, 2004; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). Also seen as an aspect of emotional intelligence, emotional clarity goes a step beyond awareness, and focuses more on the detection of precisely which emotion is being experienced. As with awareness of emotions, clarity as to which emotion is being experienced is helpful for both the recognition of emotional states in others—which aides in communication—as well as the modulation of one's own emotional experiences (Boden, Bonn-Miller, Kashdan, Alvarez, & Gross, 2012; Gohm, Corser, & Dalsky, 2005; Mayer & Geher, 1996). Individuals who have more emotional clarity have been found to be more successful at repairing negatively valenced mood states (Salovey, Mayer, Goldman, Turvey, & Palfai,1995). Clinically speaking, helping people become more cognizant of (awareness) and

better able to discern between (clarity) their emotions are often seen as important aspects of many treatments for psychopathology, with increases in emotional awareness and clarity being associated with greater therapeutic progress (Greenberg, & Pascual-Leone, 2006; Mennin, 2004).

Acceptance or lack thereof of emotional experiences marks another emotion regulation ability wherein difficulty may be experienced. The inability to accept emotional experiences, or attempts to avoid those emotions, has been associated with a wide range of psychopathology (Hayes et. al, 1996; Stewart, Zvolensky, & Eifert, 2002). In fact, emotion regulation strategies that are focused on suppressing the expression of emotional experience appear to be much more energy and resource intensive, and moreover are associated with a higher incidence of psychopathology (Gross, 2002; Gross & John, 2003). Again, as with emotional awareness and clarity, psychological treatment for some disorders includes a focus on acceptance of emotions that may be particularly difficult or uncomfortable to grapple with (Greenberg, & Pascual-Leone, 2006). Having a difficult time accepting an emotional reaction, therefore, appears to be an important category of difficulty one might experience with emotion regulation that may be linked to the development and maintenance of psychopathology. Here too, early socialization appears to play a role, as difficulties with emotional acceptance may be influenced by parental distress at-, and harsh responding to- young children's negative emotions, which simultaneously lower the frequency of children's expression of these emotions, and make those expressions, when they do occur, more intense (Fabes, Leonard, Kupanoff, & Martin, 2001). Here, research extends some into adolescence, indicating that emotional awareness is concurrently associated with strong peer and parent attachment, but little is known about how relationships with peers or romantic partners may continue to contribute to the *longitudinal* development of emotion regulation as adolescents move towards adulthood (Laible, 2007).

Perhaps the most visibly salient difficulties with emotion regulation abilities are those that occur when the inability to regulate an emotion interferes with behavior. For example, individuals who are so overcome by their emotions that they are driven to act impulsively, or that they are not able to engage in goal directed behavior, may be thought of as experiencing difficulties with emotion regulation abilities (Gratz & Roemer, 2004). Some conceptions of the impulsivity that is emblematic of Attention Deficit/Hyperactivity Disorder (ADHD) consider that impulsivity to be in part symptomatic of emotion regulation difficulties (Hinshaw, 2003). Similarly, in her conception of borderline personality disorder, Linehan (1993) explores how difficulties acting in accordance with the pursuit of one's goals are an indication of emotion regulation difficulties. It makes sense, then, to think of failure to inhibit impulses or to act in accordance with one's goals as difficulties with emotion regulation ability.

In perhaps the most commonly conceived of way, difficulties with emotion regulation can also stem from a lack of access to appropriate emotion regulation strategies. Specifically, some researchers argue that it is not the use of any particular strategies that is indicative of successful emotion regulation per se, but rather access to a variety of strategies, and the flexibility to match situations to strategies (Gratz & Roemer, 2004). The strategies themselves may be neither good nor bad, rather they are best suited for specific situations and may be adaptive or maladaptive depending on the context (Thompson, 1994). When individuals are able to flexibly match a variety of strategies to specific contexts, they are able to regulate their emotional experiences adaptively, but when they are not able to do this, they experience difficulties with emotion regulation ability.

Emotion regulation difficulties, then, are not simply the failure to modulate the experience of discrete emotions, but rather a conglomeration of emotion related abilities. Lack of

emotional awareness or clarity, inability to accept emotions, failure to inhibit impulses or to pursue goals due to emotions, and lack of access to emotion regulation strategies all together constitute difficulties in the regulation of emotional experience. Although a fair amount of research literature, as reviewed above, has focused on how difficulties with emotion regulation abilities contribute to psychopathology, the research on what factors contribute to the development of these abilities to begin with is still emerging. Moreover, extant knowledge focuses largely on the development of these difficulties in early childhood, and much still remains to be learned about how these processes unfold and impact emotion regulation abilities later in development, such as during adolescence or emerging adulthood, when peers and romantic partners act as influential agents of socialization (Gross, 2011).

Though limited mostly to younger childhood and short-term studies, research on the development of these abilities indicate the importance of socialization experiences (Eisenberg, Cumberland, & Spinrad, 1998; Keller & Otto, 2009; Thompson & Mayer, 2014). Combined, these findings suggest the possibility that individuals socialization experiences with significant others, which in adolescence may include friends and romantic partners, may lay the groundwork for success or difficulties with emotion regulation abilities. Those with relational partners who are able to engage productively in potentially emotional conversations—for example during an argument, or when discussing a difficulty the adolescent is experiencing—and are able to express appropriate emotionality without reacting poorly to the teen's own emotions, may help to foster stronger emotion regulation abilities. Conversely, when influential relational partners in adolescence habitually react poorly to emotional expressions—and again perhaps in particular to expressions of teen's negative emotions, as in the situations outlined above—adolescents may learn to suppress or ignore their emotions, leading to decreased emotional awareness, and

contributing to overall difficulties with emotion regulation abilities. However, these possibilities—particularly as they pertain to emotional development during adolescence, have not been explored.

Further bolstering the suggestion that a dearth of high quality relationships and presence of highly emotionally difficult and conflictual relationships may be important contributors to difficulties with emotion regulation, is the Borderline Personality Disorder literature. Research on the development of this disorder, which is marked by dysregulated emotions, suggests that a dearth of warm, caring, responsive, and consistent interactions with caregivers and other significant relational partners may contribute to emotion regulation difficulties (e.g., Bradley, Jenei, Westen, 2005; Nickell, Waudby, & Trull, 2002). This strengthens the as of yet untested possibility that, for adolescents, relationships with peers and romantic partners that are low in positive relational behaviors, companionship, and support, and that are instead conflictual and marked by high levels of negativity and low levels of relatedness may contribute to difficulties with emotion regulation abilities.

Though some research attention has been paid to the development of emotion regulation —or lack thereof—a through review of the literature reveals that a good deal remains to be understood about the ongoing development of emotion regulation abilities, particularly in adolescence. Based on both theory and previous research, it would make sense that socialization might play a leading role in the development of emotion regulation abilities. Research in this field could help elucidate both what types of interactions aid with adolescents' development of these abilities and difficulties, and also if certain characteristics of the interactions of adolescent relationships alter adult difficulties with these emotion regulation tasks.

Cognitive Reappraisal and Expressive Suppression

Moving beyond the question of what types of difficulties with emotion regulation abilities occur, a common line of inquiry is the differentiation and effectiveness of various strategies for the self-regulation of emotion. These different strategies for emotion regulation number in the dozens, and range from the utilization of social support to using drugs and alcohol to disengaging from a stressor, (Carver, Scheier, & Weintraub, 1989; Gross, 1998b; John & Gross, 2004). One common distinction made in the study of emotion regulation strategies is between strategies that are employed temporally before an emotional reaction is fully formed (antecedent-focused), and those that occur afterwards (response-focused), in answer to the fully formed emotional reaction (Gross, 1998a). Two heavily studied strategies that are often used as exemplars of these pre- and post- options are cognitive reappraisal and expressive suppression, respectively (Gross, 2002, Gross & John, 2003, Moore, Zoellner, Mollenholt, 2008).

Cognitive reappraisal, considered to be an antecedent-focused strategy, involves modifying the emotional impact of a potentially emotionally arousing situation by thinking about that situation differently (Gross & John, 2003; Lazarus & Alfert, 1954). For example, one might view a first date as an opportunity to meet someone new and potentially interesting and gauge the level of mutual chemistry, rather than viewing it as evaluative and the success or failure of that date a statement about ones desirability. Habitual use of cognitive reappraisal has been associated concurrently with improved social, emotional, and cognitive functioning (Gross, 2002). For individuals under a high level of stress, strong tendencies for utilizing cognitive reappraisal have even been associated with a reduced likelihood of developing depression (Troy, Wilhelm, Shallcross, & Mauss, 2010). Moreover, greater habitual use of this strategy has been associated with increased overall well-being (Haga, Kraft, & Corby, 2009).

The host of adaptive outcomes this emotion regulation strategy is associated with raises the question of what factors lead to or prevent its use. Research investigating how development influences the use of cognitive reappraisal before the adult years is only just beginning to emerge. Most research on cognitive reappraisal is concurrent in nature, with very little longitudinal research—even with a focus on how cognitive reappraisal contributes to functioning, let alone the possible developmental antecedents of reappraisal itself (Ray, et. al., 2009; Silk, Steinberg & Morris, 2003). What exists suggests that over the course of adolescence, use of cognitive reappraisal may be stable or even decrease with age, and that boys are slightly less likely than girls to report using this strategy (Gullone, Hughes, King, & Tonge, 2010). It is possible that, as with difficulties with emotion regulation, socialization plays an important role in the development of tendencies to use this strategy. During adolescence, friends and romantic partners who demonstrate the use of cognitive reappraisal, perhaps by engaging supportively with the adolescent in positive communication—both generally, and in particular during emotional conversations, such as arguments or discussions of difficulties—may contribute to the development of the use of this strategy.

In contrast to cognitive reappraisal, expressive suppression is a response-focused strategy that is centered upon restraining any manifestation of an ongoing emotional reaction (Gross, 1998). An example of this might be, on that same first date mentioned above, attempting to inhibit any outward signs of the nervousness that one might be feeling. Habitual use of expressive suppression has been associated with discomfort in ones social partners, difficulties with memory, and increased levels of psychopathology (Gross, 2002). For individuals who have been exposed to trauma, use of expressive suppression is associated with a higher rate of depressive, post-traumatic stress disorder, and anxiety symptoms (Moore, Zoellner, &

Mollenholt, 2008). In contrast to cognitive reappraisal, habitual use of expressive suppression is associated with reduced well-being (Haga, Kraft, & Corby, 2009). Expressive suppression is not necessarily ipso facto thought to be maladaptive in every context; however research suggests that indiscriminate use of this strategy may lead to difficulties down the line, in part because of the high level of energy and attention required to modulate an emotional response after the emotion is already occurring, as opposed to before the emotion is fully formed (Gross, 1998; Gross, 2002).

Given the possible pitfalls involved in the habitual use of expressive suppression, understanding the developmental factors that lead to or promote its use is important. However, the research for this strategy is similar in nature to what exists for cognitive reappraisal, in its limitations. Use of expressive suppression has been observed to decrease over time across adolescence, with the decrease becoming less marked for females as they get older, and, as opposed to with cognitive reappraisal, males, rather than females, are more likely to engage in expressive suppression (Gullone, Hughes, King, & Tonge, 2010). One possibility is that this may be due to common socialization differences, wherein boys are encouraged to suppress their emotions more than girls, however this has not been empirically tested. Following on this possibility, in considering the developmental antecedents of expressive suppression, it appears likely that experiences with friends and romantic partners that in general dissuade or discourage the expression of emotions may contribute to use of this strategy. For example, relational partners who are uncaring, un-engaged, and not emotionally supportive, or even outwardly negative when an adolescent comes to them for help, may promote the use of expressive suppression, as would perhaps being rude and demeaning, or undermining an adolescents autonomy during an argument. Additionally, it is possible that relationships marked by negativity and maladaptive communication may promote greater use of this strategy.

Social Regulation of Emotion

One emerging area of focus is the question of the extent to which emotion regulation can be viewed as a social process, influenced by the quality of an individual's social relationships (Coan & Maresh, 2013). Proximity to others is increasingly recognized as attenuating emotional reactivity (Beckes & Coan, 2011), and decreasing the cognitive burden of emotion regulation (Coan, Brown, & Beckes, 2013), with higher quality relationships most strongly buffering against threat reactivity (Coan, Schafer, & Davison, 2006). Personal history, such as experience of physical abuse or neighborhood quality during childhood and maternal support in adolescence, also appears to impact benefits gained from social regulation of emotional reactivity (henceforth; social regulation) even into adulthood (Coan, Beckes, & Allen, 2013; Pollak & Sinha, 2002).

This link may be viewed through the lens of Attachment and Social Baseline Theories. Attachment Theory posits that humans carry forward working models from previous—oftentimes caregiving—relationships of how relationships function and whether social partners can be relied upon for assistance (Ainsworth & Bowlby, 1991). Individuals with responsive and supportive caregivers are likely to feel secure in expectations that social partners will respond supportively. Social Baseline Theory builds upon this foundation, and seeks to explain the importance of social relationships more broadly. It suggests humans are adapted to the presence of other humans, that the baseline expectation for effective functioning is that others can be called upon for assistance, and, thus, how an individual budgets his or her resources is partly a function of proximity to social partners. It posits that individuals able to call upon social support in response to a given emotionally arousing situation will be less emotionally reactive due to expectations that social partners will help share the associated risk or load (Coan & Maresh, 2013).

A good deal of what is known about the social regulation of emotion has been gathered via research investigating the neurological underpinnings of emotion regulation. This research creates conditions in which individuals will be forced to call upon their emotion regulation abilities, and uses tools such as functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG) technology to understand what regions of the brain are involved in the regulation of emotion. Research thus far indicates that individuals with better quality relationships, as described above, exhibit less of an elevation in brain activity in response to these purposely arousing situations, when they are in the presence of those social partners, as compared to when they are with a stranger or alone (Coan, Schaefer, Davidson, 2006). It is believed that this reduced reactivity may afford these individuals with more resources, (i.e. energy, volition), leftover to pursue other needs or goals.

This line of research is rife with possibilities, as there is still much that remains unknown about social regulation, including the importance of additional interpersonal and developmental factors beyond those already examined. For example, these theories suggest that previous interpersonal experiences influence later social regulation, but the specific influences of different types of relationships, the importance of the temporal proximity of relationships, and the extent to which they influence social regulation is less clear. The presence of a caregiver during a brain scan attenuates emotional reactivity in anxious youth (Conner, et al, 2012), and adult attachment—significantly influenced by childhood relationships with parents—appears to affect emotional reactivity into adulthood (Wei, Vogel, Ku, Zakalik, 2005). However, little is known about other relationship experiences children or adolescents may carry forward into adulthood that potentially affect ability to benefit from social regulation. It is possible that adolescents whose friends and romantic partners demonstrate that they value and are there for the adolescent,

by being warm towards, engaged with, and supportive of the adolescent, and by acting in ways that strengthen the relationship, particularly under times of stress may help to create expectations that relational partners can be counted on for help. Similarly, high-quality relationships may also help inhibit emotional reactivity, whereas relationships high in negativity such as conflict and lack of relatedness might be associated with increased reactivity.

Neural Markers of Social Regulation of Emotion

If adolescent relationships, as described above, do have the potential to moderate emotional reactivity in the presence of close social partners in early adulthood, it would be expected that this reduction in reactivity would be seen in specific areas of the brain associated with self-regulation. In other words, individuals whose relationships with peers and romantic partners had conferred a buffer against emotional reactivity would be expected to show less neural activity in areas associated with self-regulation in response to emotion-inducing stimuli when holding a partner's hand, then when alone and exposed to the same stimuli. Essentially, for these individuals, the expectation is that they would have less of a need for self-regulation, because of their reduced reactivity. Across various neural studies of emotion regulation, a number of brain regions have been repeatedly found to be associated with self-regulation. The prefrontal cortex (PFC)—specifically the dorsolateral prefrontal cortex (dlPFC) and the orbitofrontal cortex (OFC)—and the anterior cingulate cortex (ACC), are all considered to be areas associated with self-regulation of emotion (Banfield, Wyland, Macrae, Munte, & Heatherton, 2004).

Self-regulation of emotion is often conceptualized at a neural level as a top-down process, involving emotional reactivity in the amygdala and associated limbic regions being down-regulated by the PFC (Heatherton, 2011). An inverse relationship between the reactivity in

the lateral PFC and the amydala has often been found, with activity in the PFC increasing as activity in the amygdala decreases during the self-regulation of emotion. The dlPFC, which is an area defined by its function rather than its structure, is thought to be involved in aspects of cognitive control, with individuals who have suffered damage to their dlPFC's experiencing difficulties with some aspects of behavioral inhibition, apathy, and motivation. The OFC is again differentiated by its functionality, and is responsible for the integration of affective and cognitive inputs, aspects of our behavioral and emotional expressions, and aspects of our interpersonal actions. It is also involved in representing the emotional value of reinforcers and expectations (Rolls, 2004). Individuals with damage to their OFC suffer from notable behavioral and personality changes, including increased aggression, impairments in social judgment, impulse control, insight, and difficulties with self-regulation and inhibiting need for gratification (Banfield, et al., 2004). The ACC is the frontal part of the cingulate cortex, and in addition to its more cognitive functions, it is involved in various aspects of autonomic reactivity (Critchley, et al, 2003). Cognitively, it plays a role in empathy, decision-making, aspects of both cognitive and emotional conflict, and impulse control (Boltvinick, Cohen, & Carter, 2004; Etkin, Egner, Kalisch, 2011). It is also thought to be involved in the processing of the emotional reaction to painful stimuli, as well as emotional awareness (Rainville, Duncan, Price, Carrier, & Bushnell, 1997; Lane et al., 1998). Individuals with damage to their ACC experience difficulties detecting errors and monitoring and resolving conflicts (Boltvinick, Cohen, & Carter, 2004), and there is some evidence suggesting that impairments in ACC functioning may be related to some difficulties in schizophrenia, attention deficit/hyperactivity disorder, and obsessive compulsive disorder. If experiences during adolescence with peers and romantic partners do in fact result in differential neural reactivity in the face of emotionally evocative stimuli, these three areas would

be expected to show relatively less reactivity in response to arousing stimuli when individuals are able to access social support.

The Development of Emotion Regulation

Given the very real consequences of emotion regulation failures, working to establish a better understanding of how these abilities develop is especially important. Research on emotion regulation starts early on in development, during infancy, where factors such as infant temperament, activity, and soothability are considered in terms of their associations with emotion regulation. Here, among other things, findings suggest that infants who are more easily frustrated may use different emotion regulations strategies than their peers (Calkins, Dedmon, Gill, Lomax, & Johnson, 2002), which may perhaps be early evidence that some regulation strategies may be more effective than others. Moving forward in development, during the toddler years, research has demonstrated that children's emotion regulation tendencies appear to be heavily influenced by their socialization experiences. For example, mothers who use more positive guidance to shape their toddlers behaviors have children who engage in higher levels of some distraction and mother-oriented emotion regulating behaviors (Calkins & Johnson, 1998).

The research from early childhood suggests that social relationships continue to provide important contributions to the development of emotion regulation past toddlerhood. Children appear to learn from their parents how to react in emotional situations, likely both from parents own behaviors, and the suggestions they give their children (Abaied & Rudolph, 2011). Young children also learn from their interactions with their peers how to handle their emotions (Denham & Grout, 1993). An emotionally dysregulated toddler, for example, might act on this dysregulation by lashing out at nearby peers, perhaps hitting them or screaming at them. Other children are likely to be disinterested in playing with these dysregulated toddlers, and thus

children learn that failing to regulate their emotions has social consequences. Furthermore, as they enter elementary school, children who have difficulties regulating their emotions might be ostracized due to their emotional volatility, they might be labeled as "cry-babies," express more inappropriate anger, and experience more difficulty in friendships (Eisenberg, 1992; Shields & Cicchetti, 2001). Just as emotion regulation has consequences for social development, the effects might be reciprocal, with social factors influencing the further development of emotion regulation (Spinrad, Eisenberg, Cumberland, Fabes, Valiente, Shepard, et. al., 2006). Research on children who are both bullies and victims of bullying suggests that these children may be particularly emotionally reactive, and that they might be easily upset by, and as a result, aggressive towards peers who victimize them, which may in turn make them more attractive victims, making them more likely to be rejected by peers, and perhaps further diminishing their ability for adaptive emotion regulation (Schwartz, Proctor, & Chien, 2001).

In toddlerhood and early childhood, it seems clear that socialization of emotion regulation is an important contributor to the development of these abilities. Moving into adolescence, however, the picture becomes hazy. There are known associations between social relationships and emotion regulation during adolescence. For example associations between emotion regulation and future social relationships suggest that adolescents who are better at repairing their emotional states early on have better relationships with both friends and romantic partners in the future (Hessel, Loeb, Szwedo, Allen, In Press). Similarly, research shows that adolescents with stronger emotion regulation abilities have fewer difficulties with depression, anxiety, and externalizing difficulties (Silk, Steinberg & Morris, 2003; Garnefski, Legerstee, Kraaij, Van Den Kommer, & Teerds 2002). However less is known about how emotion regulation may continue to develop during adolescence. Given the importance of socialization

processes earlier in development, it is likely that socialization processes continue to be an important factor in the continued development of emotion regulation in adolescence, however, there is still much to be learned about this prospect.

Adolescence is a time when social relationships come to the forefront of importance and begin to take on adult-like qualities (La Greca & Harrison, 2005). Adolescent peer relationships have been associated with everything from concurrent and future mental health to academic achievement, and substance use outcomes in adulthood (La Greca & Harrison, 2005; Ryan, 2001; Dishion & Owen, 2002). Relationship quality may be of particular importance during this time period, as adolescents with higher quality relationships with their peers and romantic partners may receive more encouragement to explore and be aware of their emotions. In the context of high quality relationships they are more likely to gain acceptance of their emotions from others, which may foster their own acceptance of their emotions, rather than attempts to suppress or deny them. Research focused broadly on emotional development suggests that high quality relationships, as well as socialization towards the acceptance of emotions and discussion of emotional distress may contribute to fewer difficulties with emotion regulation (Thompson & Meyer, 2014). Though limited in its scope, particularly as it pertains to adolescence, this literature suggests the possibility that high quality relationships, where adolescents and their relational partners have strong attachments and perhaps have good adaptive communication, may foster fewer difficulties with emotion regulation.

Relationship quality, which in the past has been shown to be bolstered by strong emotion regulation abilities (Lopes, Salovey, Côté, Beers, & Petty, 2005) may in turn support further adaptive use of emotion regulation strategies, as those already strong in this ability may be reinforced for it, and may therefore improve upon it. Similarly, high quality friendships, where

individuals feel supported and cared for may be more conducive to greater social regulation of emotion, as individuals in these supportive relationships may be less reactive to emotionally arousing stimuli, as a result of the high quality support they have. While all of these scenarios are possible, it is unclear if any of them are reality.

Similarly, experiences within social relationships during adolescence might provide for continuing socialization of emotional regulation in other ways. Adolescent's interactions with friends and romantic partners may provide them with experiences that guide them in their own exploration of their emotions. These relational partners might act as models, demonstrating different ways, potentially adaptive and maladaptive, of dealing with emotions. Similarly, adolescents may learn from going to these partners with a problem, or from playing out a disagreement with these partners that their emotions are acceptable, or not, worthy of attention, or not, something that will be ridiculed, or not. Adolescents who feel supported and valued when discussing something difficult, who feel that their friends or partners are really trying to help them through their problems are likely to learn very different lessons about how emotions should be approached than those with different experiences. Similarly, adolescents whose disagreements with friends and partners are productive interactions where teens are able to establish autonomy while maintaining relationships might learn one thing about handling emotions, whereas teens who are socialized to believe these disagreements are doomed to devolve into hurtful arguments may learn something else entirely.

Relationship Type

Assuming adolescent socialization is in fact an important contributor to adult emotion regulation abilities, it is like that a variety of relationships play important roles during different stages of adolescence. As adolescence ensues, and teens begin to look more outside of their

parents for social cues and guidance, friendships are likely to transition into becoming the most influential agents of socialization for emotion regulation. Adolescence is a time when friendships rise in importance, and by mid-adolescence, friends overtake parents as the people adolescents report they turn to for help and support (Furman, & Buhrmester, 1992). As adolescents put their faith and trust in these relationships, it stands to reason that the feedback they get from these friendships would influence their functioning in other domains. It is already known that peer relationships in adolescence can serve as the basis for adult social functioning (Allen, Chango, Szwedo, 2014) and the development of psychopathology (Allen, Insabella, & Porter, 2006), so it stands to reason that these relationships may also have some influence over emotion regulation.

As teens continue in development, move into late adolescence and enter into increasingly serious romantic relationships that begin to play a larger role in adolescent's lives, the importance of these relationships is likely to be paramount (Furman, & Buhrmester, 1992). Individual's interpersonal scripts and schemas for romantic relationships are known to be influential, affecting romantic relationship transitions and satisfaction in future to romantic relationships (Baldwin, 1992; Holmberg & MacKenzie, 2002; Sprecher & Metts, 1999). As adolescence is the time of first forays into romance, these relationships might be of particular import in shaping expectations for social relationships and responses to emotion—and by extension—norms for both self and social regulation. These early romantic relationships may serve as models, and particularly positive or negative experiences may influence adolescent's approaches to their emotions.

Adolescent social experiences with peers and romantic partners appear poised to influence adolescent's emotion regulation. From these experiences, adolescents are likely to learn specific values as to how to approach their emotions, what behavior is appropriate, and

how to handle emotions. Through their interpersonal interactions, they may be reinforced for or discouraged against the use of various emotion regulation strategies, which could influence which strategies they use later on. Finally, these relationships may serve as models that set expectations that future relationships will be similar. If true, this could affect the extent to which these individuals believe they can rely on others for support, and by extension, their dependence on social regulation. However, no research has looked longitudinally at the quality of adolescent relationships and how those relationships influence difficulties with emotion regulation, use of specific emotion regulation strategies, or the utilization of social regulation later in development.

Hypotheses

The proposed study is designed to enhance our understanding of the contribution that social relationships make to the development of various facets of emotion regulation, including specific components of emotion regulation abilities, specific emotion regulation strategies, and capability for self versus social-regulation of threat reactivity. To accomplish these aims, the following hypotheses will be addressed with observational, neuroimaging and multi-reporter data from a socio-demographically heterogeneous sample of 184 adolescents, their closest peers, and their romantic partners followed across a 12-year span:

Hypothesis I: Difficulties with young adulthood emotion regulation *ability* will be predicted by aspects of adolescent relationships with their close peers and romantic partners.

Fewer early adulthood difficulties with emotion regulation abilities will be predicted by:

A. High quality relationships with close peers and romantic partners during adolescence.

B. Adolescent interactions with close peers and romantic partners marked by higher levels of dyadic supportive behaviors during a support-seeking task and dyadic behaviors promoting autonomy and relatedness during a disagreement.

C. Adolescent interactions with close peers and romantic partners marked by lower levels of dyadic negativity during a support-seeking task and fewer behaviors undermining autonomy and relatedness during a disagreement.

Research Question I: Will *discrete* emotion regulation abilities, (i.e., non-acceptance of emotional responses, difficulties engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity) be predicted by qualities of adolescent relationships with closest peers and romantic partners?

Hypothesis II: Young adulthood use of specific emotion regulation *strategies* will be predicted by aspects of adolescent relationships with their close peers, and romantic partners.

Greater use of Cognitive Reappraisal in emerging adulthood will be predicted by:

A. Adolescent interactions with close peers and romantic partners marked by higher levels of dyadic supportive behaviors during a support-seeking task and more dyadic behaviors promoting autonomy and relatedness during a disagreement.

B. Adolescent interactions with close peers and romantic partners marked by lower levels of dyadic negativity during a support-seeking task and fewer behaviors undermining autonomy and relatedness during a disagreement.

Less use of Expressive Suppression in emerging adulthood will be predicted by:

A. High quality relationships with close peers and romantic partners during adolescence.

B. Adolescent interactions with closest peers and romantic partners marked by higher levels of dyadic supportive behaviors during a support-seeking task and more dyadic behaviors promoting autonomy and relatedness during a disagreement.

C. Adolescent interactions with closest peers and romantic partners marked by lower levels of dyadic negativity during a support-seeking task and fewer behaviors undermining autonomy and relatedness during a disagreement.

Hypothesis III: Individual differences in social regulation (as measured by threat related activity in the brain as a function of handholding) will be predicted by various aspects of adolescent relationships with closest peers and romantic partners.

Decreased emotional reactivity in response to threat of shock in the dlPFC, OFC, and ACC—while holding a relational partners hand, as compared to when alone—will be predicted by:

A. Adolescent interactions with closest peers and romantic partners marked by a high level of dyadic supportive behaviors during a support-seeking task and more dyadic behaviors promoting autonomy and relatedness during a disagreement.

B. Adolescent interactions with closest peers and romantic partners marked by a low level of dyadic behaviors undermining autonomy and relatedness during a disagreement.

Hypothesis IV: Self-reported emotion regulation difficulties and strategies will be associated with concurrent internalizing symptoms and problems due to substance use.

Internalizing symptoms and problems due to substance use will be predicted by

A. Difficulties with emotion regulation abilities.

B. Low levels engagement in cognitive reappraisal.

C. High levels of engagement in expressive suppression.

Research Question II: Gender and family of origin income differences will be examined as both covariates and moderators for in all analyses.

Method

Participants and Procedure

The proposed study will analyze data from a sample of 184 adolescents (86 male, 98 female), followed from ages 13 to 27, as well as their close friends and romantic partners. Participants were recruited from the seventh and eighth grades of a public middle school drawing from suburban and urban populations in the Southeastern United States. Participants were originally approached to serve either as primary participants (i.e. target teens), or as collateral informants (i.e. close peers of target teens). Of those approached, 63% of teens and their families agreed to participate. The final community sample of participants was diverse in terms of socioeconomic status and racial/ethnic identity, with adolescents identifying themselves as 58% Caucasian, 29% African-American, and 13% as from other or mixed ethnic groups. Adolescents' mothers reported a median family income in the $40,000 to $59,999 range during the first year of the study (18% of the sample reported annual family income less than $20,000, and 33% reported annual family income greater than $60,000). This sample was similar to the population of the larger community in terms of both socioeconomic status and racial/ethnic background.

Participants were recruited via an initial mailing to all parents of students in the school describing the study, along with follow-up contact efforts at school lunches. Families that indicated interest were subsequently contacted by phone. All participants provided informed assent before each interview session, and parents provided informed consent. Once participants reached 18, they gave informed consent for themselves. Interviews took place in private offices within a university academic building. The same assent/consent procedures were used for peers/romantic partners as target adolescents. All participants were fully debriefed and written procedures for handling unusual problems (e.g. responding to seriously depressed or suicidal

participants) were established and tested. The study has retained over 98% of the original sample, as of the most recent phase of the study. Proactive measures have been taken to minimize attrition by compensating the subjects well, making interviews relaxed, having interviewers establish rapport with the participants, and obtaining extensive tracking information.

Target adolescents participated a number of times throughout the course of the study, with various interaction partners. At teen ages 15-17, target teens were asked to nominate their closest peer to take part in the study. Close peers were described as "people you know well, spend time with, and whom you talk to about things that happen in your life." For adolescents who had a hard time naming close peers, it was explained that naming their "closest" peer did not mean that they were necessarily close to this peer in an absolute sense, but that they were close to this peer relative to other acquaintances they might have. By asking the teen to nominate a peer at each assessment, this provided an accurate picture of their current close peer relationships in mid to late adolescence, and avoided repeated assessments of a peer whom the teen had grown apart from.

At a later assessment, target adolescents who were in a romantic relationship of three months or longer were asked to participate. Data were collected over a three-year period, when teens were ages 17-19 (M = 18.32, SD = 1.23), with each eligible dyad participating only one time over that three-year period. Of the 184 participants in the original sample, 95 of the adolescents participated with their romantic partners (*romantic partner M age* = 19.23, SD = 3.30) during this wave of data collection. The three-month relationship criterion was established in order to ensure that teen's were involved in substantial and clearly identifiable romantic relationships. Adolescents' relationships with their romantic partners averaged 14 months in

duration, (M = 14.40, SD = 13.31). No-same gender relationships were identified at the time of the study.

At ages 23 through 26 (M = 25.28, SD = 0.88), target adolescents came in once with either a close friend or romantic partner, and participated in a portion of the study utilizing a functional Magnetic Resonance Imaging (fMRI) device. For this task, participants were excluded if they were pregnant or exhibited any risk of danger in the magnetic environment of the scanner. After being screened via telephone for exclusion criteria, participants visited the research MRI facility at the University of Virginia, where they completed the functional magnetic resonance imaging (fMRI) procedure. Before entering the MRI device, two Ag-AgCl shock electrodes were applied to the participant's ankle (left or right, counterbalanced across participants). Before functional scans were obtained, high-resolution anatomical scans were collected.

Finally, from ages 25-27, target teens alone were asked to fill out questionnaires about their own current functioning. At each assessment adolescents and their interaction partners came in and filled out questionnaires about the adolescent and about their relationship with the interaction partner/target teen, before engaging in a joint interaction task (or for the final joint assessment, the fMRI task). Participants' data were protected by a Confidentiality Certificate issued by the U.S. Department of Health and Human Services, which further protects information from subpoena by federal, state, and local courts. Adolescents, their closest peers, and romantic partners were paid for their participation. If necessary, transportation and childcare were provided.

Measures

For a simplified overview of all constructs and measures, see Table 1. For copies of questionnaire-based measures, please see the appendices.

Quality of Relationship with Close Peers and Romantic Partners

Attachment to Peers – The close peers (at teen ages 15, 16, and 17) of the target adolescent completed the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). This measure asked participants to indicate the accuracy of statements regarding their relationship with the adolescent. The total attachment score is comprised of three subscales that assess relationship trust, communication, and reverse-coded alienation with the target adolescent. Typical items included "I feel my friend is a good friend", and "When we discuss things, my friend cares about my point of view". The peer version of this measure included 25 items. Each item was rated on a 5-point likert scale, (ranging from *never true* to *almost always true*), thus overall scores could range from 25 to 125. Internal consistency for the total attachment scale ranges from .90 to .93 for the averaged peer report at age 15, 16, and 17.

Friendship Quality with Peers – At the age 15-17 assessments, close peers completed the Friendship Quality Questionnaire (FQQ; Parker & Asher, 1993). This measure asked the close peers to indicate the accuracy of statements about the quality of their friendship with the target teen. This questionnaire assesses different facets of the adolescent's relationship, including validation and caring, conflict resolution, conflict and betrayal (reverse coded), help and guidance, companionship and recreation and intimate exchange. A total friendship quality scale exists—which will be used for this study—and is comprised of all of the positive items combined, with the conflict items subtracted out. Typical items include statements such as "We make each other feel important and special", and "(S)he would like me, even if others didn't".

This questionnaire has 40-items, each of which is rated on a 5-point likert scale (ranging from *Not At All True* to *Really True),* with overall scores ranging from 40 to 200. Internal consistency for the total friendship quality scale ranged from .96 to .97 for the averaged peer reports at age 15, 16, and 17.

Relationship Quality with Romantic Partners – When the target teen was between the ages of 17-19, romantic partners completed the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985). This measure assesses numerous facets of relationship quality in romantic relationships, with 17 subscales, including two summary scales, one that looks at overall positivity, and one that looks at overall negativity in the relationship. It is the summary scales that will be used for the current investigation. Typical questions include "How much do you talk about everything with this person?" and "How often does this person point out your faults or bring you down?" All questions are answered on a 5-point likert scale (1 being *little or none* and 5 being *the most*), and there are 45 items total. Internal consistency for the summary scales was .95 for the positive summary scale, and .87 for the negative summary scale.

Conflict in Romantic Relationships – When the target teen was between the ages of 17-19, romantic partners completed the Conflict in Relationships questionnaire (CIR; Wolfe, Reitzel-Jaffe, Gough & Wekerle, 1994). This measure asked participants to indicate how often during a conflict/argument within the past year, certain situations occurred with their partners. The CIR contains three subscales, Abuse/Coercion, Positive Communication, and Negative Communication, and two summary scales, for total positivity and negativity respectively. Typical items included, "(I/)My partner said things just to make me angry", and "(I/)My partner gave me reasons why s/he thought I was wrong". The CIR contains 70 items assessing both the partners and the target adolescents behaviors, and each item was rated on a 4-point likert scale,

(ranging from 1 - *Never Happened* to 4 - *6+ times*). Internal consistency for the summary scales was .83 for the total positivity scale, and .90 for the total negativity scale.

Dyadic Supportive Behavior. At teen ages 15, 16, and 17 with their close peers, and once between the ages of 17-19 with their romantic partners, the adolescents and their partners participated in a Supportive Behavior Task (SBT), during which they discussed a "problem they were having that they could use some advice or support about." Topics typically included decisions about extracurricular activities, college, or majors, or advice about situations with peers or romantic partners. These interactions were coded using the Supportive Behavior Coding System (Allen et al. 2001), which was based on several related coding systems designed for adults (Crowell et al. 1998; Haynes and Fainsilber Katz 1998; Julien et al.1997). All interactions were coded by two trained coders who were blind to the rest of the data, with behaviors coded on a 9-point scale from 0 (low levels of coded behavior) to 4 (high levels of coded behavior) with half-points between, and there codes were then averaged. For the final composite, various subscales (as described below) were averaged across teen and interaction partner, (and in the case of interactions with close peers, across multiple waves) to create the final scores used in all analyses.

For this composite measure, subscales measuring dyadic warmth/valuing, dyadic engagement, instrumental support called for and received, emotional support called for and received, and the target teen's demonstration of satisfaction with the interaction were combined to yield an overall measure of dyadic supportive behavior. Warmth and valuing was demonstrated by the degree to which individuals display their appreciation, caring, and liking of each other, through facial expressions, body language, tone, and/or statements indicating a sense of caring or desire to support their relationship. Dyadic engagement measures how much partners

demonstrate a clear interest in paying attention and responding to what their partner says, and includes behaviors such as eye contact, nodding, and verbalizations that indicate hearing or understanding others' point of view. Calls for instrumental and emotional support were the measured as the degree to which the target teen makes it clear that they have a problem and would like instrumental aid or emotional support, respectively, in approaching the issue. Given Instrumental and Emotional Support are the degree to which partners demonstrate understanding of and responsiveness to those calls. Behaviors that are coded as instrumental support include acknowledging that a problem exists, making suggestions for how to address the problem, drawing the teen out to get more details about the problem, and problem solving throughout the discussion. Behaviors that are coded as instrumental support include demonstration of attention to teen's emotions, supporting or validating the teen's emotions, creating a comfortable atmosphere for the teen to talk about their feelings, or making a commitment to be emotionally available for the teen. Finally, the teen's satisfaction with the interaction was measured by the degree to which the teen appears to be pleased with, and have gotten what they were looking for out of the interaction.

These particular subscales were combined based on *a priori* assumptions about which behaviors would best demonstrate how supported a target teen might feel in a given relationship or support-seeking interaction. For the interactions with the romantic partners only, reverse coded dyadic displays of negativity were also included in the composite, as their inclusion resulted in stronger internal consistency (composite included: dyadic warmth/valuing, dyadic engagement, dyadic negativity, instrumental support called for and received, emotional support called for and received, and the target teen's demonstration of satisfaction with the interaction; $\alpha = .84$). The composites based on the interactions with close peers ($\alpha = .90$), were the same as for

the interactions with romantic partners, with the exception that dyadic negativity was considered separately, as including it in the composite resulted in reduced internal consistency. Interrater reliability for these scales was calculated using intraclass correlation coefficients and was in what is considered the "good" range for close peers (r = .66), and "excellent" range for the romantic partners (r = .85; Cicchetti & Sparrow, 1981).

Dyadic Negativity –The amount of dyadic negativity was also assessed within the SBT interaction, using the aforementioned coding system. Behaviors that are coded as negativity are those that have a negative emotional tone and are experienced as unpleasant by the person on the receiving end. This can be conveyed both through the tone and content of the speech. Some examples include harsh tone, stonewalling, rude comments, unfriendly teasing, and interrupting. Codes again fell along the same 9-point scale described above. Interrater reliability for the close peers was calculated using the intraclass correlation coefficient, and was found to be in the "excellent" range (r = .78). As previously mentioned, this subscale was included in the overall composite for the romantic partner interactions, and thus the intraclass correlation coefficients is included in the correlation reported above.

Dyadic Positive Autonomy and Relatedness – At teen ages 15, 16, and 17 with their close peers, and once between the ages of 17-19 with their romantic partners, the adolescents and their partners participated in an 8-minute observed revealed-differences task used to assess autonomy and relatedness behaviors. The tasks varied somewhat based on the interaction partner. With their close peers, teens participated in an 8-minute revealed-differences task, wherein they discussed a hypothetical disagreement for 8-minutes each at age 15, 16 and 17. At each age, teens and their close peers were asked to separately choose 7 out of 12 hypothetical people to receive a prize, recognition, or opportunity of some sort. In each scenario, after the teens had

made their individual choices, they were brought together, and asked to share their choices with one another, and then come to a mutual agreement about which 7 of the 12 people in each scenario should be chosen. At age 15, the teens and their peers were asked to decide who should be kicked off an island, and what of a list of luxury items they wanted to keep, at age 16, they were asked to decide who should receive a share of a large monetary lottery prize, and at age 17, they were asked who should be picked for a reality television show. Finally, once between the ages of 17 and 19, teens were again observed, this time with their romantic partners, during another 8-minute hypothetical revealed-differences task. For this version, the teen's and their romantic partner's were asked separately to decide the winners of 12 "dating court" cases, and then were brought together to come to a mutual agreement over their individual choices. All interactions were videotaped and then transcribed.

Behaviors exhibiting autonomy and relatedness from these interactions were coded using the Autonomy and Relatedness Coding System (Allen, Hauser, Bell, McElhaney, & Tate, 1998). Based on concrete behavioral indicators, this system was used to evaluate individual speeches and behaviors (8 subscales—each ranging from 0 to 4 with half-points possible). The coding system yields a rating for the target teen's and their peers' overall behavior towards each other during the interaction. Ratings are molar in nature, yielding overall scores for each individuals' behaviors across the entire the interaction; however, these molar scores are derived from an anchored coding system that considers both the frequency and intensity of each speech relevant to that behavior during the interaction in assigning the overall molar score. In addition to these 8 subscales, two additional subscales are used to create global ratings based on the overall tone of the interaction. These 10 subscales are then combined based on *a-priori* reasoning, to create a

number of overall scales to assess the degree to which behaviors displayed during the interaction promote or undermine autonomy and relatedness,

The positive autonomy an relatedness scale is a measure of behaviors displayed that promote autonomy and relatedness during the interaction, including clearly stating their reasons for their positions, displaying confidence during the discussion, maintaining a high level of positive engagement throughout the course of the interaction, as well as validating or agreeing with the other person's arguments. Two highly trained coders who were blinded to the rest of the data were used to code behaviors in each interaction on a scales from 0 (low positive autonomy and relatedness) to 4 (high positive autonomy and relatedness) with half-points included, and their codes were averaged for the final score for each the teen and the interaction partner. Then, the scores for the teen an interaction partner were averaged for the final scores for each scale. Interrater reliability was calculated using the intraclass correlation coefficient, which was found to be in the "good" range for close peer interactions, (r = .69); and the "excellent" range for romantic partner interactions (r =.77).

Dyadic Negative Autonomy and Relatedness – The negative autonomy scale is a measure of behaviors displayed by the close peer or romantic partner that undermine autonomy and relatedness during the revealed-differences task, assessed by the Autonomy and Relatedness Coding system, as described above. Behaviors that fall under this scale include attempts to avoid or distract from the discussion of disagreements, capitulating immediately to the other's perspective, making overly personal arguments (i.e., using personal examples as reasons, creating exaggerated characterizations of the others behavior, making arguments designed to affect guilt, or invoking the opinion of a 3rd person) displaying hostility towards the teen, attempts to undermine the teen as a person, cutting off the teens in any way, or ignoring the teen.

Additionally, attempts to pressure the teen into agreeing with their selection, such as by making ultimatums or use of impatient tone, would also be coded under this category. Negative autonomy and relatedness was coded on a scale from 0 (low negative autonomy) to 4 (high negative autonomy) with half-points included. Interrater reliability was calculated using the intraclass correlation coefficient, which was found to be in the "fair" range for close peers interactions (r = .57), and in the "good" range for romantic partner interactions (r = .68).

Measures of Emotion Regulation and Reactivity

Difficulties with Emotion Regulation – When the participants were age 26 and 27, they were asked to report on the difficulties they experience with regulating their emotions. Specifically, target teens completed the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). This measure asked the adolescents to indicate how often they experienced various difficulties relating to their emotions. This 36-item questionnaire is scored on a 5-point likert scale (ranging from *Almost never* to *Almost Always*), and good test-retest reliability, and adequate construct validity (Gratz & Roemer, 2004). The DERS items can be broken up into six subscales:

Non-acceptance of emotional responses is a 6-item subscale measuring the degree to which an individual tends to experience negative emotions in response to their own emotional reactions. Examples of items include, "When I am upset, I become angry at myself for feeling that way," and "When I am upset, I feel like I am weak". The internal consistency for this subscale ranged from .90 to .93 for this study.

Difficulties engaging in goal-directed behavior is a 5-item subscale measuring how well—when experiencing negative emotions—an individual is able to behave in ways that further their desired goals. Examples of items include, "When I am upset, I

have difficulty concentrating," and "When I am upset, I can still get things done" (reverse coded). The internal consistency for this subscale ranged from .83 to .87 for this study.

Impulse control difficulties is a 6-item subscale measuring the degree to which an individual is able to restrain from engaging in behaviors that are impulsive or inappropriate, and instead exert control over their behaviors while experiencing strong emotions. Examples of items include, "When I am upset, I become out of control," and "When I am upset, I feel like I can remain in control of my behaviors" (reverse coded). The internal consistency for this subscale ranged from .78 to .86 for this study.

Lack of emotional awareness is a 6-item subscale measuring how much individuals pay attention to and are aware of their emotional responses. Examples of items include, "When I am upset, I believe my feelings are valid and important," (reverse coded) and "When I am upset, I take the time to figure out what I am really feeling" (reverse coded). The internal consistency for this subscale was .83 for this study.

Limited access to emotion regulation strategies is an 8-item subscale measuring the degree to which an individual believes that once they are upset, there is not much effective that can be done to regulate or attenuate the way they are feeling. Examples of items include, "When I am upset, I believe that there is nothing I can do to make myself feel better," and "When I am upset, I believe I will end up feeling very depressed". The internal consistency for this subscale ranged from .83 to .88 for this study.

Lack of emotional clarity is a 5-item subscale that measures how much individuals know and have insight into their emotional experiences. . Examples of items include, "I have difficulty making sense out of my feelings," and "I have no idea how I

am feeling". The internal consistency for this subscale ranged from .84 to .85 for this study.

In addition to these six subscales, all items were combined into a summary scale of total difficulties with emotion regulation. Internal consistency for the summary scale ranged from .92 to .95 for the self-reports at age 26 and 27.

Emotion Regulation Strategies – At ages 25-26, participants were asked to report on their use of two common emotion regulation strategies using the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). This measure asked the target participants to rate how strongly the agreed or disagreed with statements regarding the way they typically handle positive and negative emotions. The ERQ has two subscales representing two common emotion regulation strategies, cognitive reappraisal (6-items) and expressive suppression (4 items). Typical items include "When I am faced with a stressful situation, I make myself think about it in a way that helps me stay calm." (cognitive reappraisal) and, "I control my emotions by not expressing them." (expressive suppression). All 10-items are coded on a 7-point likert scale (ranging from *strongly disagree* to *strongly agree)*. Internal consistency for the reappraisal subscale ranged from .88 to .92, and for the suppression subscale was .77, for the self- reports between ages 25 and 26.

Social Regulation of Emotional Reactivity to Threat – Between the ages of 23 and 26, target participants took part in a fMRI procedure to assess their ability to benefit from social regulation of emotional reactivity in response to threatening cues, using a well-established paradigm (Coan, Schaefer, Davidson, 2006). During this target participants were exposed to a threat of shock paradigm, wherein while in a functional Magnetic Resonance Imaging device, they were exposed to the threat of shock while holding the hand of a partner or while alone. During functional imaging, participants viewed stimuli projected onto a screen situated behind

the magnet's bore using a mirror placed on the head coil. Participants underwent two counterbalanced blocks of our threat-of-shock paradigm. During one block, the participant held the hand of their partner, and in another the participant was alone in the scanner. Each block was composed of 24 trials, 12 of which were "threat" trials and 12 of which were "safety" trials, presented in a variable order. Trials were composed of a 1 second safety or threat cue, followed by 4-10 seconds of an anticipation period indicated by a fixation cross, and then a small dot indicating the end of the trial. For shock trials, shocks were delivered and the dot indicating the trial's end appeared. The inter-trial interval varied from 4 to 10 seconds. Threat cues consisted of a red 'X' on a black background and indicated a 17% chance of electric shock, while safety cues consisted of a blue 'O' on a black background, indicating no chance of shock. Shocks were generated by an isolated physiological stimulator (Coulbourn Instruments, Allentown, PA, USA) and lasted for 20 ms at 4 mA.

Blood Oxygen Level Dependent (BOLD) functional magnetic images were obtained of teen's brains during the threat tasks. The BOLD images show what areas in the brain become more active in response to threat, between the various conditions. Hand holding in particular was used as it is a natural soothing behavior, shown to attenuate a variety of psychophysiological responses (e.g., Coan, Schaefer, & Davidson, 2006; Dunbar, 2010). Different hand holding conditions were used as the basis of comparison between the effects of holding hands with a close relational partner, versus no hand holding. Higher levels of activation imply that more blood is flowing to those brain regions, and that those regions are engaged in self-regulation in response to the threat of shock. The neural activations associated with this paradigm have been found to be associated with a variety of measures, including neighborhood quality, maternal

supportiveness, and social anxiety (Coan, Beckes, & Allen, 2013; Maresh, Beckes, Allen, & Coan, 2012).

Psychological Adjustment

Internalizing Symptoms – At adolescent ages 25 through 27, the Adult Self Report (ASR; Achenbach & Rescorla, 2003) was used to assess degree of internalizing symptoms. The 32-item internalizing scale is made up of three smaller scales, Anxious/Depressed, Withdrawn, and Somatic Complaints. All items are scored on a 3-point likert scale (ranging from *"Not True"* to "*Very True or Very Often True"),* and all items were summed to yield a total internalizing scale, where higher scores indicated more serious symptoms. A continuum/severity approach is used, in recognition of the fact that higher levels of internalizing symptoms that do not yet meet diagnostic thresholds may still have important consequences for present and subsequent functioning (Lewinsohn, Solomon, Seeley, & Zeiss, 2000). This measure is a well-validated and widely accepted measure of young adult functioning. Internal consistency for the ASR ranged from .89 to .92 for the self- reports between ages 25 through 27.

Problematic Alcohol Use – At adolescent ages 25, 26, and 27, self-reported problematic alcohol use was assessed using a subscale from the Alcohol and Drug Use Questionnaire (ADUQ; Johnston, O'Malley, Bachman & Schulenberg, 2006). This 6-item subscale included items such as "During the past 30 days, how many times did you have hangover, feel sick, get into trouble with your family or friends, miss school or work, or get into fights as a result of drinking behavior?" Higher scores on this measure were indicative of more problematic drinking behavior.

Experimentation with hard drugs- – At adolescent ages 25, 26, and 27, self-reported use of hard, excluding marijuana or proper usage following a prescription from a doctor, was

assessed using an item from the Alcohol and Drug Use Questionnaire (ADUQ; Johnston, O'Malley, Bachman & Schulenberg, 2006). This item asked the teens to check off which, if any, types of drugs from an exhaustive list, they had ever used. The list included, hallucinogens, barbiturates, tranquilizers, amphetamines, inhalants, heroin, cocaine, oxytocin, and an "other" field, where they were asked to list any other drugs they had tried, that were not listed above. For each of the drugs/classes of drugs listed, in addition to the proper name, exemplars and more common slang terms often used to refer to each drug were also listed. Scores were coded as a "1" for participants either having ever tried hard drugs, or a "0" for never having tried hard drugs.

Baseline Emotional Functioning

Emotional Repair/Regulation – At target adolescent ages 15, 16, and 17 adolescents' self-report measure of emotional repair abilities from the "Repair" subscale of the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, et al., 1995), was used to assess baseline emotional functioning. This subscale has six items, such as "I try to think good thoughts no matter how badly I feel" and "When I become upset I remind myself of all the pleasures in life". The responses were given on a 5-point likert scale, with possible responses ranging from "Strongly Agree" to "Strongly Disagree." Positively valenced items were reverse coded such that higher scores on this scale indicate greater emotional repair abilities. The repair subscale has been well validated in other research (see Fernandez-Berrocal, Alcaide et al., 2006), and it showed good internal consistency in this sample (Cronbach's $\alpha = .82$).

Table 1

Overview of primary constructs and measures

Construct Task/Measure (Type of Measure)	Reporter: Teen Age
Qualities of Peer and Romantic Partner Relationships	
Quality of relationship Close Peer - Attachment to Peers - IPPA, Friendship Quality -FQQ (Q) Romantic Partner –Overall Positivity and Overall Negativity -NRI (Q); Use of Positive and Negative Conflict Tactics – CIR (Q)	CP: 15-17 RP: 17, 18, or 19
Dyadic Behaviors Demonstrating Supportive Relationships Composite of Supportive (and for RP, reverse coded Negative) Behaviors - SBT (O)	CP: 15-17 RP: 17, 18, or 19
Dyadic Behaviors Promoting Autonomy and the Relationship Behaviors promoting Autonomy and Relatedness – A/R (O)	CP: 15-17 RP: 17, 18, or 19
Dyadic Behaviors Undermining Autonomy, the Relationship, and Relationship Quality Dyadic Negativity – Close peer only, SBT (O) Behaviors Undermining Autonomy & Relatedness – A/R (O)	CP: 15-17 RP: 17, 18, or 19
Emotion Regulation	
Baseline Emotional Functioning Repair/Regulate - TMMS (Q)	T: 15-17
Emotion Regulation Abilities Total Difficulties with Emotion Regulation - DERS (Q)	T: 26 & 27
Emotion Regulation Strategies Cognitive Reappraisal & Expressive Suppression - ERQ (Q)	T: 25 & 26
Emotional Reactivity Neural Reactivity in the dlPFC, OFC, & ACC during threat of shock paradigm (O)	T: 23, 24, or 25
Psychological Adjustment	
Internalizing Symptoms Internalizing - ASR (Q)	T: 25, 26 & 27
Problems Due to Substance Use Problems Due to Substance Use, ADUQ (Q)	T: 25, 26 & 27
Experimentation with Hard Drugs Experimentation with Hard Drugs, ADUQ (Q)	T: 25, 26 & 27

Note. T = Teen; CP = Close Peer; RP = Romantic Partner; O = Observed; Q = Questionnaire, SBT = Supportive Behavior Task; A/R = Autonomy and Relatedness Task.

Statistical Analyses

Preliminary Analyses

To begin with, descriptive statistics were conducted in order to gain a better understanding of the nature and limitations of the data. As part of this, distributions of variables, as well as basic correlations between variables intended for combination into overall measures of constructs were created. Next, the correlations, along with reliabilities (α's) of discrete behavioral codes and combinations thereof from the Supportive Behavior task were used to verify the theoretical combination of broader dimensions of relationship behaviors, as discussed above. Third, dyadic behaviors at ages 15, 16 and 17 were aggregated to provide a more stable characterization of the quality of teens dyadic interactions during adolescence. This is particularly important given that a different close peer may have been brought in by the teen to participate in the study each year. Aggregating these data across years provides a clearer picture of the *kinds* of close peer relationships teens experienced during adolescence.

Correlational Analyses

Correlational analyses were performed between all study variables. Correlations of particular interest to the study's primary hypotheses include those between, a) qualities of teens' peer and romantic relationships, and teen's emotion regulation abilities b) qualities of teens' peer and romantic relationships, and teen's use of specific emotion regulation abilities, and, c) associations between teens' emotion regulation abilities and use of emotion regulation strategies, and psychological adjustment. Additionally, to address research question I, correlational analyses between qualities of teens' peer and romantic relationships, and specific emotion regulation abilities were also examined.

Primary Analyses

Hypothesis I & II, relevant subscales from Research Question I. Regression analyses were used to test associations between relationship partners' relationships with and behaviors toward teens and teens' difficulties with their emotion regulation abilities and use of specific emotion regulation strategies. This approach allows for the simultaneous assessment of pathways between measured constructs of close peers' and romantic partners' relationships with (e.g., *total attachment*) and behaviors toward (e.g. *behaviors promoting the relationship etc.*) teens, and emotion regulation constructs (i.e. *difficulties with emotion regulation, cognitive reappraisal, expressive suppression*). Models were specified theoretically according to Hypothesis I and II, and for Research Question I were specified based on correlational analyses indicating which types of difficulties with emotion regulation may be most closely associated with various relationship constructs. Models were specified separately for each relationship and emotion regulation construct to allow for the possibility that different aspects of relationships may be associated with emotion regulation constructs in variable ways. All models were run using FIML to account for missing data. Please see Figure 1 for an exemplar analysis.

Figure 1

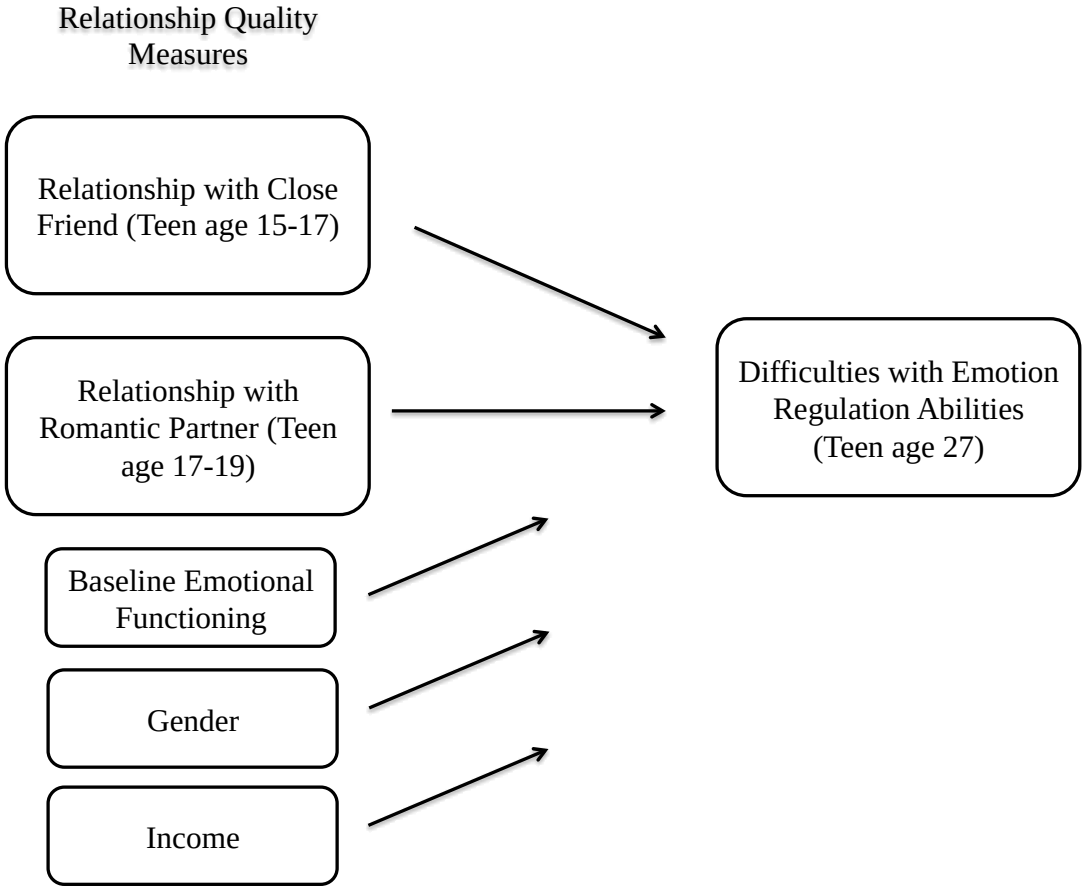


Figure 1. Example of a regression analysis examining predicted links between relationship partners' relationship with teens (i.e. *relationship quality, etc.*) and teens' emotion regulation (i.e. *Difficulties with Emotion Regulation Abilities, etc.*).

Hypothesis III. In order to determine associations between relationship partners' relationships with and behaviors toward teens and teens' neural reactivity to threat during the partner hand-holding condition relative to the alone condition, hierarchical GLM analyses that include the variable of interest as a covariate were conducted for the subsample of participants who provided neuroimaging data (*N*=86).

Image Acquisition and Analysis. Functional images were acquired using a Siemens 3.0 Tesla MAGNETOM Trio high-speed magnetic imaging device with a circularly polarized transmit/receive head coil with integrated mirror. A total of 216 functional T2*- weighted echo

planar images (EPIs) sensitive to blood-oxygen-level-dependent contrasts were collected per block, in volumes of 28 3.5-mm transversal echo-planar slices (1-mm slice gap) covering the whole brain (1-mm slice gap, repetition time (TR) = 2000 ms, echo time (TE) = 40 ms, flip angle = 90 degrees, field of view (FOV)= 192, matrix = 64 X 64, voxel size = 3 X 3 X 3.5 mm). Before collection of functional images, 176 high-resolution T1-magnetization-prepared rapid-acquisition gradient echo images were acquired to determine the localization of function (1-mm slices, TR = 1900 ms, TE = 2.53 ms, flip angle = 9 degrees, FOV =250 mm, voxel size =1 X 1 X 1 mm).

Data were preprocessed and analyzed using FMRIB's Software Library (FSL) software (Version 5.98; www.fmrib.ox.ac.uk/fsl, Worsley, 1994). Motion correction involved FMRIB's Linear Image Registration Tool, and intra-modal correction algorithm tool (MCFLIRT; Jenkinson et al., 2002), with slice scan time correction and a high-pass filtering cutoff point of 100 s, removing irrelevant signals. We used BET (Smith, 2002) brain extraction, eliminating non-brain material voxels in the fMRI data, and a 5-mm full width at half minimum Gaussian kernel for smoothing. Images were registered to the Montreal Neurological Institute (MNI) space by FLIRT (Jenkinson et al., 2002). Trials in which participants received shocks were excluded due to movement artifacts.

Using FEAT (FMRI Expert Analysis Tool) Version 5.98, part of FSL (FMRIB's Software Library, www.fmrib.ox.ac.uk/fsl) and time-series analysis by FILM (Worsley, 2001), our first level analysis of the functional data began with a threat minus safe contrast, applied separately to each handholding condition, for each subject. At the second level, again for each individual subject, data were collapsed across the two handholding conditions using a higher level FEAT analysis employing a fixed effects model. Here, additional contrasts comparing each handholding condition to the other one in all possible permutations were employed (i.e., alone –

partner & partner – alone). Finally, a third level of analysis was performed using FLAME (FMRIB's Local Analysis of Mixed Effects) state 1. Initially only the main effect of threat minus safe was brought to the third level using a whole brain voxelwise threshold of $p < .005$ to localize the main effect of threat. In a second analysis, all lower level analyses were brought to this third level. Social relationship variables of interest were centered and included as an additional covariate in each model. Multisubject effects were identified via cluster- wise tests using the FSL Z-threshold of 2.3 and cluster *p* threshold of .005, uncorrected. Descriptive statistics for figures were created by extracting the mean percent signal change from all functionally derived ROIs.

Hypothesis IV. Regression models were estimated in order to determine the possible associations between the various emotion regulation constructs (i.e. *difficulties with emotion regulation abilities, etc.)* and adolescents' concurrent internalizing symptoms and problems associated with substance use. All models were run using FIML to account for missing data.

Research Question II. Gender and family-of-origin income level were examined as potential moderators of significant associations found in analyses for Hypotheses I-IV.

Attrition Analyses

173 of the original 184 adolescents (94%) who participated at age 13 also participated in the later survey and/or observational aspects of the current study and 86 (47%) participated in the neuroimaging portion of the study. To investigate possible attrition effects we compared adolescents who participated at age 13 and did vs. did not participate in waves of the survey and observational aspects of this study wherein outcome data was gathered and also adolescents who participated at age 13 and did vs. did not participate in the neuroimaging portion of this study. Analyses revealed that adolescents who participated at age 13 but did not participate in waves

where outcome data was gathered based solely on the survey and observational portion of this study were more likely to be male ($\chi^2(1) = 9.17$, $p < .001$), more likely to have interactions with close friends reflective of higher dyadic positive autonomy and relatedness ($t(168) = -2.72$, $p < .01$), as well as to have lower quality romantic relationships ($t(85) = 2.28$, $p < .05$). Otherwise there were no significant differences between individuals who participated at age 13 but did vs. did not participate during the outcome waves of the survey and observational aspects of this study on any other baseline variables of interest. Similarly, there were not any significant baseline differences between those who participated at age 13 and did vs. did not participate in the neuroimaging aspect of this study.

Additionally, due to the requirement that adolescents be in a romantic relationship of at least 3 months or longer during the ages of 17-19—and that that partner also be willing to take part in the research—in order for the adolescent to participate in the romantic partner portion of this study, we also compared adolescents who participated at age 13 and did vs. did not participate with a romantic partner from ages 17-19. 89 out of the original 184 (48%) participated at ages 17-19 with a romantic partner. There were no significant differences found between adolescents who participated at age 13 and did vs. did not participate at ages 17-19 with a romantic partner on either demographic or baseline characteristics. Similarly, because adolescents were required to have a close friend who was willing to take part in the study from adolescent ages 15-17 in order to participate in that portion of our study, we also compared adolescents who participated at age 13 and did vs. did not participate with a close friend at ages 15-17. 175 or 95% of adolescents who participated at age 13 participated with their close friends at ages 15-17. Again, there were no significant differences found between adolescents who

participated at age 13 and did vs. did not participate at ages 15-17 with a close friend on either demographic or baseline characteristics.

To best address any potential biases due to attrition in longitudinal analyses, full information maximum likelihood (FIML) methods were used with non-neuroimaging analyses including all variables that were linked to future missing data (i.e., where data were not missing completely at random). Because these procedures have been found to yield the least biased estimates when all available data are used for longitudinal analyses (vs. listwise deletion of missing data), the entire original sample of 184 was utilized for these non-neuroimaging analyses. This full sample thus provides the best possible estimates of growth in emotion regulation abilities and strategy use and psychological adjustment, and was least likely to be biased by missing data. Alternative longitudinal analyses using just those participants without missing data (i.e., listwise deletion) yielded results that were substantially identical to those reported below. In sum, analyses suggest that attrition was modest overall and not likely to have distorted any of the findings reported.

Results

Preliminary Analyses

Table 2 presents means and standard deviations of all of the non-neuroimaging variables included in the study. Simple intercorrelations among all non-neuroimaging variables included in the study are presented in table 3 for close peer intercorrelations, table 4 for romantic partner intercorrelations, and table 5 for emotion regulation and psychopathology variables. No correlation tables for neuroimaging data are provided, as when reduced to numerical values, neuroimaging data is non-inferential. Correlations between all non-neuroimaging outcome variables, demographic variables (gender and total family income) and variables of interest are

considered and shown in each table, and both gender and family income were retained as covariates in later analyses to account for any possible effects, as well as to provide maximum information to FIML analyses. Additionally, moderating effects of demographic variables were examined in each model described below when such effects were found.

Table 2

Means and Standard Deviation of Non-Neuroimaging Variables

	Mean	**SD**
1. Emotional Repair (Age 15)	22.26	4.36
2. Emotional Repair (Age 17)	22.65	4.73
3. Friendship Quality (Age 15-17)	152.35	23.48
4. Attachment to Close Peer (Age 15-17)	103.41	11.82
5. Dyadic Positive Conflict Tactics (Age 17-19)	22.07	4.96
6. Dyadic Negative Conflict Tactics (Age 17-19)	40.09	10.69
7. Positive Relationship Quality (Age 17-19)	11.73	2.08
8. Negative Relationship Quality (Age 17-19)	5.23	1.88
9. Dyadic Supportive Behavior (Age 15-17)	1.75	0.41
10. Dyadic Negativity (Age 15-17)	0.39	0.38
11. Dyadic Supportive Behavior (Age 17-19)	2.85	0.56
12. Dyadic Behavior Undermining Autonomy & Relatedness (Age 15-17)	0.68	0.24
13. Dyadic Behavior Supporting Autonomy & Relatedness (Age 15-17)	2.38	0.34
14. Dyadic Behavior Undermining Autonomy & Relatedness (Age 17-19)	0.79	0.43
15. Dyadic Behavior Supporting Autonomy & Relatedness (Age 17-19)	2.38	0.49
16. Difficulties with Emotion Regulation (Age 26-27)	54.19	18.21
17. Emotional Awareness Difficulties (Age 26-27)	7.55	4.38
18. Cognitive Reappraisal (Age 25-26)	29.66	6.00
19. Expressive Suppression (Age 25-26)	13.16	4.43
20. Depression and Anxiety (Age 25-27)	31.18	310.68
21. Total Problems Due to Alcohol (Age 25-27)	2.36	2.66
22. Experience with Hard Drugs (Age 25-27)	0.39	0.47
23. Gender (1=male, 2= female)	48.24% Male	51.76% Female
24. Family Income	$43,619	$22,420

Table 3

Intercorrelations of Substantive Close Peer and Emotion Regulation Variables

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1. Emotional Repair (Age 15)	-	.13	.13	.18*	-.25**	-.22**	.03	-.16	-.28***	.13	-.25**	.12	.05
2. Friendship Quality (Age 15-17)		-	.85***	.40***	-.26***	-.10	.02	.04	-.09	.04	-.27***	.39***	.02
3. Attachment to Close Peer (Age 15-17)			-	.42***	-.33***	-.18*	.04	-.07	-.15	.07	-.31***	.49***	-.03
4. Dyadic Supportive Behavior (Age 15-17)				-	-.36***	-.15	.40***	.03	-.21**	.11	-.28***	.37***	.16*
5. Dyadic Negativity (Age 15-17)					-	.42***	-.22**	-.04	.13	-.04	.15	-.06	-.01
6. Dyadic Behavior Undermining Autonomy & Relatedness (Age 15-17)						-	-.11	-.05	.11	-.02	.10	-.07	.04
7. Dyadic Behavior Supporting Autonomy & Relatedness (Age 15-17)							-	-.03	-.19*	.15*	-.22**	-.03	.26***
8. Difficulties with Emotion Regulation (Age 26-27)								-	.49***	-.14	.24**	-.07	-.06
9. Emotional Awareness Difficulties (Age 26-27)									-	-.31***	.35***	-.19*	-.08
10. Cognitive Reappraisal (Age 25-26)										-	.13	.15*	.14
11. Expressive Suppression (Age 25-26)											-	-.27***	-.17*
12. Gender (1=male, 2= female)												-	-.11
13. Family Income													-

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

Table 4

Intercorrelations of Substantive Romantic Partner and Emotion Regulation Variables

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1. Emotional Repair (17)	-	-.05	-.16	-.11	-.15	.28*	-.05	.25*	-.34***	-.39***	.14	-.24**	.16*	-.07
2. Dyadic Positive Conflict Tactics (17-19)		-	.44***	.29**	.01	.05	.11	.15	.11	-.10	.12	-.24*	-.14	.14
3. Dyadic Negative Conflict Tactics (17-19)			-	.00	.48***	-.24	.25*	-.14	.14	.14	-.08	-.10	.10	-.19
4. Positive Relationship Quality (17-19)				-	.33**	-.02	-.22*	-.10	.11	.05	.07	.01	-.03	.03
5. Negative Relationship Quality (17-19)					-	-.01	.30*	-.16	-.05	.21	-.14	-.03	.10	-.30
6. Dyadic Supportive Behavior (17-19)						-	-.34**	.59***	-.28*	-.44***	.13	-.20	-.05	.06
7. Dyadic Behavior Undermining Autonomy & Relatedness (17-19)							-	-.41***	-.19	.19	-.16	.04	-.02	-.20
8. Dyadic Behavior Promoting Autonomy & Relatedness (17-19)								-	-.12	-.36**	.13	-.28*	-.09	0.1
9. Difficulties with Emotion Regulation (26-27)									-	.49***	-.14	.24**	-.07	-.06
10. Emotional Awareness Difficulties (26-27)										-	-.31	.35***	-.19*	-.08
11. Cognitive Reappraisal (25-26)											-	.13	.15*	.14
12. Expressive Suppression (25-26)												-	-.27***	-.17*
13. Gender (1=male, 2= female)													-	-.11
14. Family Income														-

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

Table 5

Intercorrelations between Emoiton Regulation and Psychopathology Variables

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1. Emotional Repair (Age 15)	-	.56***	-.25**	-.28***	.13	-.25**	-.08	-.21**	-.10	.12	.05
2. Emotional Repair (Age 17)		-	-.40***	-.39***	.14	-.24**	-.05	-.09	-.11	.17*	-.07
3. Difficulties with Emotion Regulation (Age 26-27)			-	.49***	-.18*	.23**	.05	.33***	.17*	-.04	-.01
4. Emotional Awareness Difficulties (Age 26-27)				-	-.31***	.35***	.03	.04	.09	-.19*	-.08
5. Cognitive Reappraisal (Age 25-26)					-	.13	-.03	.01	-.05	.15*	.14
6. Expressive Suppression (Age 25-26)						-	.04	.09	-.01	-.27***	-.17*
7. Depression & Anxiety (Age 25-27)							-	.26***	-.06	.07	-.04
8. Total Problems due to Alcohol (Age 25-27)								-	.41***	-.08	.12
9. Experience with Hard Drugs (Age 25-27)									-	-.24***	.30***
10. Gender (1=male, 2= female)										-	-.11
11. Family Income											-

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

Primary Analyses

Hypothesis I: Difficulties with young adult emotion regulation ability will be predicted by aspects of adolescent relationships with close peers and romantic partners.

A. *Fewer early adulthood difficulties with emotion regulation abilities will be predicted by:*

1. High quality relationships with close peers and romantic partners during adolescence:

Hierarchical regression analyses first examined predictions from the quality of adolescents' close peer relationships at ages 15-17, and romantic relationships at ages 17-19 to future difficulties with emotion regulation abilities at ages 26-27, controlling for adolescent gender, family income, and baseline emotional repair at age 15 and 17 respectively. This approach of predicting the future level of a variable while accounting for predictions from initial levels (i.e., stability) yields one marker of differences in that variable: increases or decreases in its final state relative to predictions based upon initial levels (Cohen & Cohen, 1983). No significant main effects were found predicting young adult difficulties with emotion regulation abilities from the quality of adolescent close peer and romantic relationships. Specifically, close peer's reports of the quality of their friendships with the target teen, and of the teen's total attachment to the close peer were not significant predictors of difficulties with emotion regulation in emerging adulthood, nor were romantic partner's reports of the quality of their relationship with the target teen, or of the total positive or negative conflict tactics used between themselves and the teen. An examination of gender and income as potential moderators between predictors of interest and difficulties in emotion regulation revealed no significant results.

2. Adolescent interactions with close peers and romantic partners marked by higher levels of dyadic supportive behaviors during a support-seeking task

and more dyadic behaviors promoting autonomy and relatedness during a disagreement.

Hierarchical regression analyses were next used to examine predictions from target behaviors in exchanges between adolescents and their close peer at ages 15-17, and between adolescents and romantic partners at ages 17-19, to future difficulties with emotion regulation at ages 26-27, controlling for adolescent gender, family income, and baseline emotional repair at ages 15 and 17 respectively. First, dyadic behaviors demonstrating supportiveness during the Supportive Behavior Task described above, specifically, valuing/warmth, engagement, self-disclosure, emotional support called for and received, and satisfaction with the interaction, were made into a supportive behavior composite, and then supportive behavior was examined as a predictor of difficulties with emotion regulation in emerging adulthood. In the supportive behavior composite with romantic partners, reverse coded behaviors showing negativity from the same interaction were also included in the composite, as described in the methods section. No significant main effects were found predicting difficulties in emotion regulation from dyadic supportive behaviors with close peers, or romantic partners.

An examination of gender and income as potential moderators between dyadic supportive behaviors and difficulties with emotion regulation, revealed income to be a significant moderator of dyadic supportive behavior in an exchange with a romantic partner, in predicting difficulties with emotion regulation at ages 26-27 (see table 6). This moderation indicates that adolescents from lower income backgrounds, more so than those from higher income backgrounds, whose exchanges with their adolescent romantic partners were marked by fewer supportive behaviors, reported more difficulties with emotion regulation in young adulthood. Figure 2 illustrates the

direction of the moderation between income and supportive behavior with romantic partners in predicting difficulties with emotion regulation.

Table 6

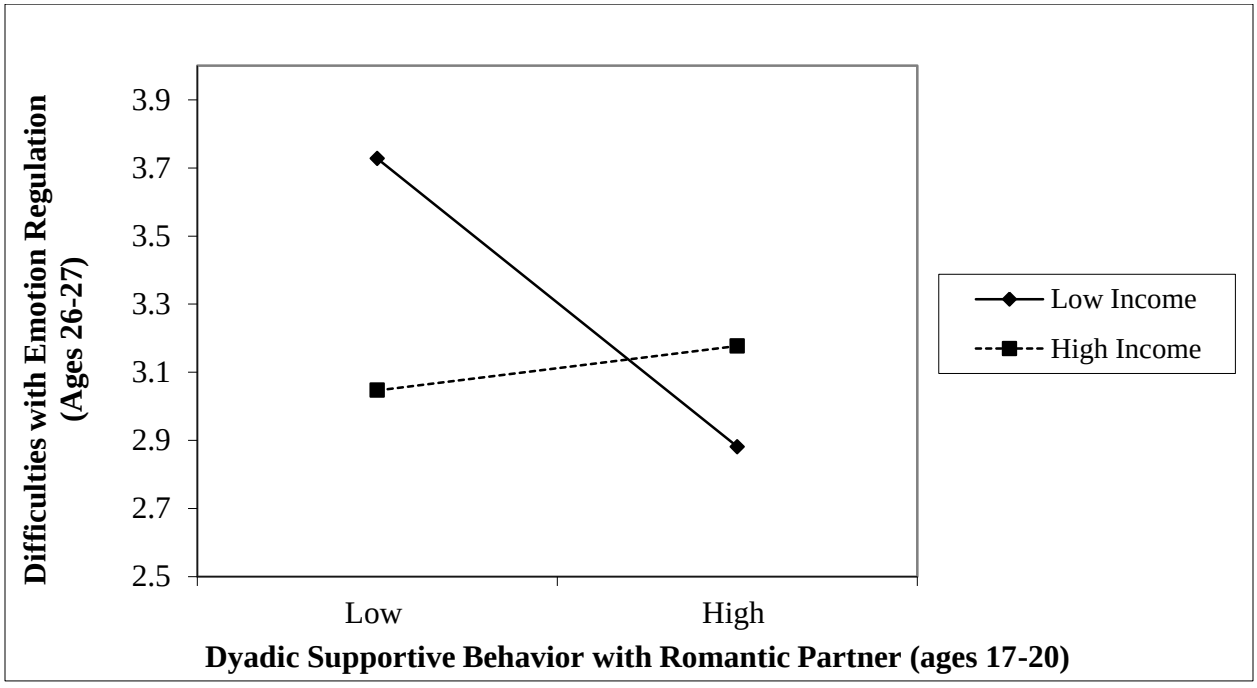
Dyadic Supportive Behavior with Romantic Partner at Ages 17-19 Interacting with Income Predicting Difficulties with Emotion Regulation at age 26-27

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1				
Gender	-.08	-.07		
Family Income	-.07	-.10		
Statistics for step			.01	.01
Step 2				
Baseline Emotion Repair (Age 17)	-.33***	-.29***	.11***	.12*
Step 3				
Dyadic Supportive Behavior with Romantic Partner (Age 17-19)	-.17	-.18	.01	.14*
Step 4				
Income X Dyadic Supportive Behavior with Romantic Partner (Ages 17-19)	.24*	.24*	.06*	.20***

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

Figure 2

Interaction between Income and Dyadic Supportive Behavior with Romantic Partner at Ages 17-19 Predicting Difficulties with Emotion Regulation at age 26-27



Next, dyadic behaviors demonstrating promotion of autonomy and relatedness during a disagreement were examined as a predictor of difficulties with emotion regulation in emerging adulthood. No significant results were found predicting difficulties with emotion regulation from dyadic behaviors with close peers or romantic partners marked by the promotion of autonomy and relatedness in the relationship. An examination of gender and income as potential moderators between dyadic behaviors promoting autonomy and relatedness and difficulties with emotion regulation revealed no significant moderations.

3. Adolescent interactions with close peers and romantic partners marked by lower levels of dyadic negativity during a support-seeking task and fewer behaviors undermining autonomy and relatedness during a disagreement.

Hierarchical regression analyses next examined peer (ages 15-17) and romantic partner (ages 17-19) interactions marked by negativity (peer only) and autonomy and relatedness-undermining behaviors, both as predictors of difficulties with emotion regulation abilities at ages 26-27, again controlling for adolescent gender, family income, and baseline emotional repair. No significant effects were found for predicting young adult difficulties with emotion regulation abilities from dyadic negativity or dyadic autonomy and relatedness-undermining behaviors between adolescents and their close peers. As described above, behaviors marked by negativity in the romantic partner interactions were included in a composite with behaviors supporting the relationship, due to higher composite reliability, and therefore they were not re-examined in this step. An examination of gender and income as potential moderators between dyadic behaviors of interest and difficulties with emotion regulation abilities did not reveal any significant moderations.

However, a main effect was found predicting young adult difficulties with emotion regulation abilities from dyadic behaviors undermining autonomy and relatedness in exchanges with romantic partners. Unexpectedly, it was found that dyadic behavior undermining autonomy and relatedness in exchanges with romantic partners was predictive of fewer difficulties with emotion regulation in young adulthood at ages 26-27 (β = -.22, p = .04; See table 7). An analysis of this interaction for potential moderation by gender or income revealed that gender significantly moderates this association. Specifically, this moderation indicates that for males, adolescent romantic relationships marked by more behaviors undermining autonomy and the relationship is predictive of significantly fewer difficulties with emotion regulation in young adulthood, (β = -.38, p = .005, see table 8), whereas for females, there was no significant association.

Table 7

Dyadic Behavior Undermining Autonomy and Relatedness with Romantic Partner at Ages 17-19 Predicting Difficulties with Emotion Regulation at age 26-27

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.				
Gender	-.08	-.01		
Income	-.07	-.12		
Statistics for step			.01	.01
Step 2.				
Baseline Measure of Emotion Repair (Age 17)	-.33***	-.35***	.11***	.12*
Step 3.				
Dyadic Behavior Undermining Autonomy and Relatedness with Romantic Partner (Ages 17-19)	-.22*	-.22*	.04*	.16**

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

In summary, young adult difficulties with emotion regulation were not predicted by overall relationship quality with close peers or romantic partners. Dyadic behaviors promoting autonomy and relatedness in relationships with peers and romantic partners were not found to predict difficulties with emotion regulation abilities, nor were peer exchanges marked by a lack

of supportive behaviors. However, income was found to mediate the association between dyadic supportive behavior in exchanges with romantic partners, and young adult difficulties with emotion regulation, indicating that for low-income youth, lack of support in these relationships may result in increased likelihood of these difficulties. Dyadic behaviors undermining autonomy and relatedness in exchanges with close peers were not found to significantly predict difficulties with emotion regulation in young adulthood. However, hostile and relationship-undermining behaviors in exchanges with romantic partners were found to predict fewer difficulties with emotion regulation in young adulthood, with a gender moderation revealing that this association was true for males, but not females. In all, including both main effects and interactions, 39 analyses were attempted for this hypothesis, and one main effect, one interaction for gender, and one interaction for income—or 7.69% of the analyses attempted—were found to reach a level of significance.

Table 8

Dyadic Behavior Undermining Autonomy and the Relationship with Romantic Partner at Ages 17-19 Predicting Difficulties with Emotion Regulation at age 26-27, by Gender

	Males				*Females*			
	β (entry)	β (final)	ΔR^2	Total R^2	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.								
Income	.01	-.06	.00	.00	-.13	-.16	.02	.02
Step 2.								
Baseline Emotion Repair (Age 17)	-.38***	-.42***	.14***	.14†	-.26*	-.26*	.06*	.08
Step 3.								
Dyadic Behavior Undermining Autonomy and Relatedness with Romantic Partner (Ages 17-19)	-.38**	-.38**	.15**	.29*	-.06	-.06	.01	.09

Note. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Research Question I: Will discrete emotion regulation abilities, (i.e., non-acceptance of emotional responses, difficulties engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity) be predicted by aspects of adolescent relationships with closest peers and romantic partners.

In order to examine the potential associations between *discrete* emotion regulation abilities and aspects of adolescent relationships with friends and romantic partners, correlations between variables of interest were examined (see table 9). Because lack of emotional awareness alone came out as significantly correlated broadly with aspects of relationships, regression analyses examining the associations between it and aspects of relationships were undertaken. The same questions as described above for Hypothesis I were subsequently explored in relation to lack of emotional awareness in young adulthood. Specifically, it was explored as to whether:

A. *Lack of emotional awareness in early adulthood will be predicted by:*

1. Low quality relationships with closest peers and romantic partners during adolescence:

Hierarchical regression analyses first examined predictions from the quality of adolescents' close peer relationships at ages 15-17, and romantic relationships at ages 17-19 to future lack of emotional awareness at ages 26-27, controlling for adolescent gender, family income, and baseline emotional repair at age 15 and 17 respectively. No significant main effects were found predicting young adult emotional awareness from the quality of adolescent close peer relationships. Specifically, close peer's reports of the quality of their friendships with the target teen, and of the teen's total attachment to the close peer were not significant predictors of lack of emotional awareness in emerging adulthood. However, the romantic partner's report of negative

Table 9

Correlations between discrete Emotion Regulation Abilities at ages 26-27 and Variables of Interest

	Non-Acceptance of Emotional Responses	Difficulties engaging in Goal-Directed Behavior	Impulse Control Difficulties	Lack of Emotional Awareness	Limited Access to Emotion Regulation Strategies	Lack of Emotional Clarity
Friendship Quality (Age 15-17)	-0.01	0.08	0.08	-0.09	0.01	-0.09
Attachment to Close Peer (Age 15-17)	-0.06	0.11	0.05	-0.15†	-0.00	-0.12
Dyadic Supportive Behavior (Age 15-17)	0.02	0.16*	0.00	-0.21**	0.05	0.14†
Dyadic Negativity (Age 15-17)	0.00	-0.13	-0.04	0.13	-0.07	-0.13
Dyadic Behavior Undermining Autonomy & Relatedness (Age 15-17)	0.08	0.01	0.03	0.11	-0.01	-0.01
Dyadic Behavior Supporting Autonomy & Relatedness (Age 15-17)	0.07	0.11	-0.11	-0.19*	-0.03	0.05
Dyadic Positive Conflict Tactics (17-19)	0.14	0.16	0.08	-0.10	0.15	0.09
Dyadic Negative Conflict Tactics (17-19)	-0.09	0.14	0.25*	0.24*	0.17	0.13
Positive Relationship Quality (17-19)	0.08	0.10	0.12	0.05	0.09	-0.02
Negative Relationship Quality (17-19)	-0.07	-0.06	0.08	0.21*	0.04	0.02
Dyadic Supportive Behavior (17-19)	-0.06	-0.23†	-0.30*	-0.44***	-0.41**	-0.26*
Dyadic Behavior Undermining Autonomy & Relatedness (17-19)	-0.25*	-0.19	-0.10	0.19	-0.12	-0.12
Dyadic Behavior Promoting Autonomy & Relatedness (17-19)	-0.12	-0.08	-0.22†	-0.36*	-0.17	-0.13

Note. *† p <.10,* * $p \leq .05$, ** $p < .01$, *** $p < .001$

conflict tactics was found to significantly predict a greater lack of emotional awareness in young adulthood (β = .20, p = .05, see table 10). Similarly, romantic partner's reports of the negative quality of their relationship with the target teen also proved to be a marginal predictor of lack of emotional awareness in young adulthood (β = .17, p = .06, see table 11). Romantic partner's report of the total positive conflict tactics used between themselves and the teen and of the positive relationship quality were not found to significantly predict young adult emotional awareness. An examination of gender and income as potential moderators between predictors of interest and lack of emotional awareness revealed no significant results.

Table 10

Romantic Partners' report of Dyadic Negative Conflict Tactics Ages 17-19 Predicting Lack of Emotional Awareness at Ages 26-27

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.				
Gender	-.21**	-.19*		
Income	-.10	-.09		
Statistics for step			.05	.05
Step 2.				
Baseline Measure of Emotion Repair (Age 17)	-.37***	-.34***	.14***	.19***
Step 3.				
Dyadic Negative Conflict Tactics with Romantic Partner (Age 17-19)	.20*	.20*	.03*	.22***

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

Table 11

Romantic Partners' report of Dyadic Negative Relationship Quality Ages 17-19 Predicting Lack of Emotional Awareness at Ages 26-27

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.				
Gender	-.21**	-.18*		
Income	-.10	-.09		
Statistics for step			.05	.05
Step 2.				
Baseline Measure of Emotion Repair (Age 17)	-.37***	-.34***	.14***	.19***
Step 3.				
Negative Relationship Quality with Romantic Partner (Age 17-19)	.17†	.17†	.03†	.22***

Note. † $p < .10$, * $p < .05$, ** p < .01, *** p ≤ .001

2. Adolescent interactions with closest peers and romantic partners with fewer dyadic supportive behaviors during a support-seeking task and fewer dyadic behaviors promoting autonomy and relatedness during a disagreement.

Hierarchical regression analyses were next used to examine predictions from target behaviors in exchanges between adolescents and their close peer at ages 15-17, and between adolescents and romantic partners at ages 17-19, to future lack of emotional awareness at ages 26-27, controlling for adolescent gender, family income, and baseline emotional repair at age 15 and 17 respectively. No significant main effects were found predicting lack of emotional awareness from dyadic supportive behaviors with close peers. However, dyadic supportive behaviors in exchanges with romantic partners were found to be predictive of less lacking emotional awareness (β = -.37, p > .001, see table 12) in early adulthood. This association was found to be moderated by gender, such that for boys, more so than girls, dyadic supportive behavior during a supportive behavior task with ones romantic partner was predictive of less lacking emotional awareness, although the association remained significant for both genders (Boys: β = -.61, p < .001, Girls: β = -.28, p = .03, see table 13).

Table 12

Dyadic Supportive Behavior with Romantic Partners Ages 17-19 Predicting Lack of Emotional Awareness at age 26-27

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.				
Gender	-.20**	-.22**		
Income	-.10	-.09		
Statistics for step			.05	.05
Step 2.				
Baseline Measure of Emotion Repair (Age 17)	-.37***	-.25**	.14***	.19**
Step 3.				
Dyadic Supportive Behavior with Romantic Partner (Age 17-19)	-.37***	-.37***	.12***	.31***

Note. † p <.10, * p <.05, ** p < .01, *** p ≤ .001

Table 13

Dyadic Supportive Behavior with Romantic Partner Predicting Lack of Emotional Awareness at ages 26-27, by Gender

	Males				*Females*			
	β (entry)	β (final)	ΔR^2	Total R^2	β (entry)	β (final)	ΔR^2	Total R^2
Step 1. Income	.08	.11	.01	.01	-.27**	-.27**	.07	.07
Step 2. Baseline Emotion Repair (Age 17)	-.27**	-.02	.07**	.08	-.51***	-.43***	.26***	.33***
Step 3. Dyadic Supportive Behavior with Romantic Partner (Age 17-19)	-.61***	-.61***	.31***	.39***	-.28*	-.28*	.07*	.40***

Note: * $p < .05$, ** $p < .01$, *** $p \leq .001$

Next, dyadic behaviors promoting autonomy and relatedness during a disagreement were examined as a predictor of lack of emotional awareness in emerging adulthood. With both close peers and romantic partners, dyadic behaviors demonstrating promotion of autonomy and relatedness during a disagreement were found to be predictive of less lacking emotional awareness in young adulthood (close peers, β = -.19, p = .02, see table 14; romantic partners, β = -.29, p = .002, see table 15). Similarly, for relationships with both close peers and romantic partners, income was found to moderate the associations with difficulties with emotional awareness. These moderations indicate that for adolescents from low income backgrounds, as opposed to those from high income backgrounds, exchanges with adolescent close peers and romantic partners marked by more dyadic behaviors supportive of autonomy and relatedness predicted less lacking emotional awareness in young adulthood (close peers - β = .16, p = .03, see table 14; Romantic partners - β = .19, p = .05, see table 15). Figure 3 illustrates the direction of the moderation between income and supportive behavior with close peers, and figure 4 with romantic partners, in predicting lack of emotional awareness.

Table 14

Dyadic Behaviors Promoting Autonomy and Relatedness in Exchanges with Close Peers at 15-17, Predicting Lack of Emotional Awareness at Ages 26-27

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1				
Gender	-.21**	-.21**		
Income	-.10	-.00		
Statistics for step			.05	.05
Step 2				
Baseline Emotion Repair (Age 15)	-.25***	-.25***	.06***	.11*
Step 3				
Dyadic Supportive Behavior with Romantic Partner (Age 15-17)	-.19*	-.18*	.03*	.14**
Step 4				
Income X Dyadic Supportive Behavior with Close Peer (Ages 15-17)	-.19*	.16*	.34*	.17**

Note. † p <.10, * p <.05, ** p < .01, *** p ≤ .001

Table 15

Dyadic Supportive Behavior with Romantic Partner (Ages 17-19), Predicting Lack of Emotional Awareness at age 26-27

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1				
Gender	-.21**	-.25***		
Income	-.10	-.14†		
Statistics for step			.05	.05
Step 2				
Baseline Emotion Repair (Age 17)	-.37***	-.32***	.14***	.19***
Step 3				
Dyadic Supportive Behavior with Romantic Partner (Age 17-19)	-.29**	-.26**	.07**	.26***
Step 4				
Income X Dyadic Supportive Behavior with Romantic Partner (Ages 17-19)	.22*	.19*	.04*	.30***

Note. *† p <. 10*, * $p \leq .05$, ** $p < .01$, *** $p \leq .001$

Figure 3

Interaction between Income and Dyadic Behaviors Promoting Autonomy and Relatedness in Exchanges with Close Peers at 15-17, Predicting Lack of Emotional Awareness at Ages 26-27

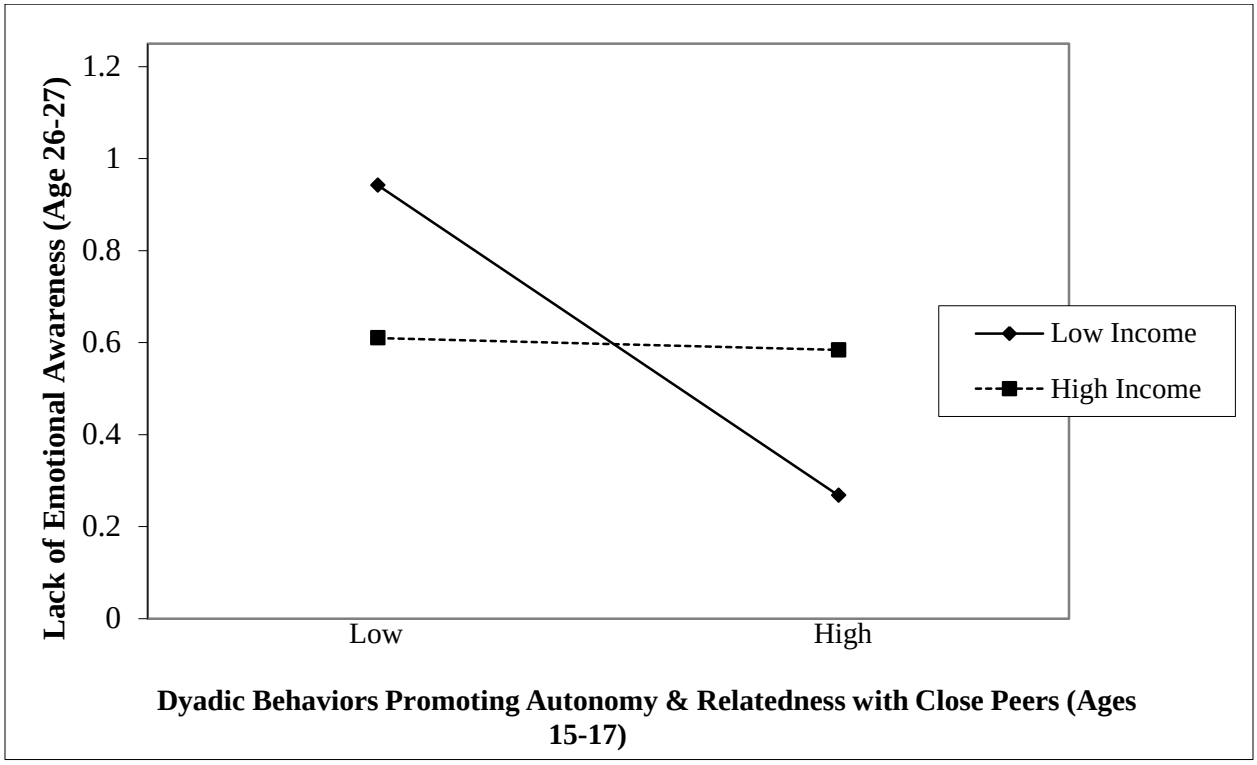
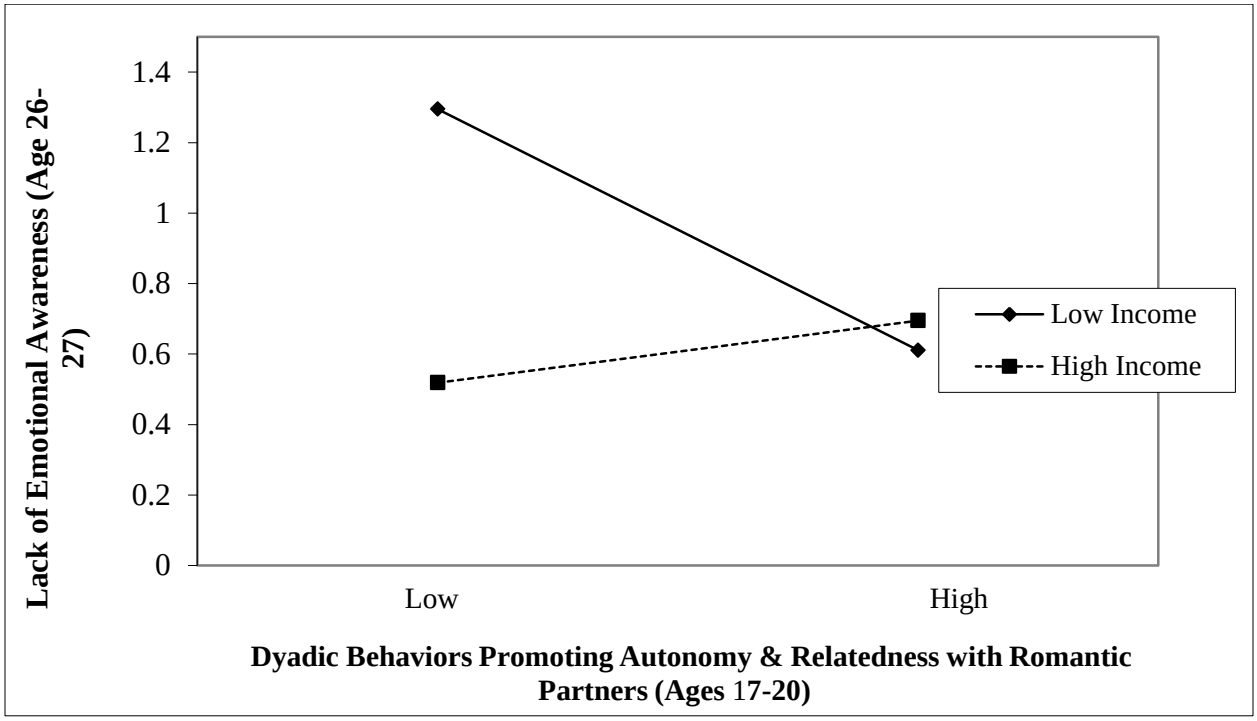


Figure 4

Interaction between Income and Dyadic Supportive Behavior with Romantic Partner (Ages 17-19), Predicting Difficulties with Emotional Awareness at age 26-27.



Further analyses examining gender and income as possible moderators for additional variables of interest revealed that they did not significantly moderate any other associations between the predictors of interest and lack of emotional awareness in young adulthood.

3. Adolescent interactions with closest peers and romantic partners marked by lower levels of dyadic negativity during a support-seeking task and fewer behaviors undermining autonomy and relatedness during a disagreement.

Hierarchical regression analyses next examined peer (ages 15-17) and romantic partner (ages 17-19) interactions marked by negativity (close peer only), and behaviors undermining autonomy and relatedness, each as predictors of lack of emotional awareness at ages 26-27, again controlling for adolescent gender, family income, and baseline emotional repair. No significant main effects were found for predicting young adult lack of emotional awareness from dyadic

negativity or behaviors undermining autonomy and relatedness with close peers. However, gender was found to moderate the association between dyadic behaviors undermining autonomy and relatedness during an argument with close peers and lack of emotional awareness at ages 26-27. Specifically, it was found that for girls, but not for boys, relationships marked by interactions undermining of autonomy and relatedness significantly predicted a greater lack of emotional awareness in young adulthood (β = .21, p = .03, see table 16). For boys, there was no effect. Finally, no effects were found for dyadic behaviors undermining autonomy and relatedness during a disagreement with a romantic partner in predicting emotional awareness.

In summary, young adult emotional awareness was not predicted by overall relationship quality with or total attachment to close peers, nor by positive relationship quality with romantic partners. However, dyadic negative conflict tactics and negative relationship quality with the romantic partner at ages 17-19 were found to predict less emotional awareness at ages 26-27. Although dyadic supportive behaviors during support-seeking interactions with close peers were not found to predict lack of emotional awareness with romantic partners, it was found that more supportive behaviors at ages 17-19 in these interactions were associated with less lacking emotional awareness later on, and that this was true even more so for males than females. Additionally, with both close peers and romantic partners, dyadic behaviors promoting autonomy and relatedness were found to predict less lacking emotional awareness, and this was found to be particularly true for individuals from low-income backgrounds. No main effects were found for predicting emotional awareness from peer dyadic negativity during the support seeking task, or dyadic behaviors undermining autonomy and relatedness during a disagreement with peers or romantic partners. However, gender was found to moderate the association between behaviors undermining autonomy and relatedness during a disagreement with close peers, and later lacking

Table 16

Dyadic Behavior Undermining Autonomy and Relatedness in Close Peer Interactions at Ages 15-17 Predicting Lack of Emotional Awareness at Ages 26-27

	Males				*Females*			
	β (entry)	β (final)	ΔR^2	Total R^2	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.								
Income	.08	.11	.01	.01	-.26**	-.20*	.07	.07
Step 2.								
Baseline Emotion Repair (Age 15)	-.20†	-.24*	.04†	.05	-.31***	-.29**	.10***	.17*
Step 3.								
Dyadic Behavior Undermining Autonomy and Relatedness with the Close Peer (Ages 15-17)	-.12	-.12	.01	.06	.21*	.21*	.04*	.21**

Note. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p \leq .001$

of emotional awareness, such that females, but not males, whose disagreements with close peers during adolescence were marked by more behaviors undermining autonomy and relatedness, reported greater lacking of emotional awareness as young adults. In all, including both main effects and interactions, 39 analyses were attempted for this hypothesis, and 4 main effects, two interactions for gender, and two interactions for income—or 20.51% of the analyses attempted—were found to reach a level of significance, with one marginally significant main effect.

Hypothesis II: Young adulthood use of specific emotion regulation strategies will be predicted by aspects of adolescent relationships with their best friends and romantic partners.

A. *Greater use of cognitive reappraisal in emerging adulthood will be predicted by:*

1. ***Adolescent interactions with close peers and romantic partners marked by higher levels of dyadic supportive behaviors during a support-seeking task and dyadic behaviors promoting autonomy and relatedness during a disagreement.***

Hierarchical regression analyses examined dyadic supportive behaviors and behaviors promoting autonomy and relatedness with peers (ages 15-17) and romantic partners (ages 17-19) as predictors of cognitive reappraisal at ages 25-26, controlling for adolescent gender, family income, and baseline emotional repair at age 15 and 18 respectively. No significant main effects were found for predicting young adult cognitive reappraisal from exchanges between adolescents and their close peers or romantic partners marked by higher levels of supportive behaviors and behaviors promoting autonomy and relatedness.

An examination of potential moderation by gender and income respectively between variables of interest and use of cognitive reappraisal revealed that gender was a significant

moderator of the association between exchanges with romantic partners marked by behaviors promoting autonomy and relatedness and cognitive reappraisal. Specifically, this finding suggests that the association between dyadic behaviors promoting autonomy and relatedness and cognitive reappraisal varies for males vs. females. Analyses splitting the sample by gender revealed that for males, exchanges with adolescent romantic partners marked by dyadic behaviors promoting autonomy and relatedness predicted significantly more use of cognitive reappraisal in young adulthood (β = .44, p = .003, see table 17). For females, there was no significant effect. No additional moderations by gender and income were found.

As such, no main effects were found in predicting cognitive reappraisal, but it was found that for males, exchanges with romantic partners marked by dyadic behaviors promoting autonomy and relatedness predicted more use of cognitive reappraisal in young adulthood.

2. ***Adolescent interactions with close peers and romantic partners marked by lower levels of dyadic negativity during a support-seeking task and fewer behaviors undermining autonomy and relatedness during a disagreement.***

Hierarchical regression analyses examined dyadic negativity and behaviors undermining autonomy and relatedness with peers (ages 15-17) and romantic partners (ages 17-19) as predictors of cognitive reappraisal at ages 25-26, controlling for adolescent gender, family income, and baseline emotional repair at age 15 and 18 respectively. No significant main effects were found for predicting young adult cognitive reappraisal from exchanges between adolescents and their close peers or romantic partners marked by a dyadic negativity or a high level of behaviors undermining autonomy and relatedness.

An examination of potential moderation by gender and income respectively between variables of interest and use of cognitive reappraisal revealed that gender was a significant

moderator of the association between dyadic behaviors undermining autonomy and relatedness during a disagreement with romantic partners and cognitive reappraisal. This moderation suggests that the association between dyadic behaviors undermining autonomy and relatedness during a disagreement amongst adolescent romantic partners, and cognitive reappraisal also

Table 17

Dyadic Behavior Promoting Autonomy and the Relationship with Romantic Partner at Ages 17-19 Predicting Cognitive Reappraisal at age 25-26, by Gender

	Males				*Females*			
	β (entry)	β (final)	ΔR^2	Total R^2	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.								
Income	.18	.27*	.03	.03	.13	.23*	.02	.02
Step 2.								
Baseline Emotion Repair (Age 17)	.16	.06	.03	.06	.12	.18	.02	.04
Step 3.								
Dyadic Behavior Promoting Autonomy and Relatedness with Romantic Partner (Ages 17-19)	.44**	.44**	.16**	.22†	-.24	-.24	.06	.08

Note. † $p < .10$, * $p \leq .05$, ** $p < .01$, *** $p \leq .001$

Table 18

Dyadic Behavior Undermining Autonomy and Relatedness in Romantic Partner Interactions at Ages 17-19 Predicting Cognitive Reappraisal at age 25-26, by Gender

	Males				*Females*			
	β (entry)	β (final)	ΔR^2	Total R^2	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.								
Family Income	.18	-.30†	.03	.03	.14	.08	.02	.02
Step 2.								
Baseline Emotion Repair (Age 17)	.16	-.01	.03	.06	.14	.18	.02	.04
Step 3.								
Dyadic Behavior Undermining Autonomy and Relatedness Romantic Partner (Age 17-19)	-.39**	-.39**	.41**	.47*	.25	.25	.03	.07

Note. . † $p < .10$, * $p < .05$, ** $p \leq .01$, *** $p < .001$

varies for males vs. females. Males whose exchanges with adolescent romantic partners were marked by more dyadic behaviors undermining autonomy and relatedness, reported using less cognitive reappraisal in young adulthood (β =-.39, p = .01, see table 18). For females, there was no significant effect. No additional moderations by gender and income were found.

B. *Less use of expressive suppression in emerging adulthood will be predicted by:*

1. High quality relationships with close peers and romantic partners during adolescence:

Hierarchical regression analyses first examined predictions from the quality of adolescents' close peer relationships at ages 15-17, and romantic relationships at ages 17-19 to future use of expressive suppression at ages 25-26, controlling for adolescent gender, family income, and baseline emotional repair at age 15 and 17 respectively. Adolescent total attachment to the close peer, as reported by that peer, was found to significantly predict decreased use of expressive suppression at ages 25-26 (β = -.24, p = .003; See table 19). Moreover, stronger overall friendship quality as reported by the close peer, was found to significantly predict decreased use of expressive suppression at ages 25-26 (β = -.18, p = .03; See table 20). Additionally, greater dyadic use of positive conflict tactics as reported by the romantic partner, was found to significantly predict less use of expressive suppression at ages 25-26 (β = -.22, p = .02; See table 21). This association was found to be significantly moderated by income. Specifically, for adolescents from lower income families, less dyadic use of positive conflict tactics during conflicts with romantic partners in adolescence is predictive of more engagement in expressive suppression during young adulthood (β = .24, p = .009; see table 21). The direction of this interaction is illustrated in Figure 5.

Table 19

Close Peers report of Teen's Total Attachment to Peer at Ages 15-17 Predicting Expressive Suppression at age 25-26

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.				
Gender	-.29***	-.14		
Income	-.20**	-.20**		
Statistics for step			.11*	.11*
Step 2. Baseline Measure of Emotion Repair (Age 15)	-.21**	-.20**	.05**	.16**
Step 3. Total Attachment to Close Peer (Age 15-17)	-.24**	-.24**	.04**	.20***

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

Table 20

Close Peers report of Teen's Friendship Quality with Close Peer at Ages 15-17 Predicting Expressive Suppression at age 25-26

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.				
Gender	-.29***	-.19*		
Income	-.20**	-.19**		
Statistics for step			.11*	.11*
Step 2. Baseline Measure of Emotion Repair (Age 15)	-.21**	-.20**	.05**	.16**
Step 3. Friendship Quality with Close Peer (Age 15-17)	-.18*	-.18*	.02*	.18***

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

Table 21

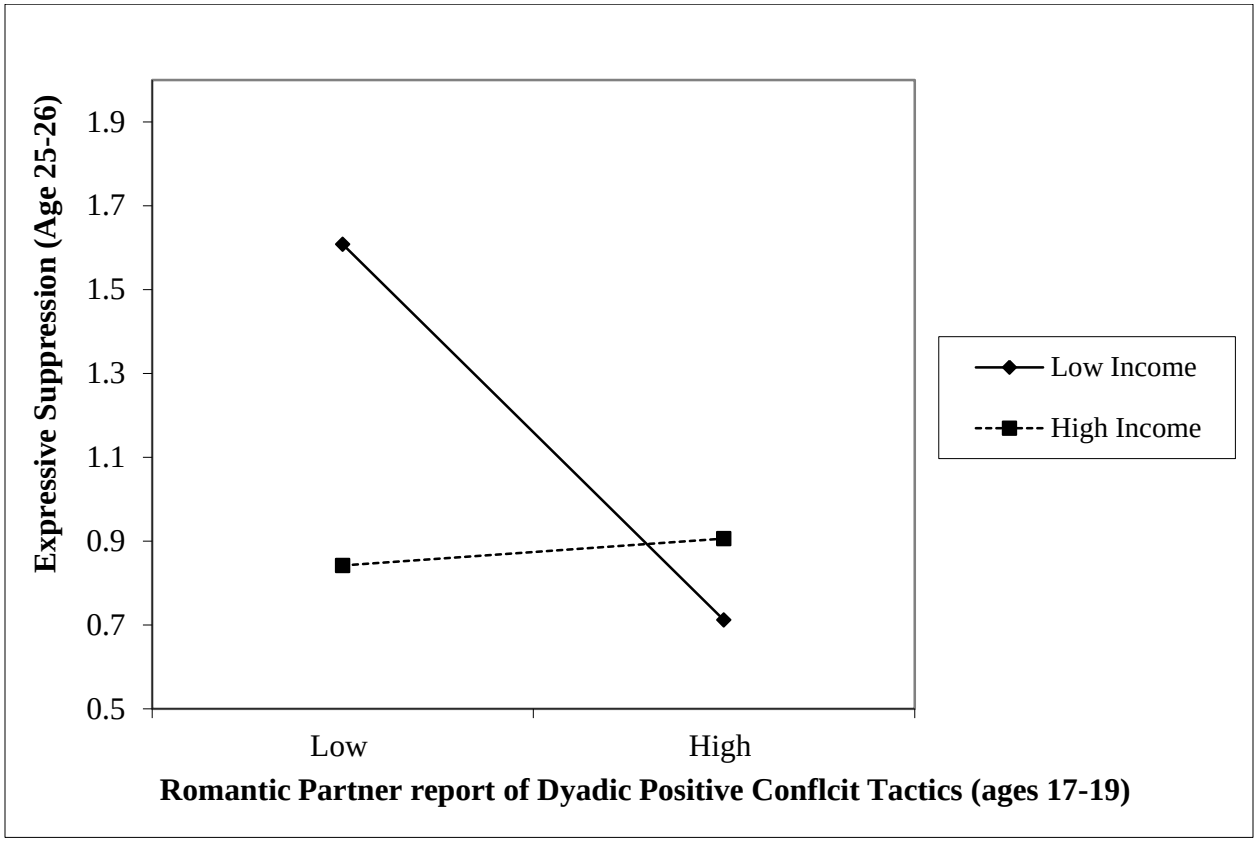
Romantic Partners' report of Dyadic Positive Conflict Tactics with Romantic Partner Ages 17-19 Predicting Expressive Suppression at age 25-26

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1				
Gender	-.29***	-.34***		
Income	-.20**	-.19*		
Statistics for step			.11*	.11*
Step 2 Baseline Emotion Repair (Age 17)	-.23**	-.14*	.06**	.17**
Step 3 Dyadic Positive Conflict Tactics with Romantic Partner (Age 17-19)	-.22*	-.21*	.04*	.21***
Step 4 Income X Dyadic Positive Conflict Tactics with Romantic Partner (Age 17-19)	.24**	.24**	.06**	.27***

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

Figure 5

Interaction between Income and Romantic Partners' report of Dyadic Positive Conflict Tactics with Romantic Partner Ages 17-19 Predicting Expressive Suppression at age 25-26



No significant effects were found predicting young adult expressive suppression from other measures of quality of adolescent romantic relationships. Specifically, romantic partner's reports of the positive and negative qualities of their relationship with the target teen and of the total negative conflict tactics used between themselves and the teen were not significant predictors of use of expressive suppression in emerging adulthood. Additionally, all further analyses examining gender and income as possible moderators for additional variables of interest revealed that they did not significantly moderate any other associations.

Overall, dyadic behaviors during adolescence with close peers and romantic partners marked by supportive behaviors and behaviors promoting and undermining autonomy and

relatedness during an argument were not found to be predictors of cognitive reappraisal in emerging adulthood. However, gender was found to significantly moderate the association between exchanges with romantic partners marked by dyadic behaviors promoting autonomy and relatedness during a disagreement in predicting use of cognitive reappraisal, such that males whose exchanges with adolescent romantic partners were marked by more dyadic behaviors promoting the relationship, reported using significantly more cognitive reappraisal in young adulthood, whereas for females there was no such association. Similarly, gender was found to significantly moderate the association between exchanges with romantic partners marked by dyadic behaviors undermining autonomy and relatedness during a disagreement in predicting use of cognitive reappraisal, such that males whose exchanges with adolescent romantic partners were marked by more dyadic behaviors undermining the relationship, reported using significantly less cognitive reappraisal in young adulthood, whereas for females there was no association.

2. ***Adolescent interactions with close peers and romantic partners marked by higher levels of dyadic supportive behaviors during a support-seeking task and more dyadic behaviors promoting autonomy and relatedness during a disagreement.***

Hierarchical regression analyses next examined dyadic supportive behaviors and behaviors promoting autonomy and relatedness with peers (ages 15-17) and romantic partners (ages 17-19) as predictors of expressive suppression at ages 25-26, controlling for adolescent gender, family income, and baseline emotional repair at age 15 and 17 respectively. Dyadic supportive behaviors amongst peers and romantic partners during adolescence were not found to significantly predict young adult expressive suppression. However, a marginal effect was found

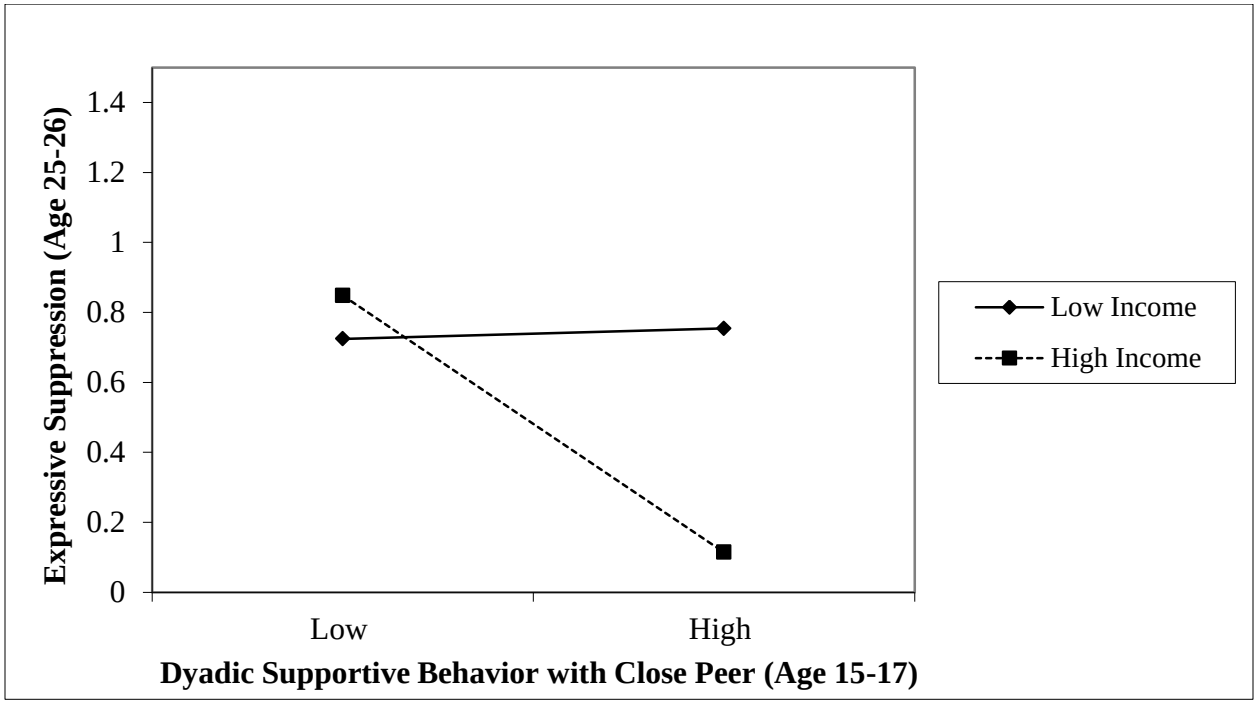
for dyadic supportive behaviors with close peers, such that that those individuals whose close peer exchanges were marked with more supportive behavior demonstrated marginally less use of expressive suppression as young adults at ages 25-26 (β = -.16, p = .06; See table 22). An examination of gender and income as potential moderators revealed that this association was moderated by income. This moderation indicates that adolescents from higher income backgrounds, more so than those from lower income backgrounds, whose exchanges with their adolescent close peers were marked by more supportive behaviors, reported less use of expressive suppression in young adulthood (β = .19, p = .011; See table 22). Figure 6 illustrates the direction of the moderation between income and supportive behavior with romantic partners in predicting expressive suppression. No gender or income moderations were found.

Table 22
Dyadic Supportive Behavior with Close Peers ages 15-17 Predicting Expressive Suppression at age 25-26

	β (entry)	β (final)	ΔR^2	Total R^2
Step 1				
Gender	-.29***	-.18*		
Income	-.20**	-.19**		
Statistics for step			.11*	.11*
Step 2				
Baseline Emotion Repair (Age 15)	-.21**	-.13†	.5**	.16**
Step 3				
Dyadic Supportive Behavior with Close Peer (Age 15-17)	-.16†	-.18*	.02†	.18***
Step 4				
Income X Dyadic Supportive Behavior with Close Peer (Ages 15-17)	-.19*	-.19*	.04*	.22***

Note. † p <.10, * p <.05, ** p < .01, *** p ≤ .001

Figure 6
Interaction between Income and Dyadic Supportive Behavior with Close Peers ages 15-17 Predicting Expressive Suppression at age 25-26



Next, dyadic behaviors promoting autonomy and relatedness during a disagreement between the target teen and the relational partner were examined. A significant effect was found with close peers for dyadic behaviors promoting autonomy and relatedness, such that exchanges marked by more of these behaviors at ages 15-17 predicted less use of expressive suppression at ages 25-26 (β = -.19, p =.01; See table 23). Similarly, a significant effect was found with romantic partners for dyadic behaviors promoting autonomy and relatedness, such that exchanges marked by more of these behaviors at ages 17-19 predicted less use of expressive suppression in young adulthood at ages 25-26 (β = -.23, p = .02; See table 23). Gender and income were not found to be moderators of any of the above associations.

Table 23

Dyadic Behaviors Promoting Autonomy and Relatedness in Exchanges with Relational Partners, Predicting Expressive Suppression at ages 25-26

	Close Peer Interactions (Ages 15-17)				*Romantic Partner Interactions (Ages 15-17)*			
	β (entry)	β (final)	ΔR^2	Total R^2	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.								
Gender	-.29***	-.27***			-.29***	-.29***		
Income	-.20**	-.14*			-.20**	-.18*		
Statistics for step			.11*	.11*			.11*	.11*
Step 2.								
Baseline Emotion Repair	-.21**	-.21**	.05**	.16**	-.23**	-.17*	.06**	.17**
Step 3.								
Dyadic Behaviors Promoting Autonomy and Relatedness	-.19*	-.19*	.03*	.19***	-.23*	-.23*	.04*	.21***

Note: * $p \leq .05$, ** $p < .01$, *** $p \leq .001$

3. Adolescent interactions with close peers and romantic partners marked by less dyadic negativity during a support-seeking task and fewer behaviors undermining autonomy and relatedness during a disagreement.

Hierarchical regression analyses next examined dyadic negativity and behaviors undermining autonomy and relatedness, with close peers (ages 15-17) and romantic partners (ages 17-19) as predictors of expressive suppression at ages 25-26, controlling for adolescent gender, family income, and baseline emotional repair at age 15 and 17 respectively. No significant main effects were found for adolescent peer dyadic negativity during a support seeking task, or peer or romantic dyadic behaviors undermining autonomy and relatedness during a disagreement in predicting young adult expressive suppression. As described above, when examining dyadic behavior with romantic partners, behaviors marked by negativity were included in a composite with behaviors supporting the relationship, due to higher composite reliability, and therefore they were not re-examined here.

Additionally, gender and income were examined as potential moderators of the associations between predictors of interest and expressive suppression at ages 25-26. Gender was found to significantly moderate the association between dyadic behaviors marked by negativity during the support-giving task, and subsequent expressive suppression. This finding suggests that the association between dyadic negativity in adolescent close peer relationships, and young adulthood expressive suppression varies based on a person's gender. Further analyses splitting the sample by gender revealed that, for males, exchanges with close peers that were high in these dyadic negative behaviors were associated with significantly more expressive suppression in young adulthood, (β =.28, p=.02, see table 24), whereas for females there was no significant association. No additional significant moderators were found.

Table 24

Dyadic Negativity During the Supportive Behavior Task with the Close Peers Predicting Expressive Suppression at ages 25-26, by Gender

	Males				*Females*			
	β (entry)	β (final)	ΔR^2	Total R^2	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.								
Income	.09	.09	.01	.01	-.42***	-.41***	.18*	.18*
Step 2.								
Baseline Emotion Repair (Age 15)	-.32**	-.26*	.09**	.11	-.11	-.12	.01	.19**
Step 3.								
Dyadic Negativity with Close Peer in Supportive Task (Age 15-17)	.28*	.28*	.08*	.19*	-.04	-.04	.01	.20***

Note: * $p \leq .05$, ** $p < .01$, *** $p \leq .001$

Overall, in predicting expressive suppression in emerging adulthood, adolescents total attachment to and overall quality of their relationship with their close peer, as well as greater dyadic use of positive conflict tactics with the romantic partner were associated with decreased expressive suppression at ages 25-26. Income was found moderate the association between dyadic use of positive conflict tactics with the romantic partner and expressive suppression at ages 25-26, suggesting lower income youth whose adolescent romantic relationships were marked by fewer dyadic positive tactics during conflict may be at greater risk for increased expressive suppression in young adulthood. As with cognitive reappraisal, dyadic supportive behaviors amongst romantic partners were not found to significantly predict young adult expressive suppression. A marginal effect was found, however, for predicting greater use of expressive suppression at ages 25-26 from fewer dyadic supportive behaviors during an interaction with peers. This association was moderated by income, suggesting higher income youth whose adolescent peer relationships were marked by more supportiveness during the support-seeking task may be at less risk for increased expressive suppression in young adulthood. In examining dyadic behaviors promoting autonomy and relatedness during a disagreement between the target teen and the relational partner, in both close peer and romantic partner interactions, fewer of these behaviors were found to predict greater use of expressive suppression in early adulthood. Finally, no significant main effects were found for adolescent peer and romantic partner dyadic negativity, or behaviors undermining autonomy and relatedness during a disagreement in predicting young adult expressive suppression. However, a significant moderation by gender was found in the association between dyadic negativity during the peer support-giving task, and expressive suppression, such that for boys, greater negativity during this task significantly predicted greater use of expressive suppression in adulthood, whereas for girls,

no effect was found. For hypothesis II overall, including both main effects and interactions, 60 analyses were attempted, and five main effects, three interactions for gender, and two interactions for income—or 16.67% of the analyses attempted—were found to reach a level of significance, with one marginally significant main effect.

Hypothesis III: Individual differences in social regulation (as measured by threat related activity in the brain as a function of handholding), will be predicted by various aspects of adolescent relationships with best friends and romantic partners.

A. *Decreased emotional reactivity in response to threat of shock in the dlPFC, OFC, and ACC—while holding a relational partners hand, as compared to when alone—will be predicted by:*

1. Adolescent interactions with close peers and romantic partners marked by a high level of dyadic supportive behaviors during a support-seeking task and dyadic behaviors promoting autonomy and relatedness during a disagreement.

To test for the effects of adolescent dyadic supportive behaviors and dyadic behaviors promoting autonomy and relatedness and handholding on threat related brain activity at ages 23-25, we predicted threat– safe contrast derived from our a-priori ROIs using hierarchical generalized linear models (GLMs) with handholding as a fixed effect and dyadic behaviors as covariates (West et al 2007). For each test within the model, the type III sum of squares was specified, allowing each variable (handholding, dyadic supportive behaviors, and dyadic behaviors promoting autonomy and relatedness) to predict unique variance. A summary of significant effects is presented in Table 25.

Table 25.
A-priori Regions of Interest, Coordinates, and Local Maxima in the Alone > Partner condition at Ages 23-25 by Dyadic Supportive Behavior

Anterior Cingulate Cortex				Orbitofrontal Cortex			
Voxels	*MAX X (mm)*	*MAX Y (mm)*	*MAX Z (mm)*	*Voxels*	*MAX X (mm)*	*MAX Y (mm)*	*MAX Z (mm)*
95	0	30	8	13	-20	36	-8
71	-4	40	-10	12	28	36	-12
5	-2	52	14	8	-6	42	-22
2	-8	-24	48	7	46	32	2
2	-8	28	-6	5	26	8	-10
1	0	28	36	5	-16	42	-20
1	-14	-18	36	4	18	22	-12
1	6	26	-2	4	18	6	-16
				2	-46	42	-16
				2	12	26	-16

None of the hypothesized interactions between close friend (age 15-17) or romantic partner (age 17-19) dyadic behaviors supporting autonomy and relatedness and any of our three ROI's (at ages 23-25) were observed. Similarly, none of the hypothesized interactions between close friend or romantic partner dyadic supportive behaviors were observed in the dlPFC. However, for close friend dyadic supportive behaviors, a hypothesized interaction was observed in the ACC, with greater dyadic supportive behavior in interactions with the close peer at ages 15-17 corresponding with less threat-related activation during partner hand holding relative to the alone condition, (see Figure 7) at ages 23-25. No additional interactions for the close peer were found in OFC. Similarly, for romantic partner dyadic supportive behaviors at ages 17-19, a hypothesized interaction was observed in the OFC with greater dyadic supportive behavior in interactions with the romantic partner again corresponding with less threat-related activation during partner hand holding relative to the alone condition, (see Figure 8) at ages 23-25. No additional interactions for the close peer were found in OFC.

Figure 7

Point estimates of percent signal change in Anterior Cingulate Cortex graphed as a function of handholding by dyadic supportive behavior with close peer.

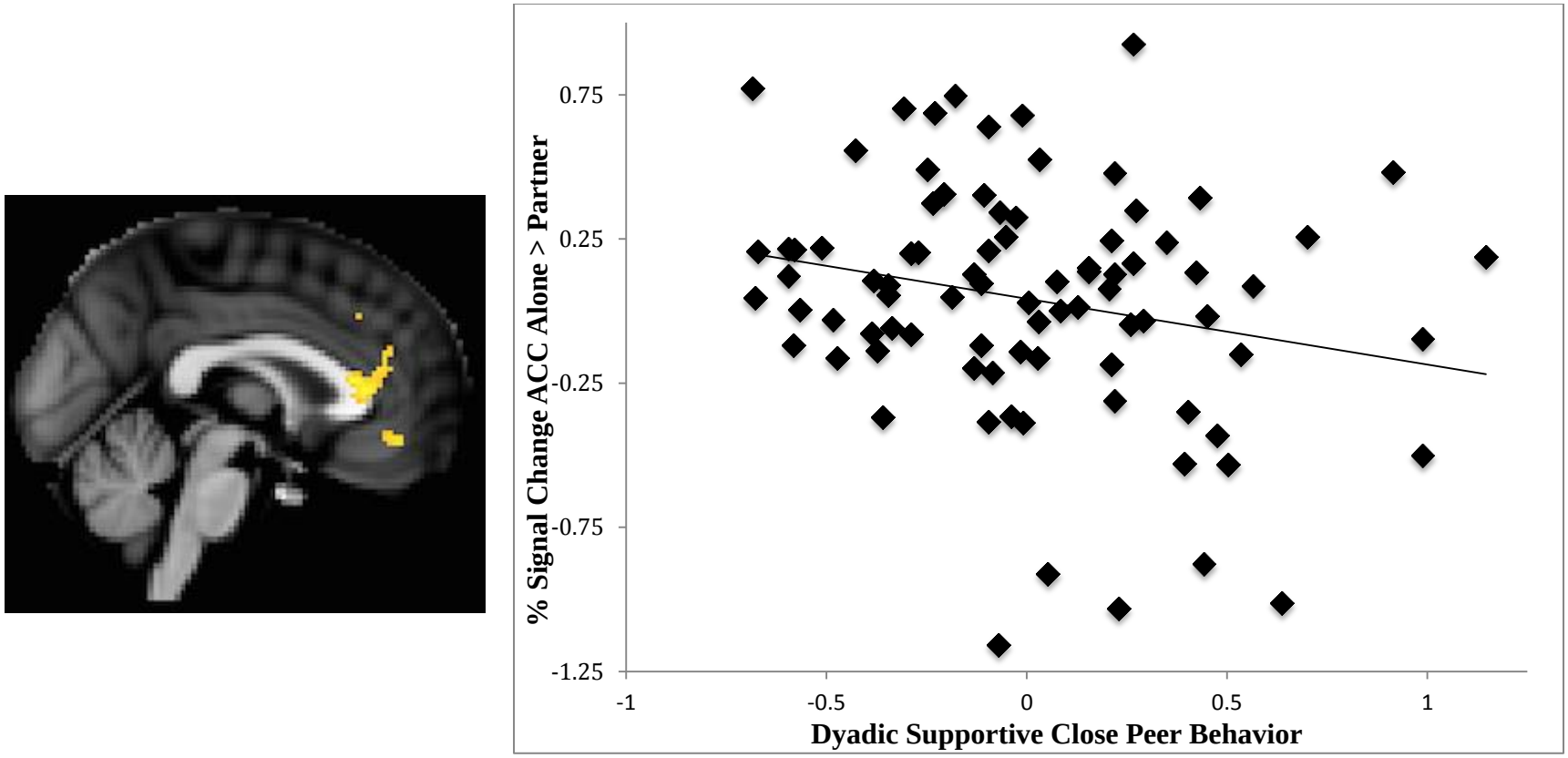
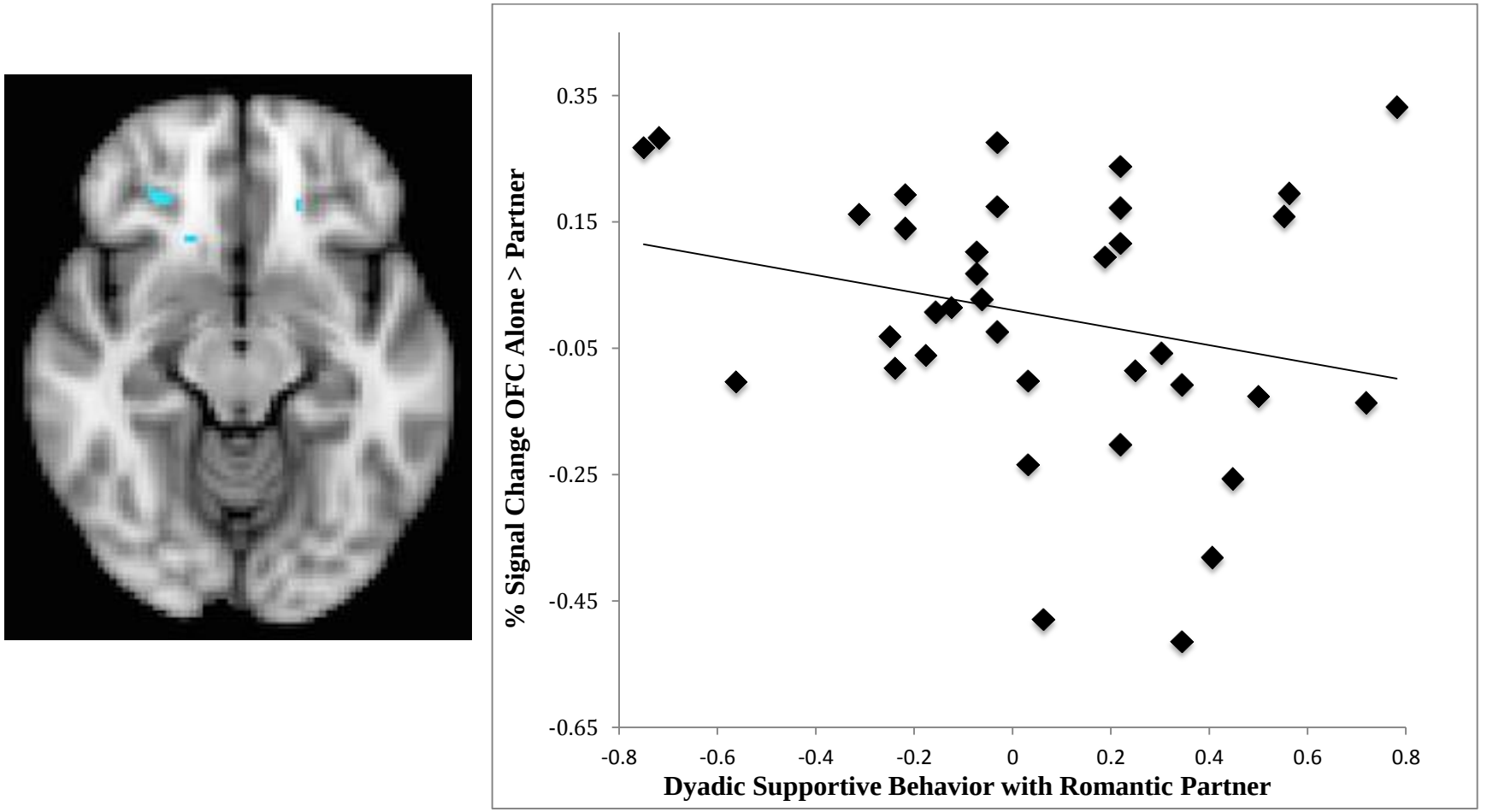


Figure 7

Point estimates of percent signal change in Orbitofrontal Cortex graphed as a function of handholding by dyadic supportive behavior with romantic partner.



2. *Dyadic behaviors undermining autonomy and relatedness during a disagreement, in interactions with close friends and romantic partners, during adolescence.*

To test for the effects of dyadic behaviors undermining autonomy and relatedness during adolescence and handholding on threat related brain activity at ages 23-25, we predicted threat–safe contrast derived from our a-priori ROIs using hierarchical generalized linear models (GLMs) with handholding as a fixed effect and dyadic behaviors as covariates (West et al 2007). For each test within the model, the type III sum of squares was specified, allowing each variable (handholding and dyadic behaviors undermining autonomy and relatedness) to predict unique variance. None of the hypothesized interactions between close friend or romantic partner dyadic behaviors undermining autonomy and relatedness and any of our three ROI's were observed. In all for hypothesis III, 18 analyses were attempted, and two interactions—or 11.11% of the analyses attempted—rose to the level of significance.

Table 26
Summary of Neuroimaging Results

	Neuroimaging Results (Ages 23-25)		
	dlPFC	ACC	OFC
Close Friend (Ages 15-17)			
Dyadic Supportive Behavior		✓	
Dyadic Pos. Autonomy & Relatedness			
Dyadic Neg. Autonomy & Relatedness			
Romantic Partner (Ages 17-19)			
Dyadic Supportive Behavior			✓
Dyadic Pos. Autonomy & Relatedness			
Dyadic Neg. Autonomy & Relatedness			

- Statistically Significant Results Found at $p < .005$

Table 26

Summary of Main Effects and Interactions for Hypotheses 1-3 and Research Question 1

	Difficulties with Emotion Regulation (Ages 26-27)			Emotional Awareness (Ages 26-27)			ERQ- Cognitive Reappraisal (Ages 25-26)			ERQ- Expressive Suppression (Ages 25-26)			Neuro-imaging Results (Ages 23, 24, or 25)
Peer Predictors (Ages 15-17)	Main Effect	Income	Gender	Main Effect	Income	Gender	Main Effect	Income	Gender	Main Effect	Income	Gender	
Attachment to Peer										**			
Relationship Quality										*			
Dyadic Supportive Behavior										†	*		*
Dyadic Negativity												*	
Dyadic Pos. Autonomy & Relatedness				*	*					*			
Dyadic Neg. Autonomy & Relatedness						*							
Romantic Partner Predictors (Ages 17, 18 or 19)													
Positive Relationship Quality													
Negative Relationship Quality				†									
Positive Conflict Tactics										*	**		
Negative Conflict Tactics				*									
Dyadic Supportive Behavior		*		***		***							*
Dyadic Pos. Autonomy & Relatedness				**	*				*	*			
Dyadic Neg. Autonomy & Relatedness	*R		**R						***				

Note: All non-neuroimaging analyses account for baseline emotional repair. Marginally significant results found at † - $p < .10$, * - Statistically significant results found at $p \leq .05$, ** - Statistically significant results found at $p < .01$, *** - Statistically significant results found at $p \leq .001$, **R** - Results Found in Unexpected Direction, Greyed out boxes indicate questions that were beyond the scope of this research and not examined.

Hypothesis IV: Self-reported emotion regulation difficulties and strategies will be associated with concurrent internalizing symptoms and problems due to substance use.

A. *Internalizing symptoms and problems due to substance use will be predicted by:*

1. Difficulties with emotion regulation abilities

Hierarchical regression analyses examined difficulties with emotion regulation at ages 26-27 as a predictor of concurrent anxiety and depression symptoms, total problems due to alcohol, and use of hard drugs at ages 25-27, controlling for adolescent gender and family income. Difficulties with emotion regulation at ages 26-27 were not found to significantly predict concurrent depression and anxiety symptoms, but they were found to predict total problems due to alcohol (β = .33, p < .0001; See table 26), and having experimented with hard drugs (β = .16, p = .03; See table 26).

2. Lack of emotional awareness

Hierarchical regression analyses examined lack of emotional awareness at ages 26-27 as a predictor of concurrent anxiety and depression symptoms, total problems due to alcohol, use of hard drugs at ages 25-27, controlling for adolescent gender and family income. No significant effects were found for predicting young adult depression, anxiety, total problems due to alcohol, or experimentation with hard drugs from concurrent lack of emotional awareness.

3. Low levels engagement in cognitive reappraisal

Hierarchical regression analyses examined use of cognitive reappraisal at ages 25-26 as a predictor of concurrent anxiety and depression symptoms, total problems due to alcohol, use of hard drugs at ages 25-27, controlling for adolescent gender and family income. No significant effects were found for predicting young adult depression, anxiety, total problems due to alcohol, or experimentation with hard drugs from concurrent cognitive reappraisal.

Table 26

Difficulties with Emotion Regulation (Ages 26-27) predicting concurrent Substance Use Outcomes (Ages 25-27)

	Total Problems Due to Alcohol (Age 25-27)				*Use of Hard Drugs (Age 25-27)*			
	β (entry)	β (final)	ΔR^2	Total R^2	β (entry)	β (final)	ΔR^2	Total R^2
Step 1.								
Gender	-.20**	-.05			-.20**	-.19**		
Income	-.27***	.12			-.27***	.27***		
Statistics for step			.13	.13**			.13*	.13*
Step 3.								
Difficulties with Emotion Regulation (Age 26-27)	.33***	.33***	.00***	.13**	.16*	.16*	.02*	.15**

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

4. High levels of engagement in expressive suppression.

Hierarchical regression analyses examined use of expressive suppression at ages 25-26 as a predictor of concurrent anxiety and depression symptoms, total problems due to alcohol, and use of hard drugs at ages 25-27, controlling for adolescent gender and family income. No significant effects were found for predicting young adult internalizing, total problems due to alcohol or experimentation with hard drugs from concurrent expressive suppression.

Overall, difficulties with emotion regulation were found to be a significant concurrent predictor of total problems due to alcohol and experimentation with hard drugs. Cognitive reappraisal, expressive suppression, and lack of emotional awareness were not found to be significant concurrent predictors of any psychopathology or substance use outcomes. In all for hypothesis IV, 12 analyses were attempted, two—or 16.67% of the analyses attempted—were found to reach a level of significance.

Table 27

Summary of Findings for Hypotheses 4

Emotion Regulation Predictors	Internalizing Symptoms (ages 25-27)	Experimentation with Hard Drugs (ages 25-27)	Problems due to Substance Abuse (ages 25-27)
Difficulties with Emotion Regulation (ages 26-27)			
Lack of Emotional Awareness (ages 26-27)			
ERQ- Cognitive Reappraisal (ages 25-26)			
ERQ- Expressive Suppression (ages 25-26)			

- Statistically significant results found.

Discussion

This dissertation aimed to enhance our understanding of the contribution that adolescent social relationships make to the development of various facets of the regulation of emotions.

Qualities of peer and romantic relationships, including indices of relationship quality and interpersonal processes, were examined as potential predictors of difficulties with both overall and specific components of emotion regulation abilities, specific emotion regulation strategies, and capability for self- versus social-regulation of threat reactivity. A secondary aim was to determine if and how these various facets of self-regulation were then associated with concurrent psychological functioning in early adulthood. The roles of gender and income in moderating these associations were also assessed. These aims were addressed with observational and multi-reporter data from a socio-demographically heterogeneous sample of 184 adolescents, their closest friends, and their romantic partners followed across a twelve-year span.

Difficulties with Overall Emotion Regulation Abilities

There was very limited support for the hypothesis that difficulties with overall young adulthood emotion regulation abilities would be predicted by aspects of adolescent relationships with romantic partners, and no support for the idea that difficulties with emotion regulation abilities would be predicted by adolescent relationships with close peers. There was no support found for the hypothesis that either close peers' or romantic partners' reports of the quality of their relationships with the target teens would predict difficulties with emotion regulation abilities. Similarly, there was no evidence that dyadic supportive behavior, behaviors promoting autonomy and relatedness, negativity or behavior undermining autonomy and relatedness during exchanges with closest peers, predicted subsequent difficulties with overall emotion regulation abilities in young adulthood.

There was, however, some support for the role of dyadic behaviors during emotionally charged exchanges with adolescent romantic partners in predicting young adult difficulties with emotion regulation abilities. First, although no main effect was found for dyadic supportive

behaviors in support-seeking exchanges with adolescent romantic partners in predicting overall young adult difficulties with emotion regulation abilities, an interaction was found with family income. Specifically, it was found that adolescents from lower income backgrounds whose exchanges with their adolescent romantic partners were marked by fewer supportive behaviors and more negativity, reported more difficulties with emotion regulation abilities in young adulthood, than did their peers from more affluent families.

It may be that adolescents from families with higher incomes have caregivers who are less taxed by the pursuit of financial security, and are therefore more capable of providing emotional support to their adolescents (Ceballo & McLloyd, 2002). If this is the case, the contribution of supportive behavior from romantic partners above and beyond what parents provide for these teens may have less of an impact. In comparison, for adolescents from lower income backgrounds whose parents have fewer resources available to spend on providing emotional support for their adolescents, a romantic partner's supportiveness or lack thereof may be more consequential. As such, for these teens from low-income families, having romantic partners who provide a high level of emotional support may serve as a protective factor that may help facilitate their emotional development. In turn, low-income adolescents whose exchanges with their romantic partners are non-supportive and more negative may be missing out on important developmental experiences, and may therefore experience greater difficulties with emotion regulation abilities in young adulthood.

There were no results predicting difficulties with overall emotion regulation abilities in young adulthood from dyadic behaviors promoting autonomy and relatedness during a disagreement with a romantic partner. Dyadic behaviors undermining autonomy and relatedness during a disagreement with a romantic partner *were* found to predict subsequent difficulties with

emotion regulation abilities, however the direction of these effects was contrary to what was expected. Specifically, those whose disagreements with their romantic partners were observed to have more dyadic behaviors undermining autonomy and relatedness were actually found to report fewer difficulties with emotion regulation in young adulthood.

Though unexpected, there are a number of possible explanations that could account for this finding. One possibility is that adolescents whose emotionally charged interactions with their romantic partners are marked by this seemingly maladaptive interpersonal pattern may as a consequence have more opportunities early on to practice and improve upon their emotion regulation abilities. They may learn early on how to moderate their emotional reactions to potentially upsetting interpersonal situations, so as to be able to recover from those interactions, and may as a result be better able to moderate their emotional responses more broadly. Similarly, previous research with adolescents and their parents found that when adolescent's fathers behaved in ways that undermined autonomy and relatedness *within the context of an overall supportive relationship,* adolescents grew more in terms of ego development and self-esteem over the next 2 years (Allen, Hauser, Bell & O'Connor, 1994). Similar to this previous research, the current findings might suggest that the undermining behavior adolescents experience may provide a growth-producing challenge, that facilitates the development of greater emotion regulation abilities. Another possibility is that for individuals whose interpersonal disagreements with partners during adolescence were marked by behaviors that discouraged individuation and speaking up about one's own experience, or where doing so might have been perceived as a threat to a relationship, these individuals may learn to suppress their emotional reactions to situations. As young adults, they may therefore be particularly likely to overestimate or over

report their emotion regulation abilities, as they may have learned that discussing a concern leads to more turmoil, and thus may avoid thinking about or acknowledging difficulties.

When this association was examined for potential interactions with gender and family income, gender was found to moderate the association between dyadic behaviors undermining autonomy and relatedness with a romantic partner, and subsequent difficulties with emotion regulation abilities. The analyses were then broken down by gender, at which point it was found that the above pattern held for males, but that there was no association for females between behaviors undermining autonomy and the relationship, and subsequent difficulties with emotion regulation. In light of this, it may be that males, who are often socialized from an early age to express less emotion and less emotional distress (Brody, 2000; Chaplin, Cole, & Zahn-Waxler, 2005; Garside & Klimes-Dougan, 2002), when exposed to adolescent relationships where expressions of disagreement were met with behavior discouraging autonomy and threatening to the relationship, may become particularly reticent to express difficulties. As young adults, these men may therefore be more likely to deny or downplay any difficulties with their emotion regulation abilities.

After examining the associations between relationships with friends and romantic partners and subsequent overall emotion regulation abilities, some specific facets of emotion regulation difficulties and abilities were examined. This was done to determine if any results might be driven by an association with only one or some facets of emotion regulation abilities, or alternatively, if peer processes might predict some facets when considered independently, that might be missed or washed out by other null results, when multiple facets of emotion regulation were considered in concert. The individual aspects of difficulties with emotion regulation abilities considered included emotional acceptance, ability to engage in goal directed behavior

despite emotions, abilities to control impulses despite emotions, emotional awareness, ability to be flexible in use of emotion regulation strategies, and emotional clarity. This correlational analysis revealed that the only sub-component of difficulties with emotion regulation abilities for which the pattern of findings was substantially distinct from the findings for overall emotion regulation abilities was emotional awareness. As such, associations between the interpersonal predictors examined for overall emotion regulation abilities and emotional awareness were examined, and the results are discussed below.

Emotional Awareness

There was some support for the hypothesis that young adult lack of emotional awareness would be predicted by adolescent relationships with closest peers, and considerable support for the hypothesis that lack of emotional awareness would be predicted by adolescent relationships with romantic partners. As with difficulties with overall emotion regulation abilities, there was no support found for the hypothesis that closest peers' reports of the quality of their relationships with the target teen's predicted lack emotional awareness. However, there was some limited support for the possibility that romantic partner-reported adolescent relationship quality might predict target teens lack of emotional awareness in young adulthood. Additionally, for relationships with close friends, although dyadic supportive behavior was not a significant predictor, dyadic behaviors promoting autonomy and the relationship were found to predict emotional awareness. For interactions with romantic partners, both dyadic supportive behaviors and dyadic behaviors promoting autonomy and the relationship were found to predict less lacking emotional awareness. Finally, limited evidence was found for close friendships that dyadic behaviors undermining autonomy and the relationship were predictive of lack of emotional awareness, but no association was found for exchanges with romantic partners.

Adolescent close friend-reported relationship quality, including teen's attachment to their friend and overall relationship quality, was not predictive of subsequent lack of emotional awareness, nor was romantic partner-reported positive relationship quality or use of positive conflict tactics. However, both romantic partner-reported *negative* relationship quality and use of *negative* conflict tactics were found to predict *lack of* emotional awareness in young adulthood. First, a marginal effect was found predicting lack of emotional awareness from negative relationship quality with a romantic partner, such that individuals whose relationships were marked by more negative qualities were found to have less emotional awareness as young adults. Similarly, a significant effect was found indicating that adolescents whose conflicts during adolescence were marked by the use of more negative conflict tactics, reported less emotional awareness as young adults.

This pattern of findings suggest that teens attachment to close friends and the presence or absence of high quality relationships with close friends and romantic partners may be less consequential to the development of emotional awareness than is the experience of poor quality relationships, or exposure to more negative experiences within relationships. Specifically it might be that the presence of high quality relationships or positive qualities within relationships has little to do with the development of emotional awareness, beyond that gained from other key relationships or socialization experiences, such as with parents. In contrast, negative quality relationships, and specifically use of negative conflict tactics may make more of an impression on adolescents, and those who have these experiences may learn to pay less attention to their feelings, or to place less value on how they are feeling in a relationship, as a form of protection against relationships marked by this negativity. Adolescents may learn to downplay or ignore their emotions in an attempt to preserve their perception that a romantic relationship is positive,

supportive, or that a romantic partner cares about them. Also important to consider is the possibility that adolescents with pre-existing deficits in emotional awareness may develop or have more negative interpersonal relationships that are highly negative in quality or in the use of maladaptive conflict tactics. Although this research did control for baseline abilities to repair one's negative emotions, this ability is not an exact analogue to emotional awareness, and thus it remains possible that pre-existing emotional awareness accounts for the poor quality relationships, rather than the other way around.

There was no indication that dyadic supportive behavior or negativity with close friends during adolescence would predict young adult lack of emotional awareness, however, dyadic supportive behavior within exchanges with romantic partners was found to be predictive of later emotional awareness. Adolescents whose exchanges with their romantic partners were marked by more support and less negativity were, as young adults, less lacking in emotional awareness, even after controlling for their baseline self-reported emotional repair abilities. This finding may indicate that adolescents who seek help or aid from their romantic partners, and experience warm, supportive, and engaged interactions, may learn from these exchanges that their feelings are important and valued, and may as a result grow into young adults who are themselves more aware of and responsive to their own emotional reactions and needs.

Further examination revealed a moderation of the above results by gender, such that although this pattern held true for both genders, males, more than females, whose adolescent romantic relationships were marked by warm and supportive exchanges in response to support-seeking, reported even higher levels of emotional awareness, relative to males whose exchanges were lacking this quality. It may be that boys benefit more than girls from warm, engaged, non-critical supportive interactions, because adolescent-male friendships may provide fewer

opportunities for such support (Rose & Rudolph, 2006), whereas girls may experience more warmth and opportunities to share their emotions about a difficult situation, without being perceived as “a wimp” or “too feminine”. Therefore while both genders may benefit from warm and engaged supportive interactions with romantic partners in adolescence, boys, more so than girls, may have more to gain from these types of exchanges.

Dyadic behaviors promoting autonomy and the relationship during exchanges with close friends and with romantic partners were both found to be predictive of less lacking young adult emotional awareness abilities, even after controlling for a baseline measure of emotion regulation abilities. This indicates that adolescents who experience relationships with friends and romantic partners wherein the discussion of a disagreement is undertaken in a way that allows and promotes both continued connection and individual ability to express oneself, one’s opinions, and one’s feelings, may be learning implicit lessons about the acceptability and importance of their emotions. The freedom and encouragement they may be given to explore their own thoughts and feelings without concern for losing an important relationship may help them to develop greater emotional awareness, as they move through adolescence into young adulthood.

For exchanges with both close friends and romantic partners, familial income was found to moderate the aforementioned associations with young adult emotional awareness. Specifically, adolescents from lower income families appeared to benefit even more from exchanges that were supportive of autonomy and the relationship, than did their peers from higher income families. As discussed previously, individuals from lower income backgrounds may have parents who work more and may therefore be less emotionally available, or when available may be less able to respond as flexibly due to fatigue or too many additional competing demands, and thus for these adolescents, relationships with friends and romantic partners may be more important. If

these relationships represent the primary experiences where as adolescents these individuals are able to express a different point of view and be met by a response that allows them to do so without fear of harming the relationship, than it would make sense that those with this experience may be more aware of their emotions in young adulthood.

There were no main effects found predicting young adult lack of emotional awareness from dyadic behaviors undermining autonomy and the relationship during an argument with a close friend or a romantic partner in adolescence. However, in exchanges with close friends, gender was found to moderate the association between dyadic behaviors undermining autonomy and relatedness during a disagreement and lack of emotional awareness in early adulthood. Specifically, it was found that for girls only, relationships marked by exchanges that were undermining of autonomy and the relationship, were associated with significantly less emotional awareness in young adulthood. It may be that adolescent girls, more so than boys, rely on their close friends for emotionally supportive interactions, and thus when their interactions lack this—such as when a disagreement with a close friend results in the sense that ones relationship is in danger, or that one's opinion or point-of-view is not valued—females may be more affected, as they might have a greater expectation that their relationships will provide these things (Rose & Rudolph, 2006).

It is important to note that the pattern of findings for emotional awareness is distinct from the pattern of findings for overall difficulties with emotion regulation abilities. Although no clear pattern emerged for any other subcomponents of difficulties with emotion regulation abilities, social relationships in adolescence do predict the other subcomponents in combination differently than when looking at emotional awareness in isolation. This suggests that social relationships may be most influential for the development of emotional awareness, but that they

may still contribute some to the development of some additional subcomponents of emotion regulation abilities.

Specific Emotion Regulation Strategies

In addition to examining the role adolescent close friendships and romantic relationships may play in the development of broader emotion regulation capability, this research was also concerned with the role of these relationships in young adult utilization of specific emotion regulation strategies, including cognitive reappraisal and expressive suppression. These two heavily studied emotion regulation strategies have been liked to various social, emotional, and cognitive outcomes, and thus gaining a better understanding of factors that may lead to their use could help with designing efforts to promote or limit their utilization. Results revealed that the use of cognitive reappraisal during emerging adulthood was not predicted by any aspects of observed exchanges with close friends, and no main effects were found when predicting from observations of dyadic behavior with romantic partners, however, gender was found to be a significant moderator of some romantic partner associations. Expressive suppression in young adulthood, conversely, was predicted by a variety of aspects of both close friend and romantic partner relationships in adolescence.

Cognitive Reappraisal

Cognitive reappraisal, an emotion regulation strategy that involves altering the emotional impact of a situation by thinking about that situation differently, was not predicted by any of the examined aspects of close peer relationships in adolescence. Similarly, it was not predicted by observed dyadic supportive behaviors or negativity between romantic partners in adolescence. Additionally, no main effects were found predicting cognitive reappraisal from either dyadic behaviors promoting or undermining autonomy and the relationship during a disagreement for

romantic partners. However, gender was found to significantly moderate these two associations. First, it was found that for men, but not women, dyadic behaviors promoting autonomy and the relationship during disagreements in adolescence predicted greater use of cognitive reappraisal in early adulthood. Similarly, it was again found that for men, but not women, dyadic behaviors undermining autonomy and the relationship during a disagreement in adolescence predicted less use of cognitive reappraisal.

This pattern of few significant predictors for cognitive reappraisal is suggestive of the possibility that mid- to late-adolescent broad socialization experiences are not very influential predictors of young adult use of cognitive reappraisal. It may be that cognitive reappraisal—more so than other strategies such as expressive suppression—is more explicitly taught and reinforced, such as by friends and partners explicitly suggesting alternative ways to think about upsetting situations. In both friendships and romantic relationships, overall support received, though perhaps important for other outcomes (Lewinsohn, Solomon, Seeley, & Zeiss, 2000; Wang & Eccles, 2012; Williams, Connolly, Pepler, & Craig, 2005), may be too indirectly related to the use of cognitive reappraisal to influence its use into early adulthood. Perhaps the socialization experiences that would contribute to the use of cognitive reappraisal, such as the encouragement adolescents get for considering alternative ways of thinking about emotionally difficult situations, would need to be examined separately to detect any potential role of the socialization for use of cognitive reappraisal. It is possible that re-examining dyadic behavior in the support-seeking task to look only at encouragement of alternative ways of thinking about emotionally evocative issues would be a more precise and stronger predictor than overall supportive behavior. Receipt of more general support (or not) from friends and romantic partners, may be more likely to relate to one's willingness to discuss difficult situations, or one's

perceptions that their emotions are important and valid, than it is to relate to one's tendencies to reframe one's experiences to change their emotional impact.

Behaviors during a disagreement that promote or undermine autonomy and the relationship, may have a stronger potential relationship with cognitive reappraisal, as a disagreement may provoke more of a need for self-regulation, and therefore the way disagreements and emotional reactions therein are handled and reacted to may be more directly socializing for use of cognitive reappraisal. The lack of findings for these behaviors in exchanges with close friends predicting cognitive reappraisal, may again reflect that whereas with emotional awareness and expressive suppression the overall tenor of these conversations and the attitudes towards emotions conveyed therein may provide important socialization, the experiences that provide socialization for use of cognitive reappraisal may have to be more directly similar, such as aspects of conversations more explicitly exploring different ways of thinking about the same situation. This may be particularly true in regards to friendships, because most adolescents have had various friendships by this age (Berndt & Hoyle, 1985; Rubin, Bowker, Booth-LaForce, Burgess, & Rose-Krasnor, 2006), and because the plurality of friendships allows most adolescents to turn to additional friends in the face of an argument with a single peer, at which those other friends might provide the necessary support in considering alternative ways of thinking about a situation. To some degree, this may also explain why behaviors during disagreements with romantic partners are less consequential for adolescent girls, as girls may be more likely to have close friends to turn to for support and encouragement of their use of cognitive reappraisal in the face of a disagreement with a romantic partner. Boys, in contrast, might not have close friendships that provide allow for the same degree of exploration of ways of thinking about emotional situations, and therefore the encouragement, or lack thereof,

they receive from romantic partners during a disagreement may be more directly related to their ability to explore different ways of thinking about potentially emotional situations, and therefore may be more influential for their use of cognitive reappraisal into early adulthood.

Expressive Suppression

In contrast to cognitive reappraisal, use of expressive suppression does appear to be predicted by a variety of aspects of close friendships and romantic partner relationships in adolescence. Adolescents whose closest peers reported that their relationship's with their friend were of high quality, and were marked by trust, communication, and lack of alienation, were, as young adults, less likely to engage in expressive suppression. This may be because adolescents who have high quality friendships, where they feel close to friends whom they feel they can trust and communicate openly with, may be—in the context of these relationships—receiving more encouragement and support for accepting and exploring their emotional reactions. Adolescents with high quality close friendships may be in relationships that are reinforcing of tendencies to accept and process emotional reactions, which may discourage the use of expressive suppression as an emotion regulation strategy in emerging adulthood.

Similarly, adolescents whose romantic partners reported greater dyadic use of positive conflict tactics, such as stating reasons for one's own point of view, taking part of the responsibility for an argument, or speaking calmly during a disagreement, also reported less use of expressive suppression in early adulthood. This finding indicates that experiences in adolescent romantic relationships where one is encouraged to express thoughts and feelings during a conflict, and doing so is not routinely aversive, but rather is experienced as respectful and encouraging, may result in individuals being more able and willing to embrace rather than suppress their emotional reactions in early adulthood. In examining this association further,

adolescents' family income was found to moderate this interaction. Specifically, it was found that for adolescents from low-income background, less dyadic positive conflict tactics with romantic partners in adolescence was predictive of greater levels of expressive suppression in emerging adulthood. As with previously discussed findings, this may indicate that adolescents from lower income backgrounds may be more sensitive to variations in the quality of their relationships with romantic partners, perhaps due to decreased parental emotion socialization due to parents who are more preoccupied with concerns of daily living, and may therefore have less time and energy to be emotionally supportive to their children.

Similar to the finding that high quality relationships with close friends predicted decreased expressive suppression, a marginal prediction was found from observed dyadic supportive behavior with close friends during adolescence to less use of expressive suppression in adulthood. Although this result is marginal, it again suggests that friends may serve as important agents of socialization, and that adolescents whose discussions of a problem or concern with their close peers are warm, supportive, and engaging, may be receiving reinforcement for acknowledging and working through their emotions, and thus may be less likely to suppress their emotional reactions in the future. Income was also found to significantly moderate this association, this time with adolescents from more affluent backgrounds appearing to potentially benefit the most from exchanges with close friends high on dyadic supportiveness, as evidenced by less utilization of expressive suppression in early adulthood. It is unclear why in this instance—when looking at relationships with close friends rather than romantic partners, the relationship with income appears to be the opposite of what has been found elsewhere in this body of work, and further research will be needed to gain a better understanding of this nuance.

In keeping with this same pattern of findings, exchanges with both close peers and romantic partners that were high on dyadic promotion of autonomy and relatedness in the face of a disagreement were found to predict less use of expressive suppression in emerging adulthood. This finding suggests that discussions of disagreements with friends and romantic partners which occur in such a way that adolescents expressions of their beliefs and concerns are experienced as relationship affirming, may also discourage them from pushing aside or ignoring their emotional experiences as a way to control them. Adolescents whose disagreements with important relationship partners are characterized by encouragement to share opinions and experiences, may be socialized by these experiences to believe that emotional reactions are acceptable and will be met with respect. In contrast, individuals without these positive experiences may be more hesitant to approach their emotional reactions, because it may be unclear to them how others will receive them, and as a result, they may tend more towards suppressing their emotional reactions.

Dyadic behaviors undermining autonomy and the relationship during disagreements with close peers and romantic partners were not found to predict subsequent expressive suppression in emerging adulthood. Similarly, no main effect was found for dyadic negativity during a support-seeking discussion in predicting use of expressive suppression in emerging adulthood. However, this association was significantly moderated by gender, such that boys, but not girls, whose support-seeking exchanges with close friends that were marked by greater dyadic negativity, engaged in greater expressive suppression as young adults. This result suggests that adolescent boys may be more sensitive to negativity in their close friendships, and that when adolescent boys turn to friends for help or support and are met by hostility, criticism, or annoyance, that this may lead them to shy away from their emotional experiences, and instead suppress their emotional reactions instead, so as to avoid such negativity. As discussed with some previous

findings, the gendered pattern of these results may be related to variations within our culture for the acceptance of vulnerability as well as some emotions, such as sadness or anxiety, for males versus females. Because it is already often seen as less acceptable for males to act in a way that might be perceived as vulnerable or "emotional", males may be more sensitive to negativity in discussions of their concerns, and any negativity might therefore leave a stronger impression for them, making them less likely to express their emotions in the future.

Self vs. Social Regulation of Emotion

Along with examining the role adolescent close friendships and romantic relationships may play in the development of emotion regulation abilities and strategies, an additional aim of this research was to explore the role of these relationships in young adult social regulation of emotion. Specifically examined was self versus social regulation of threat reactivity in three areas of the brain chosen for their known associations with the self-regulation of emotion; the dlPFC, OFC, and ACC. Benefit gained from social regulation of emotion has been found to be moderated by various social and relational factors such as experience of physical abuse during childhood or maternal support in adolescence (Coan, Beckes, & Allen, 2013; Gonzalez, Beckes, Chango, Allen, Coan, 2015; Pollak & Sinha, 2002), but the question remained whether adolescent peer and romantic relationships—often thought of as central to this stage of development—moderated an individuals ability to benefit from social regulation of emotion in early adulthood. Results revealed that differences in threat-related reactivity between alone and partner conditions in the three areas of interest were not moderated by an individuals experience of dyadic behaviors promoting autonomy and the relationship or undermining autonomy and the relationship with either close peers or romantic partners in adolescence. However, results indicated that for both close peer and romantic relationships, individuals' adolescent experience

with dyadic supportive behavior with a partner did moderate differences in threat-related reactivity between alone and partner conditions in some areas of interest.

Specifically, as observed in the ACC only, greater dyadic supportive behavior in interactions with the close peer corresponded with less threat-related activation during friend hand holding relative to the alone condition. As the ACC is thought to be involved in the emotional reaction to pain and emotional awareness, reduced ACC activation in the handholding condition for individuals whose adolescent romantic partners were more supportive may indicate that these individuals are benefiting from the presence of a partner—or the social regulation of emotional reactivity—in that they may be experiencing the threat of shock as less emotionally evocative when a partner is present. The presence of a close social partner—for these individuals who have learned that close social partners can be sources of support—appears to result in less ACC activation due to social regulation, and thus less of a need for self-regulation of emotion, after the fact.

Similarly, for romantic partner dyadic supportive behaviors, the hypothesized interaction was observed in the OFC with greater dyadic supportive behavior in exchanges with the romantic partner corresponding with less threat-related activation during partner hand holding relative to the alone condition. This reduced reactivity in the OFC—an area which is involved in signaling the expectation of rewards and punishments—indicates that individuals whose close peers were more supportive during adolescence may benefit from social regulation and experience the threat of shock as less aversive when holding a relational partners hand, than when alone. It is possible that the presence of their partner results in them having less of an expectation that the shock will be aversive—resulting in less OFC activation—and indicating that as a result, they may receive more benefit from social regulation than do individuals whose

close peers were less supportive during adolescence. No additional moderations for dyadic supportive behavior with close peer or romantic partner were found.

One possibility for the null findings in regards to dyadic behaviors promoting and undermining autonomy and the relationship across both peer and romantic relationships may be that the behaviors in question—as compared to the supportive behavior which was found to moderate reactivity in some instances—may be less related to the specific task used to measure social regulation. Specifically, self vs. social regulation was assessed by measuring reactivity to threat when an individual was explicitly receiving no "support" versus when an individual was receiving social "support"—in the form of handholding— from a close friend or romantic partner. It may be that although adolescent experience with dyadic behaviors promoting and undermining autonomy and the relationship with close friends and romantic partners might have some influence on how individuals view friendships going forward, they do not significantly influence an individuals sense that relational partners will be helpful in supporting them in times of need.

In contrast, dyadic supportive behaviors during adolescence may be more directly relevant to an individuals sense that a relational partner's presence will be beneficial, and thus these experiences may more significantly moderate reactivity, even years later. Individuals whose adolescent interactions with their close friends and romantic partners leave them with a sense that their relational partner is there to support them, and will help them out in times of need may from these experiences generalize that relational partners can be counted on in times of need for support or assistance. As such, they may eventually be put more at ease by the presence or availability of relational partners, than would individuals whose experiences have not led them to the same conclusions.

Although there was some support in this research for social mediation of affect regulation as predicted by the supportive behavior task in the OFC and ACC, there was no evidence for the same in the dlPFC. This research's inclusion of the dlPFC as an area of interest was predicated on the dlPFC's role en effortful control, which is thought to be important for effective self-regulation, but less important in social regulation (Banfield, et al., 2004; Coan, Schaefer & Davidson, 2006). As such, it would be expected that when individuals are able to rely on social regulation of emotion—and less reliant on self-regulation and accessing their own resources for emotion regulation, that the dlPFC would be less activated. The null findings in this research may suggest that that despite other neural differences in social and self-regulation seen in this research, that the expected differences in effortful control were not present, and that this mechanism may not be as differentially important in self- vs social regulation of emotion as previously believed.

Some limitations specific to the neuroimaging findings on self- versus social-regulation of emotion are important to note. First of all, these findings are specific to self- versus social-regulation of threat reactivity, and although this is a well-accepted paradigm (Coan, Beckes, & Allen, 2013; Coan, Schaefer, Davidson, 2006), it may be that these findings do not generalize to the regulation of other emotional experiences. Additionally, the very small sample size of individuals with both romantic partner observational data and neuroimaging data for the romantic partner data subset may have limited this research's ability to reach significant conclusions, and simultaneously, suggest that the conclusions reached should be interpreted with caution. Given the small sample size and this research utilized a conservative exploratory approach, namely in the use of theoretically determined a-priori ROI's, and the fact that all findings were constrained to a significance level of $p < .005$, to better differentiate signal from

noise in these results. However, the novelty of these findings—specifically the use of a diverse community sample followed from adolescence through early adulthood, with both observational and neuroimaging data—cannot be overstated, and thus despite the small sample size, these findings represent exploratory findings suggesting that this may be a rich area for future research.

Emotion Regulation and Concurrent Psychosocial Functioning

One reason that understanding the etiology of emotional functioning and emotion regulation in particular is so important is the associations that have been found between emotion regulation and various mental health outcomes (e.g., Amstadter, 2008; Axelrod, Perepletchikova, Holtzman, & Sinha, 2011; Gratz & Roemer, 2008). In this sample, when considering self-reported internalizing symptoms and problematic substance use, only overall emotion regulation abilities were a significant predictor of concurrent outcomes. Specifically, overall emotion regulation abilities were significant predictors of concurrent problems due to alcohol, as well as use of hard drugs. Emotional awareness, cognitive reappraisal, and expressive suppression were not found to be associated with internalizing or substance use outcomes.

There are a number of potential explanations for this. First, it may be that the specific outcomes measured may not be strongly linked to concurrent emotion regulation, and instead, both internalizing symptoms and substance use often represent long-term patterns, that earlier emotion regulation abilities and tendencies would better predict these outcomes. Another possibility is, the finding that only overall emotion regulation abilities predict concurrent problems due to alcohol use and use of hard drugs may reflect the fact that these outcomes are more predicted by overall emotion regulation, as opposed to specific sub-abilities or strategies. Finally, it is important to note that this is a community sample, and as such, it might be that overall functioning is too normative, and that in a clinical sample which would be more

symptomatic in terms of internalizing or where there might be greater substance use concerns, that various indices of emotion regulation abilities and strategies might serve as a better predictor of outcomes.

Implications and Future Directions

Altogether, these results paint a picture suggesting that some aspects of adolescent close friendships and romantic relationships may be consequential in terms of long-term emotion regulation outcomes. Various measures of relationship quality, as well as observations of some discrete dyadic behaviors within emotionally evocative exchanges were found to predict various facets of later emotion regulation. One pattern that became evident throughout these findings was that adolescent friendships and romantic relationships appeared to be much more strongly related to emotional awareness and expressive suppression than they were to broader emotion regulation abilities or cognitive reappraisal. This suggests that although adolescent social relationships have some implications for other aspects of emotion regulation and emotion regulation more broadly, they may be particularly important for the development of how cognizant individuals are of their emotional experiences, and relatedly, the degree to which individuals attempt to quash or quell that experience.

Another pattern to emerge was that observational measures of discrete dyadic behaviors in both friendships and romantic relationships were more robust predictors of future emotion regulation outcomes than were relational partner's reports of relationship quality. Only a small handful of emotional awareness and expressive suppression outcomes were predicted by partner-reported relationship quality. Relational partner's reports of quality were specifically chosen over self-reports of the same measures to avoid potential biases inherent in relying only on self-reported data. However it may be that peer-reports better reflect the degree to which only the

target teen is warm and accepting of the relational partners emotions, and thus don't fully capture what the adolescent receives back in turn. Future research could examine whether combining relational partner and adolescent self-report of relationship quality yields a better prediction of young adult emotion regulation. Similarly, it may be that observational measures capture a fuller or richer picture of these relationships, and that the specific behaviors examined in these interactions—namely supportive behavior, negativity, and behaviors supporting or undermining autonomy and relatedness—may be more consequential in the development of emotion regulation than broadly measured relationship quality. Specifically, it may be that adolescents' understanding that their emotions are manageable, sensible and acceptable is developed—much like attachment in infancy—in part as an emergent property of the how their emotions are responded to in interpersonal interactions (Ainsworth, 1979; Ainsworth & Bowlby1991).

There were a number of results in this research moderated by gender or income, and across almost all predictors and outcomes, the relationships between adolescent social relationships and emotion regulation outcomes were stronger for males than for females, and for less affluent rather than more affluent individuals. For most of the interactions where adolescent social relationships were stronger predictors of young adult emotion regulation for males more so than females, the social relationship that was a more influential along these gender lines was the relationship with the romantic partner. This suggests that boys, more so than girls, may rely on their romantic partners for support or encouragement of their emotional expression. For boys, the provision or lack of this encouragement in adolescent romantic relationships—as evidenced by the dyadic behaviors examined in these findings—may be more consequential perhaps because unlike girls boys may not get much support for their emotionality in their platonic relationships. This is consistent with other research findings that suggest females same-sex

friendships are more close and cohesive, and involve more self disclosure, all of which would seem to facilitate more support of emotionality (Johnson, 2004; Rose & Rudolph, 2006). In regards to income, as discussed previously, the finding that the development of emotion regulation for adolescents from less affluent backgrounds appears more strongly related to their social relationships may be a reflection of the fact that these adolescents may have parent's whose energy may be more depleted by the quest for financial security, and thus might be less available or have less energy to nurture the development of their teen's emotion regulation. This fits well with research on resiliency, which indicates having a larger support network—with support from individuals outside of your family, such as friends, teachers and neighbors, is often a significant predictor of greater resiliency (Colarossi & Eccles, 2003; Rosenfeld, & Richman, 2003). Future research controlling for adolescents' relationships and interactions with their parents, or even looking at single-parent versus dual-parent households, may help to clarify this pattern.

Finally, this research failed to identify any aspects of emotion regulation as broadly consequential to the prediction of concurrent psychopathology, and particularly to any internalizing symptoms. Although overall emotion regulation abilities were associated with problems due to alcohol and use of hard drugs, no other concurrent associations were found between emotion regulation and current psychopathology. This may suggest that for internalizing difficulties in particular, the emotion regulation abilities and strategies examined in this dissertation may be less consequential than other non-examined abilities or strategies (e.g., non-acceptance of emotional reactions, limited range of emotion regulation strategies, or ruminative coping) for current emotional functioning. However, it is also important to note that this is a community sample, not an at-risk sample, and thus it may be that there was not enough variance

in the psychopathology outcomes for consequential differences based on emotion regulation to be detected.

Limitations and Conclusions

A number of limitations should be kept in mind when interpreting these results. First, although this study is longitudinal and assessed relative changes in several constructs over time, there were not baseline measures of the exact outcome variables, so while emotion regulation broadly speaking was controlled for at baseline using adolescent emotional repair, the exact constructs of interest were not controlled for, due to not being measured at baseline. More broadly it is of note that this longitudinal design can only potentially disconfirm, but cannot directly confirm the presence of hypothesized causal pathways from social relationships to future emotion regulation. For example, it remains possible that the links between dyadic supportive behavior with the romantic partner and emotional awareness identified here were actually mediated by a third unmeasured variable that influenced both adolescent social relationships and future emotion regulation.

Additionally, although the sample size allowed for the detection of significant effects of social relationships, there may not have been enough power to detect all possible effects within the data. This may be particularly true in regards to romantic relationships, where the sample size was particularly limited by the requirement that participant be in sustained romantic relationships long enough to be eligible for participation in that aspect of this research. As such, future endeavors should continue to investigate the role of adolescent romantic relationships in predicting future emotion regulation, with larger samples. The current sample is also not a clinical sample and as such, it remains unknown how individuals falling at the extremes in terms of the quality of their social relationships or their emotion regulation functioning may fare. Also,

it is notable that many analyses were attempted, with overall few significant results emerging. Although this does represent a potential limitation, because little research has investigated the associations between adolescent relationships and subsequent emotion regulation, much of this work was exploratory in nature, and future research should investigate these same questions in order to provide confirmatory patterns. Finally, it may be important to look further back in development to see if social relationships even earlier in adolescence (particularly romantic experiences) continue to predict young adult emotion regulation, or if adolescent social relationships predict emotion regulation beyond emerging adulthood.

The emerging picture suggests that adolescent's relationships with their peers and romantic partners may provide important socialization of emotion regulation that contributes to young adult emotion regulation. This appears to be particularly true in regards to the way adolescents engage with each other during potentially emotional interactions, as well as when considering the development of emotional awareness and expressive suppression. Although in some instances the link between adolescent social relationships and young adult emotion regulation appears stronger for males and those from less affluent backgrounds, the overall pattern of findings does suggest that adolescent social relationships may play an important role in the development of broad emotion regulation. Future research should continue to explore the role that adolescents' social relationships have on their emotion regulation, and work to elucidate more broadly the precise mechanisms by which this ability may relate to future emotional development.

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Appendix A -
Difficulties with Emotion Regulation Scale

Please read each item below and indicate to what extent you feel the statement describes you.

	Almost Never	Sometimes	About Half the Time	Most of the Time	Almost Always
1. I am clear about my feelings.	1	2	3	4	5
2. I pay attention to how I feel.	1	2	3	4	5
3. I experience my emotions as overwhelming and out of control.	1	2	3	4	5
4. I have no idea how I am feeling.	1	2	3	4	5
5. I have difficulty making sense out of my feelings.	1	2	3	4	5
6. I am attentive to my feelings.	1	2	3	4	5
7. I know exactly how I am feeling.	1	2	3	4	5
8. I care about what I am feeling.	1	2	3	4	5
9. I am confused about how I feel.	1	2	3	4	5
10. When I'm upset, I acknowledge my emotions.	1	2	3	4	5
11. When I'm upset, I become angry with myself of feeling that way.	1	2	3	4	5
12. When I'm upset, I become embarrassed for feeling that way.	1	2	3	4	5
13. When I'm upset, I have difficulty getting work done.	1	2	3	4	5
14. When I'm upset, I become out of control.	1	2	3	4	5
15. When I'm upset, I believe that I will remain that way for a long time.	1	2	3	4	5
16. When I'm upset, I believe that I'll end up feeling very depressed.	1	2	3	4	5
17. When I'm upset, I believe that my feelings are valid and important.	1	2	3	4	5
18. When I'm upset, I have difficulty focusing on other things.	1	2	3	4	5
19. When I'm upset, I feel out of control.	1	2	3	4	5
20. When I'm upset, I can still get things done.	1	2	3	4	5
21. When I'm upset, I feel ashamed with myself for feeling that way.	1	2	3	4	5
22. When I'm upset, I know that I can find a way to eventually feel better.	1	2	3	4	5

23. When I'm upset, I feel like I am weak.	1	2	3	4	5
24. When I'm upset, I feel like I can remain in control of my behaviors.	1	2	3	4	5
25. When I'm upset, I feel guilty for feeling that way.	1	2	3	4	5
26. When I'm upset, I have difficulty concentrating.	1	2	3	4	5
27. When I'm upset, I have difficulty controlling my behaviors.	1	2	3	4	5
28. When I'm upset, I believe that there is nothing I can do to make myself feel better.	1	2	3	4	5
29. When I'm upset, I become irritated with myself for feeling that way.	1	2	3	4	5
30. When I'm upset, I start to feel very bad about myself.	1	2	3	4	5
31. When I'm upset, I believe that wallowing in it is all I can do.	1	2	3	4	5
32. When I'm upset, I lose control over my behaviors.	1	2	3	4	5
33. When I'm upset, I have difficulty thinking about anything else.	1	2	3	4	5
34. When I'm upset, I take time to figure out what I'm really feeling.	1	2	3	4	5
35. When I'm upset, it takes me a long time to feel better.	1	2	3	4	5
36. When I'm upset, my emotions feel overwhelming.	1	2	3	4	5

Appendix B
Emotion Regulation Questionnaire

The following statements are about your <u>emotional experience</u>, or what you feel like inside and your <u>emotional expression</u>, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. Please check one box for each item to indicate how much you agree or disagree.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral / Mixed	Somewhat Agree	Agree	Strongly Agree
1. When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.	☐	☐	☐	☐	☐	☐	☐
2. I keep my emotions to myself.	☐	☐	☐	☐	☐	☐	☐
3. When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.	☐	☐	☐	☐	☐	☐	☐
4. When I am feeling positive emotions, I am careful not to express them.	☐	☐	☐	☐	☐	☐	☐
5. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.	☐	☐	☐	☐	☐	☐	☐
6. I control my emotions by not expressing them.	☐	☐	☐	☐	☐	☐	☐
7. When I want to feel more positive emotion, I change the way	☐	☐	☐	☐	☐	☐	☐

I'm thinking about the situation.							
8. I control my emotions by changing the way I think about the situation I'm in.	☐	☐	☐	☐	☐	☐	☐
9. When I am feeling negative emotions, I make sure not to express them.	☐	☐	☐	☐	☐	☐	☐
10. When I want to feel less negative emotion, I change the way I'm thinking about the situation.	☐	☐	☐	☐	☐	☐	☐

Appendix C

Inventory of Parent and Peer Attachments (Peer Version)

	Not True	Usually Not True	Sometimes True, Sometimes Not	Usually True	Almost Always True
1. I like to get my friend's point of view on things I'm concerned about.	1	2	3	4	5
2. My friend can tell when I'm upset about something.	1	2	3	4	5
3. When we discuss things, my friend cares about my point of view.	1	2	3	4	5
4. Talking over my problems with my friend makes me feel ashamed or foolish.	1	2	3	4	5
5. I wish I had a different friend.	1	2	3	4	5
6. My friend understands me.	1	2	3	4	5
7. My friend helps me to talk about my difficulties.	1	2	3	4	5
8. My friend accepts me as I am.	1	2	3	4	5
9. I feel the need to be in touch with my friend more often.	1	2	3	4	5
10. My friend doesn't understand what I'm going through these days.	1	2	3	4	5
11. I feel alone or apart when I'm with my friend.	1	2	3	4	5
12. My friend listens to what I have to say.	1	2	3	4	5
13. I feel my friend is a good friend.	1	2	3	4	5
14. My friend is fairly easy to talk to.	1	2	3	4	5
15. When I am angry about something, my friend tries to listen.	1	2	3	4	5
16. My friend helps me to understand myself better.	1	2	3	4	5
17. My friend cares about how I am.	1	2	3	4	5
18. I feel angry with my friend.	1	2	3	4	5
19. I can count on my friend when I need to get something off my chest.	1	2	3	4	5
20. I trust my friend.	1	2	3	4	5
21. My friend respects my feelings.	1	2	3	4	5
22. I get upset a lot more than my friend knows about.	1	2	3	4	5
23. It seems as if my friend is irritated with me for no reason.	1	2	3	4	5
24. I can tell my friend about my	1	2	3	4	5

problems and troubles.					
25. If my friend knows something is bothering me, he/she asks me about it.	1	2	3	4	5

Appendix D –
Friendship Quality Questionnaire

	Not At All True	A Little True	Somewhat True	Pretty True	Really True
1. We always spend free time at school together.	1	2	3	4	5
2. We get mad at each other a lot.	1	2	3	4	5
3. (S)he tells me I am good at things.	1	2	3	4	5
4. (S)he sticks up for me if others talk behind my back.	1	2	3	4	5
5. We make each other feel important and special.	1	2	3	4	5
6. We always pick each other as partners for things.	1	2	3	4	5
7. (S)he says "I'm sorry" if she hurts my feelings.	1	2	3	4	5
8. (S)he sometimes says mean things about me to other kids.	1	2	3	4	5
9. (S)he has good ideas about things to do.	1	2	3	4	5
10. We talk about how to get over being mad at each other.	1	2	3	4	5
11. (S)he would like me even if others didn't.	1	2	3	4	5
12. (S)he tells me I am pretty smart.	1	2	3	4	5
13. We always tell each other our problems.	1	2	3	4	5
14. (S)he makes me feel good about my ideas.	1	2	3	4	5
15. I talk to her when I'm mad about something that happened to me.	1	2	3	4	5
16. We help each other with chores a lot.	1	2	3	4	5
17. We do special favors for each other.	1	2	3	4	5
18. We do fun things together a lot.	1	2	3	4	5
19. We argue a lot.	1	2	3	4	5
20. We can count on each other to keep promises.	1	2	3	4	5
21. We go to each other's houses.	1	2	3	4	5
22. We always play together or hang out together.	1	2	3	4	5
23. (S)he gives me advice with figuring things out.	1	2	3	4	5

24. We talk about the things that make us sad.	1	2	3	4	5
25. We make up easily when we have a fight.	1	2	3	4	5
26. We fight a lot.	1	2	3	4	5
27. We talk about how to make ourselves feel better if we are mad at each other.	1	2	3	4	5
28. We share things with each other.	1	2	3	4	5
29. (S)he does not tell others my secrets.	1	2	3	4	5
30. We bug each other a lot.	1	2	3	4	5
31. We come up with good ideas on ways to do things.	1	2	3	4	5
32. We loan each other things all the time.	1	2	3	4	5
33. (S)he helps me so I can get done quicker.	1	2	3	4	5
34. We get over our arguments really quickly.	1	2	3	4	5
35. We count on each other for good ideas on how to get things done.	1	2	3	4	5
36. (S)he doesn't listen to me.	1	2	3	4	5
37. We tell each other private things.	1	2	3	4	5
38. We help each other with schoolwork a lot.	1	2	3	4	5
39. We tell each other secrets.	1	2	3	4	5
40. (S)he cares about my feelings.	1	2	3	4	5

Appendix E
Network of Relationships Inventory

We are interested in the different kinds of things young adults experience in romantic relationships. Please answer the following questions as they relate to ###. Please check the box that best describes your relationship:

	Never/ None	A Little	Somewhat	Quite a Bit	Extremely Much
1. How much free time do you spend with this person?	☐	☐	☐	☐	☐
2. How much do you play around and have fun with this person?	☐	☐	☐	☐	☐
3. How often do you go places and do enjoyable things with this person?	☐	☐	☐	☐	☐
4. How much do you and this person get upset with or mad at each other?	☐	☐	☐	☐	☐
5. How much do you and this person disagree and quarrel?	☐	☐	☐	☐	☐
6. How much do you and this person argue with each other?	☐	☐	☐	☐	☐
7. How much does this person teach you how to do things that you don't know how to do?	☐	☐	☐	☐	☐
8. How much does this person help you figure out or fix things?	☐	☐	☐	☐	☐
9. How often does this person help you when you need to get something done?	☐	☐	☐	☐	☐
10. How much do you and this person get on each other's nerves?	☐	☐	☐	☐	☐
11. How much do you and this person get annoyed with each other's behavior?	☐	☐	☐	☐	☐
12. How much do you and this person hassle or nag each other?	☐	☐	☐	☐	☐
13. How much do you talk about everything with this person?	☐	☐	☐	☐	☐
14. How much do you share your secrets and private feelings with this person?	☐	☐	☐	☐	☐
15. How much do you talk to this person about things that you don't want others to know?	☐	☐	☐	☐	☐
16. How much do you help this person with things s/he can't do by him/herself?	☐	☐	☐	☐	☐

17. How much do you protect and look out for this person?	☐	☐	☐	☐	☐
18. How much do you take care of this person?	☐	☐	☐	☐	☐
19. How much does this person like or love you?	☐	☐	☐	☐	☐
20. How much does this person really care about you?	☐	☐	☐	☐	☐
21. How much of a strong feeling of affection (loving or liking) does this person have toward you?	☐	☐	☐	☐	☐
22. How much does this person treat you like you're admired or respected?	☐	☐	☐	☐	☐
23. How much does this person treat you like you're good at many things?	☐	☐	☐	☐	☐
24. How much does this person like or approve of the things you do?	☐	☐	☐	☐	☐
25. How much do you tell the other person what to do (more than they tell you what to do)?	☐	☐	☐	☐	☐
26. Between you and this person, how much do you tend to be the boss in the relationship?	☐	☐	☐	☐	☐
27. In your relationship with this person, how much do you tend to take charge and decide what should be done?	☐	☐	☐	☐	☐
28. How sure are you that this relationship will last no matter what?	☐	☐	☐	☐	☐
29. How sure are you that your relationship will last in spite of fights?	☐	☐	☐	☐	☐
30. How sure are you that your relationship will continue in the years to come?	☐	☐	☐	☐	☐
31. How often do you turn to this person for support with personal problems?	☐	☐	☐	☐	☐
32. How often do you depend on this person for help, advice, or sympathy?	☐	☐	☐	☐	☐
33. When you are feeling down or upset, how often do you depend on this person to cheer you up?	☐	☐	☐	☐	☐
34. How often does this person point out your faults or put you down?	☐	☐	☐	☐	☐

35. How often does this person criticize you?	☐	☐	☐	☐	☐
36. How often does this person say mean or harsh things to you?	☐	☐	☐	☐	☐
37. How often does this person get his/her way when you two do not agree about what to do?	☐	☐	☐	☐	☐
38. How often does this person end up being the one who makes the decisions for both of you?	☐	☐	☐	☐	☐
39. How often does this person get you to do things his/her way?	☐	☐	☐	☐	☐
40. How satisfied are you with your relationship with this person?	☐	☐	☐	☐	☐
41. How good is your relationship with this person?	☐	☐	☐	☐	☐
42. How happy are you with the way things are between you and this person?	☐	☐	☐	☐	☐
43. How much does this person punish you?	☐	☐	☐	☐	☐
44. How much does this person discipline you for disobeying him/her?	☐	☐	☐	☐	☐
45. How much does this person scold you for doing something you are not supposed to do?	☐	☐	☐	☐	☐

Appendix F

Conflict in Relationships

The following questions ask you about things that may have happened to you and ### while you were having an argument. Check the box that is your best guess as to how often these things have happened IN THE PAST YEAR. Please remember that all answers are confidential.

During a conflict/argument in the past year:	Never Happened	1-2 times	3-5 times	6+ times
1. I gave reasons for my side of the argument.	☐	☐	☐	☐
2. My partner gave reasons for his/her side of the argument.	☐	☐	☐	☐
3. I touched my partner sexually when he/she didn't want me to.	☐	☐	☐	☐
4. My partner touched me sexually when I didn't want him/her to.	☐	☐	☐	☐
5. I tried to turn my partner's friend against him/her.	☐	☐	☐	☐
6. My partner tried to turn my friends against me.	☐	☐	☐	☐
7. I did something to make my partner feel jealous.	☐	☐	☐	☐
8. My partner did something to make me feel jealous.	☐	☐	☐	☐
9. I destroyed or threatened to destroy something my partner valued.	☐	☐	☐	☐
10. My partner destroyed or threatened to destroy something I valued.	☐	☐	☐	☐
11. I told my partner that I was partly to blame.	☐	☐	☐	☐
12. My partner told me that he/she was partly to blame.	☐	☐	☐	☐
13. I brought up something bad that my partner had done in the past.	☐	☐	☐	☐
14. My partner brought up something bad that I had done in the past.	☐	☐	☐	☐
15. I threw something at my partner.	☐	☐	☐	☐
16. My partner threw something at me.	☐	☐	☐	☐
17. I said things just to make my partner angry.	☐	☐	☐	☐
18. My partner said things just to make me angry.	☐	☐	☐	☐
19. I gave reasons why I thought my partner was wrong.	☐	☐	☐	☐

20. My partner gave me reasons why he/she thought I was wrong.	☐	☐	☐	☐
21. I agreed that my partner was partly right.	☐	☐	☐	☐
22. My partner agreed that I was partly right.	☐	☐	☐	☐
23. I spoke to my partner in a hostile or mean tone of voice.	☐	☐	☐	☐
24. My partner spoke to me in a hostile or mean tone of voice.	☐	☐	☐	☐
25. I forced my partner to have sex when he/she didn't want to.	☐	☐	☐	☐
26. My partner forced me to have sex when I didn't want to.	☐	☐	☐	☐
27. I offered a solution that I thought would make us both happy.	☐	☐	☐	☐
28. My partner offered a solution that he/she thought would make us both happy.	☐	☐	☐	☐
29. I threatened my partner in an attempt to have sex with him/her.	☐	☐	☐	☐
30. My partner threatened me in an attempt to have sex with me.	☐	☐	☐	☐
31. I put off talking until we calmed down.	☐	☐	☐	☐
32. My partner put off talking until we calmed down.	☐	☐	☐	☐
33. I insulted my partner with put downs.	☐	☐	☐	☐
34. My partner insulted me with put downs.	☐	☐	☐	☐
35. I discussed the issue calmly.	☐	☐	☐	☐
36. My partner discussed the issue calmly.	☐	☐	☐	☐
37. I kissed my partner when he/she didn't want me to.	☐	☐	☐	☐
38. My partner kissed me when I didn't want him/her to.	☐	☐	☐	☐
39. I said things to my partner's friend about him/her to turn them against him/her.	☐	☐	☐	☐
40. My partner said things to my friends about me to turn them against me.	☐	☐	☐	☐
41. I ridiculed or made fun of my partner in front of others.	☐	☐	☐	☐
42. My partner ridiculed me or made fun of me in front of others.	☐	☐	☐	☐
43. I told my partner how upset I was.	☐	☐	☐	☐

44. My partner told me how upset he/she was.	☐	☐	☐	☐
45. I kept track of who my partner was with and where he/she was.	☐	☐	☐	☐
46. My partner kept track of who I was with and where I was.	☐	☐	☐	☐
47. I blamed my partner for the problem.	☐	☐	☐	☐
48. My partner blamed me for the problem.	☐	☐	☐	☐
49. I kicked, hit, or punched my partner.	☐	☐	☐	☐
50. My partner kicked, hit or punched me.	☐	☐	☐	☐
51. I left the room to cool down.	☐	☐	☐	☐
52. My partner left the room to cool down.	☐	☐	☐	☐
53. I gave in, just to avoid conflict.	☐	☐	☐	☐
54. My partner gave in, just to avoid conflict.	☐	☐	☐	☐
55. I accused my partner of flirting with another person.	☐	☐	☐	☐
56. My partner accused me of flirting with another person.	☐	☐	☐	☐
57. I deliberately tried to frighten my partner.	☐	☐	☐	☐
58. My partner deliberately tried to frighten me.	☐	☐	☐	☐
59. I slapped my partner or pulled his/her hair.	☐	☐	☐	☐
60. My partner slapped me or pulled my hair.	☐	☐	☐	☐
61. I threatened to hurt my partner.	☐	☐	☐	☐
62. My partner threatened to hurt me.	☐	☐	☐	☐
63. I threatened to end the relationship.	☐	☐	☐	☐
64. My partner threatened to end the relationship.	☐	☐	☐	☐
65. I threatened to hit my partner or throw something at him/her.	☐	☐	☐	☐
66. My partner threatened to hit me or throw something at me.	☐	☐	☐	☐
67. I pushed, shoved or shook my partner.	☐	☐	☐	☐
68. My partner pushed, shoved or shook me.	☐	☐	☐	☐
69. I spread rumors about my partner.	☐	☐	☐	☐

70. My partner spread rumors about me.	☐	☐	☐	☐

Appendix G
Adult Self Report
(Although the entire measure was given, only items that fall under the "Internalizing" scale are reproduced below)

Below is a list of items that describe people. For each item, please check the box that best describes yourself *over the past six months.* Please answer <u>all</u> items as well as you can, even if some do not seem to apply to you.

	Not True	Somewhat True or Sometimes True	Very True or Often True
12. I feel lonely.	☐	☐	☐
14. I cry a lot.	☐	☐	☐
25. I don't get along with other people.	☐	☐	☐
30. My relationships with the opposite sex are poor.	☐	☐	☐
31. I am afraid I might think or do something bad.	☐	☐	☐
33. I feel that no one loves me.	☐	☐	☐
34. I feel that others are out to get me.	☐	☐	☐
35. I feel worthless or inferior.	☐	☐	☐
42. I would rather be alone than with others.	☐	☐	☐
45. I am nervous or tense.	☐	☐	☐
47. I lack self-confidence.	☐	☐	☐
48. I am not liked by others.	☐	☐	☐
50. I am too fearful or anxious.	☐	☐	☐
51. I feel dizzy or lightheaded.	☐	☐	☐
52. I feel too guilty.	☐	☐	☐
54. I feel tired without good reason.	☐	☐	☐
56. Physical problems ***without known medical cause:***			
56a. Aches or pains (***not*** stomach or headaches)	☐	☐	☐
56b. Headaches	☐	☐	☐
56c. Nausea, feel sick	☐	☐	☐
56d. Problems with eyes (***not*** if corrected by glasses)	☐	☐	☐
56e. Rashes or other skin problems	☐	☐	☐
56f. Stomachaches	☐	☐	☐
56g. Vomiting, throwing up	☐	☐	☐
60. There is very little that I enjoy.	☐	☐	☐
65. I refuse to talk.	☐	☐	☐
67. I have trouble making or keeping friends.	☐	☐	☐
69. I am secretive or keep things to myself.	☐	☐	☐
71. I am self-conscious or easily embarrassed.	☐	☐	☐
103. I am unhappy, sad, or depressed.	☐	☐	☐
107. I feel that I can't succeed.	☐	☐	☐

111. I keep from getting involved with others.	☐	☐	☐
112. I worry a lot.	☐	☐	☐

Appendix H
Alcohol and Drug use Questionnaire
(Only the "Total Problems" score, which is the sum of Item 8, will be used for this study)

Please answer the following questions. Remember that all of your answers are confidential. Please skip any questions you can't answer truthfully.
In the following questions, a "drink" is defined as a can or bottle of beer, a glass of wine or a wine cooler, a shot of liquor, or a mixed drink with liquor in it. Those times when you had only a sip or two from a drink are not considered consumption.

1. Have you ever tried alcohol (beer, wine, wine coolers, or liquor)? This does not include when you have a sip of alcohol, or on a special occasion at home.

☐ Yes ☐ No **(If NO skip to #2)**

1a. During the past 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?
- ☐ 0 days
- ☐ 1 or 2 days
- ☐ 3 to 9 days
- ☐ 10 or more days

1b. During the past 30 days, how many times did you drink so much alcohol that you were really drunk?
- ☐ 0 times
- ☐ 1 or 2 times
- ☐ 3 to 9 times
- ☐ 10 or more times

1c. On the days that you drank during the past 30 days, how many drinks did you usually have?
- ☐ Less than one drink
- ☐ 2 drinks
- ☐ 3 drinks
- ☐ 4 drinks
- ☐ 5 or more drinks

1d. During the past 30 days, on how many days did you have 5 or more drinks on the same occasion?
- ☐ 0 times
- ☐ 1 or 2 times
- ☐ 3 to 9 times
- ☐ 10 or more times

1e. During the past 30 days, how many times did you have a hangover, feel sick, get into trouble with your family or friends, miss school or work, or get into fights as a result of drinking alcohol?
- ☐ 0 times
- ☐ 1 or 2 times
- ☐ 3 to 9 times
- ☐ 10 or more times

1f. What is the most number of drinks you have had on one occasion?
- ☐ Less than one drink
- ☐ 2 drinks
- ☐ 3 drinks
- ☐ 4 drinks
- ☐ 5 or more drinks

2. How many of your friends drink alcohol?
- ☐ None
- ☐ A few

- ☐ Some
- ☐ Most
- ☐ All

3. How many of your friends get drunk at least once a week?

- ☐ None
- ☐ A few
- ☐ Some
- ☐ Most
- ☐ All

4. Have you ever used marijuana? (Marijuana is also called pot, dope, grass, weed, hash, hashish, and hash oil)

☐ Yes ☐ No **(If NO skip to #5)**

4a. **If yes**, in the last 30 days, how many times have you used marijuana?

☐ None ☐ 1-2 ☐ 3-5 ☐ 6-9 ☐ 10 or more

5. Which of the drugs listed below have you used? (You may check more than one)

- ☐ **Hallucinogens** (Mushrooms, LSD/acid, PCP, peyote, mescaline, shrooms, angel dust, peace pill, STP, psilocybin)
- ☐ **Barbiturates** (sleeping pills, downers, seconal, rainbows, goofballs, yellows, reds, blues) (only if not given to you by a doctor)
- ☐ **Tranquilizers** (Librium, valium, xanax) (only if not given to you by a doctor)
- ☐ **Amphetamines** (Ecstasy/E, preludin, uppers, speed, beanies, dexies, pep pills, meth/crystal, meth/crack, Ritalin, diet pills) (only if not given to you by a doctor)
- ☐ **Inhalants** (sniffed/breathed in glue, gas, sprays, nitrous oxide, laughing gas, whippits)
- ☐ **Heroin** (used by IV needles, snorting, sniffing, or freebasing)
- ☐ **Cocaine** (used by IV needles, snorting, sniffing, freebasing, powdered/coke, crack/crystal/rock, speedball)
- ☐ **Oxycontin** (used by chewing, crushing, snorting or shooting the pills)
- ☐ **Other** (please specify: _____)

6. During the past 12 months, how many times have you used ANY of those drugs (if you have used more than one of those drugs in the past 12 months, add all the times together when you used any of the drugs).

- ☐ None
- ☐ 1-2 times
- ☐ 3-5 times
- ☐ 6-9 times
- ☐ 10 or more times

7. During the past 12 months, have you ever used a needle to inject drugs?

☐ Yes ☐ No

8. Have you ever experienced any of the following due to your drinking or drug use during the past 12 months? Check all that apply.

☐ a. had a hangover

☐ b. performed poorly on a test or important project
☐ c. been in trouble with the police
☐ d. damaged property, pulled a fire alarm, etc.
☐ e. got into an argument/fight
☐ f. got nauseated or vomited
☐ g. driven a car while under the influence
☐ h. missed class or work
☐ i. been criticized by someone you know
☐ j. thought you might have a drinking or drug problem
☐ k. experienced memory loss
☐ l. done something you later regretted
☐ m. been arrested for DUI/DWI
☐ n. been taken advantage of sexually
☐ o. taken advantage of another person sexually
☐ p. tried unsuccessfully to stop using drugs or alcohol
☐ q. seriously thought about suicide
☐ r. seriously tried to commit suicide
☐ s. been hurt or injured
☐ t. done something dangerous that you wouldn't normally have done