

Investigating the Interrelationships between Adverse Developmental Experience, Emotion Regulation  
Strategies, and Mental Health

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BA (Hons) Psychology

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## Abstract

**Background:** Adverse developmental experiences influence the development of emotion regulation (ER) strategies; and ER strategies are associated with individual differences in mental health. This study's sought to determine if: (1) sex, age, peer-rejection, parental supervision, childhood adversities, and attachment styles were associated with adaptive and maladaptive ER strategies; and (2) ER strategies were significantly associated with anxiety/depression symptoms and psychological wellbeing, respectively, after controlling for sex, age, and adverse developmental experiences.

**Methods:** A non-probability convenience sample was used including participants from a forum for victims of childhood abuse ( $N = 235$ ). Self-report measures were employed and data were analyzed using standard and hierarchical multiple regression analyses.

**Findings:** In the case of objective 1, the standard multiple regression models explained 11% and 32% of variance in cognitive reappraisal (adaptive ER) and expressive suppression (maladaptive ER), respectively. Peer-rejection and anxious attachment were negatively associated with cognitive reappraisal; and secure attachment was negatively associated with expressive suppression. In the case of objective 2, hierarchical multiple regression results found that ER strategies significantly contributed to the explanation of anxiety/depression symptoms and psychological wellbeing scores, after controlling for demographic and developmental factors. Cognitive reappraisal, but not expressive suppression, was associated with positive and negative psychological health.

**Discussion:** Attachment styles and peer-rejection are particularly important correlates of adaptive and maladaptive ER strategies. Furthermore, ER evidenced incremental validity in the prediction of mental health status. Clinical interventions seeking to improve mental health should pay particular attention to cognitive appraisal.

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# Investigating the Interrelationships between Adverse Developmental Experience, Emotion Regulation Strategies, and Mental Health

Mental health disorders afflict approximately one-third of the population of the European Union (EU) in any 12-month period. A recent study conducted by the World Health Organization estimated that the annual economic cost of mental health disorders within the EU is €432 billion (Wittchen et al., 2011). Two of the most prevalent mental health disorders are depressive and anxiety disorders. Lifetime prevalence studies have found that rates of anxiety in Europe are 21% (Wittchen & Jacobi, 2005), and the 12-month prevalence rate worldwide stands at 8.3% (Kessler et al., 2009). Additionally, lifetime prevalence of depression in Europe is 12.4%, and depression is the third leading cause of disease burden worldwide (Ferrari et al., 2013). Given the personal and social burden, economic cost, and chronic nature of depressive and anxiety disorders, it is extremely important that researchers establish the aetiology of these disorders. Over the past two decades, researchers accumulated an extensive body of evidence regarding the various risk-factors associated with these disorders.

Researchers and theorists alike have long argued that adversity experiences in early-life are important risk-factors for mental health disorders (Bebbington et al., 2004; Carr, Martins, Stingel, Lemgruber & Juruena, 2013; Jonas et al., 2011; Kessler et al., 2010a; Sitko, Bentall, Shevlin & Sellwood, 2014; Varese et al., 2012). An extensive body of research has demonstrated that childhood adversities can shape the course, symptom severity, and onset of depression and anxiety disorders (Gibb, Chelminski, & Zimmerman, 2007; Huh, Kim, Lee, & Chae, 2017). However, not all individuals who experience adversities in childhood develop psychopathology, and despite the well-established link between childhood adversity and mental illness, knowledge of the mediating and moderating factors in this relationship remains unclear. Recently, researchers have proposed that the ability to effectively regulate

emotions may be an important underlying factor between early-life adversities and later depression and anxiety symptoms (Berking & Wupperman, 2012; Dvir, Ford, Hill & Frazier, 2014; Huh et al., 2017). Numerous studies have now demonstrated that cognitive emotion regulation (ER) strategies do indeed mediate the relationship between early-life adversities and the severity of adulthood depression and anxiety symptoms (Crow, Cross, Powers & Bradley, 2014; Hopfinger, Berking & Bockting, 2016; Huh et al., 2017). Difficulty regulating emotions is also predictive of a range of negative personal consequences such as poorer social competence and peer rejection, which are themselves risk-factors for depression and anxiety (Gottman, Katz, & Hooven, 1996; Gross & John, 2003). In this study, the relationship between early developmental adversities and ER strategies will be investigated. Additionally, this study will also investigate if ER strategies are associated with psychological health, above and beyond the influence of early developmental experiences.

### **The nature of emotion regulation**

Emotions are a complex and dynamic part of the human experience. In order to achieve healthy psychological functioning, a capacity to adaptively regulate emotions is crucial. Emotion regulation has been defined in various ways throughout the developmental literature (e.g., Essau, LeBlanc, & Ollendick, 2017) however one of the most widely used definition comes from Gross (1998a, p. 274): "*Emotional regulation consists of the extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying emotional reactions, especially their intensive and temporal features, in order to accomplish one's goals*". Aspects of this definition merit further discussion. For instance, in addition to an individual's own personal efforts to manage their emotions (intrinsic), emotions are also influenced by other people's actions (extrinsic). One of these extrinsic factors includes interactions with the family in which attachment relationships and emotional socialization



strategies develop (Kring & Sloan, 2009). This insight has guided researchers interest toward developmental factors that influence ER strategies.

In early-life, caregivers are primarily responsible for managing an infant's emotions. The child's emotional repertoire and tolerance are determined by the efforts of the caregiver to manage the infant's emotional arousal (Kring & Sloan, 2009). This concept is important in understanding how emotion-related psychopathology can manifest later in life. It has been proposed that via the contribution of social facilitation or inhibition, individuals learn to manage their emotions in adaptive or maladaptive ways (Kring & Sloan, 2009). Another important aspect of Gross's definition is that emotional regulation involves appraisals of emotional experiences (Gross, 1998a). Emotional appraisal directly effects if, and how, an emotion will be experienced. In terms of developmental influences, it is important to note that a child's capacity for appraisal changes substantially during adolescence, where individuals rely more on peer relationships to acquire social norms regarding appropriate ways to regulate emotions (John & Gross, 2003).

### **Theoretical framework of emotion regulation**

One of the most important theoretical contributions to the understanding of emotion regulation was Gross's process model of emotion regulation (Gross, 1998a; Gross, 1998b). According to the process model of emotion regulation, the emotion regulatory process starts with an evaluation of internal and external emotion clues. Subsequently, evaluations of these cues influence the type of response tendency that will be applied. These response tendencies are based on experiential, behavioural, and physiological systems (John & Gross, 2004; Turliuc & Bujor, 2012). In the process model, the authors distinguished between a number of emotion modulating processes and categorized them into two types based on where exactly in the emotion-generative process they have their impact (John & Gross, 2004). The first are

‘antecedent-focused’ strategies which occur before response tendencies are triggered, for example assessing a situation again, once an emotion has been elicited; and the second are ‘response-focused’ strategies, which involve the modulation of emotion responses once they have been triggered. An example of this is suppressing expression of an emotion once it has been activated (Gross & Munzo, 1995). As research has progressed, the authors of the model focused their attention toward a more limited number of well-defined ER strategies which were based on several criteria. The criteria included strategies that are used in everyday life, strategies that could be manipulated in experimental settings, and finally John and Gross, (2004) wanted to include exemplars from each strategy category (antecedent vs response). Based on the criteria two ER strategies emerged: (1) Cognitive Reappraisal and (2) Expressive Suppression (John & Gross, 2004).

Cognitive reappraisal is known as the cognitive change strategy, this is where individuals re-evaluate and re-define potentially emotional-eliciting situations in order to modify their impact (Turliuc & Bujor, 2012). Cognitive reappraisal is an antecedent-focused strategy as it occurs before the occurrence of an emotional response and has been well-established by many researchers as an adaptive form of ER (John & Gross, 2004; Turliuc & Bujor, 2012). Expressive suppression involves reducing or inhibiting emotionally expressive reactions once an emotional state has been triggered (Gullone, Hughes, King & Tonge, 2010). This strategy comes late in the emotional-generative phase. Although the ability to suppress emotions is considered highly adaptive in certain social situations (e.g., in work-related environments) (Haga, Kraft & Corby, 2009), It is the habitual and inflexible use of expressive suppression that is considered by many researchers as a maladaptive form of emotion regulation (Campbell-Sills et al., 2006; John & Gross, 2004; Kashdan, Barrios, Forsyth & Steger, 2006; Moses & Barlow, 2006; Sperbeg & Stabb, 1998). Subsequent to establishing the process model of ER, the authors used factor analytic techniques to

demonstrate that cognitive reappraisal and expressive suppression were two distinct ER strategies (John & Gross, 2004).

### **The development of emotion regulation strategies**

Emotion regulation has re-emerged as a construct of interest due to a growing recognition that dysfunctionality in emotional regulatory capacity is central to a multitude of psychiatric disorders (Berking et al., 2008; Deniss, 2007; Gresham & Gullone, 2012; Livingstone, Harper & Gillanders, 2009; Saxena, Dubey & Pandey, 2011). Consequently, considerable work has been conducted to identify factors associated with emotion regulation strategies. These studies have highlighted a wide range of variables including demographic factors such as gender and age, intrinsic factors such as temperament and personality, and extrinsic factors such as familial interactions, attachment styles, peer relations, and parental practices (Einsberg, Spinrad, & Morris, 2002; Thompson, 1994; Turliuc & Bujor, 2012). Although intrinsic factors are related to ER strategies, it appears that they are primarily determined by interpersonal interactions within the family (Gresham & Gullone, 2012; Shaver & Mikulincer, 2007; Feldman & Greenbaum, 1997), or by social interactions among peers (Fussner, Luebbe, Mancini & Becker, 2018; Hubbard, 2001).

### **Attachment styles and parental practices**

Attachments are defined as deep, emotional bonds that tie two individuals together across time and space (Ainsworth, 1979; Bowlby, 1969). Many attachment theorists state that parent-child attachments effect an individual's emotional development (Shaver, Mikulincer, Gross, Stern, & Cassidy, 2016; Brumariu, 2015). According to Cassidy (1994) and Thompson (1994), differences in the security of child-parent attachment is especially significant in the development of emotion regulation strategies. These theorists have proposed that children who are securely attached to their primary caregivers are more likely

to become emotionally self-aware, have better understandings of their own emotions, and develop flexible and adaptive ways in which to regulate emotions (Thompson & Meyer, 2007). In contrast, insecure children tend to have caregivers who are less prone to be sensitive and responsive to their feelings and less comfortable speaking to their children about difficult emotional experiences. This can lead to a limited understanding of emotions, and greater emotional dysregulation (Thompson & Meyer, 2007).

Thus, emerging evidence has linked attachment disruption to maladaptive ER strategies and psychopathology (Benoti et al., 2010; Grehsham & Gullone 2012; Izard, Stark, Trentacosta & Schultz, 2008; Izard et al., 2011; Jaffe, 2010; Lowell, Renk & Adgate, 2014; Morris et al., 2007; Turliuc & Bujor, 2012). Research conducted by Gross and John (2004) found that habitual use of expressive suppression was associated with an attachment styles characterized as ‘anxious/avoidant’. Moreover, a recent study found that highly secure adults reported greater use of cognitive reappraisal and less use of expressive suppression during interpersonal difficulties, whereas highly-anxious individuals reported greater use of expressive suppression (Winterheld, 2016). Moreover, several developmental studies have shown that children display more adaptive ER strategies when caregivers/parents respond with acceptance and support to instances where the child experiences negative affect (Denham, Bassett & Wyatt, 2007; Eisenberg, Cumberland & Spinard, 1998; Kring & Sloan, 2009). Overall, the existing data suggests that an invalidating environment, and insecure (‘anxious/avoidant’) attachment, increase an individual’s use of maladaptive ER strategies such as expressive suppression (Rosenthal, Hall, Palm, Batten & Follette, 2005). Finally, a recent meta-analysis conducted by Pallini et al. (2018) which analysed one hundred and six papers from the beginning of the databases through to 2017, found that securely attached children had moderately higher levels of ER abilities as compared to children characterized as insecure-avoidant or insecure-resistant ( $ES = .20$ ). This associated was proposed to be due

to; receiving responsive caregiving, higher-quality parenting styles, teaching and scaffolding and general more guidance from parental figures (Eisenberg et al., 2016)

### **Parental supervision**

Parental research has indicated that insufficient parental supervision is associated with deficits in emotion regulation capacity (Frick & Morris, 2004). Neglectful and uninvolved parenting increases risk for ER problems due to lack of boundaries and emotional support (Maccoby, 1992). Research has consistently shown that for infant's parental unavailability is a significant stressor (Bridges, Grolnick, & Connell, 1997). It has been proposed by many researchers that an infant's ability to successfully down-regulate emotions and develop adaptive ER strategies is significantly hindered when a caregiver is uninvolved (Bridges, Grolnick, & Connell, 1997). Moreover, research has shown that lack of paternal supervision has significant associations with emotion dysregulation in adolescent samples (Hadley, Houck, Barker & Senocak, 2015; Lui & Chang 2016). Therefore, the importance of a secure attachment bond with a caregiver and adequate parental supervision may be critical for successful ER development in early childhood. However, limited research has confirmed direct casual links between parental supervision and ER, despite the strong links between parenting styles and ER difficulties (Morris, Silk, Steinberg, Meyer & Robinson, 2007; Steinberg & Morris, 2001;).

### **Childhood adversities**

As noted previously, extensive research has demonstrated the negative effects of childhood adversity in relation to adulthood psychopathology (Bebbington et al., 2004). A growing body of evidence has also emerged examining the relationship between childhood adversity and emotion regulation strategies. Childhood adversity refers to experiences including abuse (emotional, sexual, and physical), witnessing domestic violence, parental

separation or divorce, living with parents who are addicted to drugs or alcohol, are mentally ill, or engaged in criminal behaviour (Dube, Anda, Felitti, Chapman, Williamson & Giles, 2001). Largely derived from the 'Adverse Childhood Experiences' studies (ACE: Felitti et al., 1998), exposure to adversities in childhood interferes with the acquisition of adaptive ways to regulate emotions (Alink, Cicchetti, Kim & Rogosch, 2009; Burns et al., 2010; Cole, Martin & Dennis, 2004). In one study, girls who were sexually abused exhibited difficulties understanding and regulating emotions, had fewer expectations of receiving emotional support from others, and experienced more negative psychological states (Shipman et al., 2000). In another study by Shipman (2005) neglected children had less capability of understanding negative emotions and possessed fewer adaptive emotion regulation skills, compared to non-neglected children. It was also reported that neglected children expected their caregivers to respond in a negative way to their expression of emotions and consequently attempted to suppress their emotions. Research in this area has indicated that different types of childhood maltreatment are related to different types of dysfunctionality in understanding and regulating emotions.

As well as instances of abuse, research indicates that early development ER is also influenced by the wider emotional climate of the family life and its emotional demands (Kring & Sloan, 2009). Many studies suggest that growing up in a positive, loving home environment facilitates the development of adaptive ER capacities, whereas growing up in home environments characterized by interfamilial anger and hostility leads to the development of maladaptive ER strategies (Halberstadt, Crisp, & Eaton, 1999). A longitudinal study found that ER strategies acted as both risk and protective-factors in the association between child maltreatment and later psychopathology via its influences on peer relations (Kim & Cichetti, 2010). In other words, this study illustrated how instances of

abuse, neglect and peer rejection contribute significantly to the relationship between ER difficulties and psychopathology.

### **Peer rejection**

Another important correlate of emotion regulation strategies is peer rejection (Kim & Cicchetti, 2010). Consistent with a socio-emotional perspective, successful peer relations contribute to a child's healthy cognitive, behavioural, and emotional development (Fussner, Luebbe, Mancini, & Becker, 2018). Peer rejection has been defined as experiencing non-preferential attitudes from relevant peer groups (Dishon, 1990) and is characterized by adverse experiences such as being shunned, ignored, teased, or excluded (Asher, Rose, & Gabriel, 2001 p.106). Emerging evidence suggests that peer rejection may contribute to an individual's inability to regulate emotions adequately (Troop-Gordon, Rudolph, Sugimura & Little, 2015). One study found that peer rejection predicted higher instances of emotional dysregulation, as reported by teachers across one full school year (Kelly, Schwarts, Gorman, & Nakamoto, 2008). Similarly, prospective studies have shown that peer-rejection in childhood predicts disruption in both the expression of emotions (Reijntes et al., 2006; Sandstrom, 2004), and in adaptive regulation of emotions (Fussner et al., 2018). Indeed, Fussner and colleagues showed that maladaptive emotional regulation mediated the (positive) relationship between peer-rejection and depression.

To explain the link between peer-rejection and emotion regulation difficulties, Dodge et al. (2003, p. 374) proposed that as rejected children are "*disliked, unaccepted and ignored by their peers*", they are left with fewer opportunities to effectively learn appropriate ways to regulate their emotions. Furthermore, children who have experienced peer rejection tend to view emotions such as hostility and aggression as acceptable strategies for dealing with conflicts, and these emotional responses in turn predict additional rejection from peers.

### **Emotion regulation and mental health**

The relationship between ER strategies and mental health is reasonably well-established (Schafer, Naumann, Holmes, Tuschen-Caffier & Samson, 2017). Empirical studies have consistently linked deficits in ER to mental health difficulties (see Dvir et al., 2014 for a full review), and indicated that maladaptive ER strategies precede the onset of psychopathological symptoms (Folk, Zeman, Poon, & Dallaire, 2014). Cross-sectional research has demonstrated that habitual use of expressive suppression is associated with adverse mental health outcomes such as depression and anxiety, whereas habitual use of cognitive reappraisal is associated with lower levels of depression and anxiety, and higher levels of life satisfaction and psychological wellbeing (Gross & John, 2003; John & Gross, 2004).

A recent meta-analytic study conducted by Aldao et al. (2010) examined 114 studies provided with 241 effect sizes in order to investigate the relationships between ER strategies and psychopathology. Maladaptive strategies (expressive suppression) were positively associated with psychological distress, whereas, adaptive strategies (cognitive reappraisal) were negatively associated with psychological distress. Results indicated that habitual use of expressive suppression had a small-to-medium relationship with psychopathology ( $r = .34$ ), in general, and with depression ( $r = .36$ ) and anxiety ( $r = .29$ ), specifically. These results are consistent with another meta-analytic review of ER and psychopathology in adolescents (Schafer et al., 2016). Results from 35 studies, including 68 effect sizes, indicated small effect sizes between habitual use of expressive suppression and depression ( $r = .22$ ) and anxiety ( $r = .21$ ).

Consistent findings from two meta-analyses focusing on different developmental periods offers robust evidence to support the relationship between use of different ER strategies and mental health difficulties. Despite this support, the empirical literature also suggests that this relationship may not be unidirectional in nature. In a longitudinal study,



depressive symptoms predicted increased use of expressive suppression one year later, but expressive suppression did not predict later depressive symptoms (Larsen et al., 2013). It may well be the case therefore that ER difficulties are predicted by mental health problems, but not vice-versa. Such a conclusion should however be offered tentatively, as the majority of the theoretical and empirical literature supports the view that ER difficulties act as a risk-factor for psychological distress.

### **Rationale and objectives of the current study**

In summary, the empirical literature has consistently demonstrated that the use of distinct ER strategies (e.g., cognitive reappraisal and expressive suppression) are associated with mental health problems, including common psychological disorders such as depression and anxiety. Consequently, there has been increasing interest in identifying what factors are associated with individual difference in ER strategies. Early developmental factors which have been identified as important include childhood adversity, peer rejection, parental supervision, and attachment styles. Although the existing research has highlighted a number of possible early developmental factors that may be related to the development of cognitive reappraisal and expressive suppression, no study has yet assessed all of these variables simultaneously within a multivariate context.

Previous research demonstrates that anxiety and depression are major public mental health concerns. Additionally, while there are a multitude of contributing factors that explain variation in anxiety/depression symptoms, early developmental difficulties (childhood adversities, lack of parental supervision, peer-rejection, and attachment styles) are among the most empirically supported risk-factors. However, research also indicates that ER difficulties are also integral to the development of anxiety/depression symptoms. No study has yet

assessed whether ER strategies are associated with psychological health after the effects of early developmental experiences have been controlled for.

Determining the early developmental factors that are uniquely associated with different ER strategies may (1) allow for improved early intervention strategies to be put in place to identify individuals at-risk, (2) advance current scientific understandings of how various developmental factors are differentially associated with different ER strategies, and (3) lead interventions to be more clearly targeted at factors that are most strongly associated with ER difficulties. The present study sought to investigate two objectives (n.b., in both cases age and sex were included as covariates):

1. To determine the bivariate and multivariate associations between early developmental experiences (childhood adversities, peer rejection, parental supervision, parental attachment) and two forms of ER: cognitive reappraisal and expressive suppression.
2. To determine if ER strategies (cognitive reappraisal and expressive suppression) significantly contribute to the understanding of positive (psychological wellbeing) and negative (anxiety/depression symptoms) psychological health, having controlled for early developmental experiences (childhood adversities, peer rejection, parental supervision, parental attachment).

## Methods

### Participants

The study was a web-based survey, and participants were recruited via multiple online sources including online forums and self-help organizations for victims of childhood adversities. The non-probability convenience sample consisted of 237 participants.

Participants were predominantly female 77.0% ( $n = 181$ ), with a mean age of 29.11 years ( $SD = 9.59$ , range 18-71). The majority of the sample were employed in full-time or part-time work (67.3%,  $n = 158$ ), with the remaining participants 'not in employment, not seeking work' (21.3%,  $n = 50$ ), 'not in employment, seeking work' (9.4%,  $n = 22$ ), or engaged in voluntary work (2.1%,  $n = 5$ ). Similarly, the majority of the sample had attended college or university (73.6%,  $n = 173$ ) or secondary school (26%,  $n = 61$ ), reflecting a generally well-educated sample. Finally, 58.3% ( $n = 137$ ) of the sample reported growing up in an urban area, and 41.7% ( $n = 97$ ) reported growing up in a rural area. Inclusion criteria consisted of being over the age of 18, and having proficiency with English. Two participants were excluded from the study based on not meeting the inclusion criteria of being over the age of 18.

### Procedures

Participants were recruited from multiple online resources, including one online, self-help forum for victims of childhood abuse and adversity<sup>1</sup>. In order to recruit participants from this online support forum, written authorization was obtained from a senior administrative member of the organization. Subsequently, ethical approval was granted by the ethics committee at the National College of Ireland, and an advertisement for the study was then posted on the forum. Participants were presented with a link to follow which informed them

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<sup>1</sup> By request from the administrator of this site, the name of the self-help forum has been excluded so as to ensure anonymity of the participants. Information regarding the name of the forum is available upon request from the study author.

about the nature of the study and what their participation involved. They were also informed that their responses were entirely anonymous, and that all data would be maintained on a secure device. Additionally, all participants were informed of their right to withdraw at any time, and no inducements or incentives were used to recruit participants. Upon providing informed consents, participants were then asked to complete a series of demographic questions and self-report questionnaires. All surveys were completed online.

## **Materials**

*Childhood adversity:* The Adverse Childhood Experience questionnaire (ACE: Felitti et al., 1998) is a self-report questionnaire which consists of 10 items. It was developed for the ‘ACE study’ in order to identify childhood experiences of abuse and neglect (Felitti et al., 1998) The ACE is used to retrospectively measure participants’ experiences of early-life adversities and all items are responded to on a "Yes" (1) or "No" (0) basis. All questions were pertained to participants first 18 years of life with questions covering family dysfunction, neglect, and physical, sexual and emotional abuse by parents or caregivers. Responses were summed to compute an overall ACE ranging from 0-10 with higher scores reflecting greater levels of adversity.

*Attachment:* Each participant’s level of parental attachment was determined using the Revised Adult Attachment Scale (RAAS: Collins, 1996). The RAAS is a measure of adult attachment based upon the original AAS (Collins & Read, 1990) which is a measure of close interpersonal relationships. The scale consists of 18 items and all items are responded to using a five-point Likert scale ranging from “Not at all characteristic of me” (1) to “Very characteristic of me” (5). The RAAS consists of three subscales: ‘closeness’, ‘dependent’, and ‘anxiety’, with each scale composed of six items. High scores on the closeness scale characterize individuals who are comfortable with closeness and intimacy and find it easy to get close to someone (e.g., “*I find it relatively easy to get close to people*”). High scores on

the anxiety dimension characterize individuals who are worried about being rejected or unloved by present or future romantic partner (e.g., “*I often worry that romantic partners won’t want to stay with me*”). Finally, high scores on the dependent dimension reflect individual’s ability to find others trustworthy and dependable (e.g., “*I am comfortable depending on others*”) (Collins, 1996). To test the original four attachment styles proposed by Bartholomew (1990) (secure, pre-occupied, fearful, and dismissive) the closeness and dependency scales are added together to form a combined scale. This results in two subscales: (i) ‘Close/dependency’ (12-items) and ‘Anxiety’ (6 items). Within the present study both subscales demonstrated good internal consistency with the close/dependency subscale yielding a Cronbach's alpha of .81, and the anxiety subscale demonstrating a Cronbach’s alpha of .89.

*Peer-rejection:* Peer-rejection during childhood (Mikami et al., 2005) was measured using a retrospective four-item inventory, in which, participants responded to on a five-point Likert scale ranging from a positive answer (5) to a negative (1) with one reverse-scored question (Q3). Thus, scores ranged from a minimum of 4 to a maximum of 20, with *lower* scores reflecting greater experiences of peer rejection during childhood. Participants were asked to answer questions related to their peer relationships in school, for example, “*How many students in your class did you get along with?*”. Prior studies have demonstrated a desirable degree of validity and reliability for this scale (Boduszek et al., 2013). The current sample demonstrated an acceptable level of reliability for this measure (Cronbach’s alpha = .87).

*Emotion regulation:* Emotion regulation was measured using the Emotion Regulation Questionnaire (ERQ: Gross & John, 2003). The ERQ is a 10-item scale designed to measure respondent’s habitual use of either (1) cognitive reappraisal or (2) expressive suppression. Respondents answer each item on a seven-point Likert scale ranging from 1 (“strongly

disagree”) to 7 (“strongly agree”). The cognitive reappraisal subscale consists of six items regarding emotion and includes questions such as, "*When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about*". The expressive suppression consisted of four items regarding emotional experiences including, and "*I control my emotions by not expressing them*". Higher scores are indicative of more frequent use of each strategy. Within the current sample, both subscales demonstrated acceptable reliability, with expressive suppression (Cronbach's alpha = .87) and cognitive reappraisal (Cronbach's alpha = .87). This is consistent with previous research that has shown acceptable levels of reliability for the expressive suppression scale, the cognitive reappraisal scale consistently (Gross & John, 2003). In terms of validity, the ERQ has also demonstrated adequate convergent validity with several coping, personality and mood management measures with both child and adult samples (John & Gross, 2004).

*Parental supervision:* Parental supervision during childhood was measured using a six-item scale based on the work of Ingram, Patchin, Huebner, McCluskey and Bynum (2007). This retrospective measure includes questions about parental knowledge surrounding a number of aspects of the participant's life when they were in school. These aspects included parental knowledge of participants' friends, school work, and, activities (e.g., "*How much did your parents know about what you were doing with friends?*"). Answers were based on a four-point Likert scale ranging from 1 (“knows nothing”) to 4 (“knows everything”). Therefore, scores could possibly range from a minimum of 6 to a maximum of 24, with *lower* scores indicating less parental supervision during childhood. Previous studies have shown this scale to be a reliable and valid measure of parental supervision (Boduszek et al., 2013). Amongst the current sample, the reliability was good (Cronbach's alpha = .87).

*Psychological Wellbeing:* Psychological wellbeing was measured using the World Health Organization's Wellbeing Index (WHO-5: WHO, 1998). The WHO-5 is a

psychometrically sound and internationally-validated measure of positive psychological wellbeing (Bech, 2004). It consists of five items assessing how participants have been feeling over the past 2 weeks, participants are asked to respond to each positively-phrased statement using a 6-point Likert scale ranging from 'At no time' (0) to 'All of the time' (5). The sum score of the WHO-5 ranges from 0 to 25; with higher scores indicating a greater psychological wellbeing. Scores below 13 indicate poor wellbeing and represents an indication possible presence of a psychiatric disorder (Awata et al., 2007). A recent review of over 200 international studies support the reliability and validity of the WHO-5 scale (Topp, Østergaard, Søndergaard, & Bech, 2014). In the present sample, the internal reliability of the scale was high (Cronbach's alpha = .90).

*Anxiety and Depression:* four-item Patient Health Questionnaire (PHQ-4; Kroenke, Spitzer, Williams, & Löwe, 2009) is a valid and reliable brief screening measure of symptoms of anxiety and depression. Each item assess how a person has been feeling over the past two weeks, and items are answered on a four-point Likert scale ranging from 0 (“not at all”) to 3 (“nearly every day”). Questions included; “*Over the past two weeks have you been feeling down, depressed, or hopeless?*” The total score of anxiety and depression is calculated by adding each score from the four items. According to the scale developers (Kroenke et al., 2009), scores are rated as normal (0-2), mild (3-5), moderate (6-8), and severe (9-12). The PHQ-4 showed good internal consistency amongst the current sample (Cronbach’s alpha = .88).

### **Design and data analysis**

The present study was a quantitative, multivariate, cross-sectional research design. Statistical analyses included descriptive statistics, Pearson product-moment correlation coefficients, and multiple and hierarchical regression analyses. All data were analyzed using SPSS version 22. Two standard multiple regression analyses were conducted in order to

investigate objective 1 which sought to investigate the relationship between seven predictor variables (age, sex, adverse childhood experiences, peer rejection, parental supervision close/dependent attachment, and anxiety attachment) and the two criterion variables (cognitive reappraisal and expressive suppression).

In order to address objective 2, two hierarchical multiple regression analyses were conducted. In these models, psychological wellbeing and anxiety/depression were the criterion variables. The hierarchical models included seven predictor variables in Block 1 (age, sex [male = 0, female = 1], childhood adversity, peer-rejection, parental supervision, close/dependent attachment, and anxiety attachment) and two predictor variables in Block 2 (cognitive reappraisal and expressive suppression).



## Results

### *Descriptive statistics*

Descriptive statistics for each of the measured variables in the current study are presented in Table 1. Preliminary analyses were conducted including the inspection of histograms and Q-Q plots; all of which indicated that the continuous variables in the current analyses approximated normality. The mean levels of anxiety/depression was 5.79 which, according to the scoring instructions of the PHQ-4 (Kroenke et al., 2009), indicated mild-to-moderate psychological distress. Likewise, the mean psychological wellbeing scores was 9.56 which indicated significant psychological distress, and possible psychiatric morbidity (Awata et al., 2007). Overall, these results indicated that participants, on average, had poor mental health. Scores for both ER strategies (cognitive reappraisal and expressive suppression) were in the moderate range, on average, however there appeared to be considerable variation in these scores. The sample also reported moderate levels of close/dependency attachment styles and moderate-to-high levels of anxiety attachment. Additionally, results demonstrated high levels of peer rejection and relatively low levels of parental supervision, on average. Finally, individuals reported experiencing more than three adversities during childhood, on average.

Table 1

*Descriptive statistics of all continuous variables (n = 235)*

	Mean (95% CI)	Std. Error	Median	SD	Range	Possible
		Mean				Range
Childhood Adversity	3.56 (3.20-3.92)	.18	3	2.78	0-10	0-10
Parental Supervision	11.64 (10.83-12.45)	.41	12	6.22	1-24	6-24
Peer Rejection	6.80 (6.30-7.30)	.25	7	3.84	0-16	0-16
Close/Dependency	31.73 (30.41-33.06)	.67	31	10.05	13-57	12-60
Anxiety Attachment	21.07 (20.25-21.90)	.41	22	6.38	6-30	6-30
Anxiety/Depression	5.79 (5.31-6.27)	.24	5	3.70	0-12	0-12
Psychological Wellbeing	9.56 (8.84-10.28)	.37	8	5.50	0-25	0-25
Cognitive Reappraisal	24.32 (23.26-25.37)	.53	25	8.11	6-41	6-42
Expressive Suppression	16.90 (16.14-17.66)	.38	17	5.90	4-28	4-28

Note: 95% CI = 95% confidence intervals of the mean; SD = standard deviation.

## *Inferential statistics*

### **Bivariate correlation**

Prior to conducting the standard and hierarchical multiple regression analyses, bivariate correlations were conducted to determine the relationships between all of the predictor variables (PVs) and the criterion variables (CVs), as well as the relationship between all predictor variables. Results from these analyses are presented in Table 2.

With respect to the first objective of the present study, the correlations between the PVs (age, sex, childhood adversities, peer rejection, parental supervision, close dependency attachment and anxiety attachment) and cognitive reappraisal and expressive suppression were examined. Only peer rejection ( $r = -.28$ ) was significantly associated with cognitive reappraisal; whereas five of the seven predictor variables were significantly correlated with expressive suppression (age and sex being uncorrelated). Significant correlations ranged from  $r = -.25$  (Childhood adversity) to  $r = -.55$  (Close/Depend Attachment). Additionally, correlations between the PVs were examined, and many of the associations were non-significant. Of the significant correlations, values ranged from  $r = -.17$  (sex and close/dependent attachment) to  $-.64$  (anxiety attachment and close/dependent attachment) indicating that multicollinearity was unlikely to be a problem (see Tabachnick & Fidell, 2013).

With regard to the second objective, correlations between the PVs and the CVs (anxiety/depression and psychological wellbeing) were examined. As can be seen in table 2, all of the PVs (age, sex, childhood adversities, peer rejection, parental supervision, close dependency attachment, anxiety attachment, cognitive reappraisal, and expressive suppression) were correlated with anxiety/depression and psychological wellbeing,

respectively, with the exception of age. Examining the correlations between the PVs, there was no evidence of violation of the assumption of multicollinearity.

Table 2. *Pearson correlation results between all variables.*

<b>Variables</b>	1	2	3	4	5	6	7	8	9	10	11
1. Anxiety/Depression	1										
2. Psychological Wellbeing	-.75**	1									
3. Cognitive Reappraisal	-.37**	.37**	1								
4. Expressive Suppression	.32**	-.36**	-.03	1							
5. Sex (female)	.18**	-.27**	.04	.01	1						
6. Age	-.09	.02	.07	.04	-.05	1					
7. Childhood Adversity	.43**	-.44**	-.09	.25**	.10	.25**	1				
8. Parental Supervision	-.23**	.36**	.03	-.32**	.01	-.23	-.56**	1			
9. Peer Rejection	.43**	-.45**	-.26**	.29**	-.02	.11	.40**	-.39**	1		
10. Close/Depend Attachment	-.44*	-.55**	.06	-.55**	-.17*	-.13	-.52**	.49**	-.47**	1	
11. Anxiety Attachment	.50**	-.56**	-.21	.42**	.05	-.08	.43**	-.32**	.39**	-.64**	1

Note. Statistical significance: \* $p < .05$ ; \*\* $p < .01$ .

## Multiple regression results for emotion regulation

Two standard multiple regression analyses were performed to determine how well cognitive reappraisal and expressive suppression, respectively, could be explained by seven variables including sex, age, childhood adversities, peer rejection, parental supervision, close attachment, and anxiety attachment (see Table 3 for full details).

The seven variables explained 10.9% of variance in cognitive reappraisal ( $F(7, 209) = 3.66, p < .001$ ). Two of the seven variables were found to uniquely predict cognitive reappraisal. Peer rejection was the strongest predictor ( $\beta = -.28, p < .001$ ), followed anxiety attachment styles ( $\beta = -.22, p = .017$ ). These results show that greater peer-rejection and higher levels of anxiety attachments are associated with lower levels of cognitive reappraisal.

The same regression model explained 32.6% of the variance in expressive suppression ( $F(7, 209) = 14.45, p < .001$ ). Only close/dependency attachment styles were uniquely and statistically associated with expressive suppression ( $\beta = -.48, p < .001$ ). These results indicate that higher levels of close/dependency attachment styles are associated with lower levels of expressive suppression.

Table 3

*Standard multiple regression results for Cognitive Reappraisal and Expressive Suppression (n = 235)*

Variable	Cognitive Reappraisal			Expressive Suppression		
	B (95% CI)	SE	B	B (95% CI)	SE	$\beta$
Sex (female)	.39 (-2.20, 2.9)	1.30	.02	-.96 (-2.6, .66)	0.82	-.07
Age	.05 (-.07, .16)	0.05	.06	-.03 (-.10, .04)	0.03	-.05
Childhood Adversities	-.07 (-.57, .43)	0.25	-.03	-.20 (-.52, .11)	0.16	-.09
Parental supervision	-.07 (-.29, .14)	0.10	.06	-.09 (-.22, .04)	0.07	-.09
Peer Rejection	-.58 (-.90, -.26)	0.16	-.28**	.04 (-.16, .25)	0.10	.03
Closeness/Depend	-.15 (-.30, .01)	0.08	-.18	-.29 (-.38, -.19)	0.05	-.48**
Anxiety Attachment	-.27 (-.50, -.05)	0.11	-.22*	.10 (-.03, .25)	0.07	.11
F	3.67**			14.45**		
R <sup>2</sup>	10.9%			32.6%		

*Note.* B = Unstandardized beta value; 95% CI = 95% confidence intervals for B; SE = standard error B;  $\beta$  = Standardized beta value; R<sup>2</sup> = variance explained; Statistical significance = \* < .05, \*\*p < .001.

## **Hierarchical multiple regression results for mental health outcomes**

Two hierarchical multiple regression models were conducted to investigate the ability of ER strategies (cognitive reappraisal and expressive suppression) to predict anxiety/depression symptoms and psychological wellbeing scores, respectively, after controlling for demographics (age, sex) and adverse developmental factors (childhood adversity, parental supervision, peer rejection, close/dependency attachment, and anxiety attachment). Full details are presented in Table 4.

In the first step of hierarchical multiple regression model predicting anxiety/depression scores, seven predictors were entered: age, sex, childhood adversity, parental supervision, peer rejection, close/dependency attachment, and anxiety attachment. This model was statistically significant ( $F(7, 216) = 19.12; p < .001$ ), and explained 39% of variance in anxiety/depression scores. After the entry of ER strategies (cognitive reappraisal, emotion suppression) at Step 2, the total variance explained by the model was 45.5% ( $F(9, 216) = 19.16; p < .001$ ). The introduction of ER strategies explained an additional 6.4% variance in anxiety/depression scores ( $R^2 \text{ Change} = 6.40; F(2, 216) = 12.17; p = < .001$ ). In the final model six predictors were uniquely associated with anxiety/depression scores. Childhood adversities ( $\beta = -.26, p < .001$ ) and cognitive appraisal ( $\beta = -.25, p < .001$ ) were the strongest predictors of anxiety/depression (see Table 4 for full results).

Hierarchical multiple regression was again performed to investigate the ability of ER strategies to predict psychological wellbeing, after controlling for demographics and adverse developmental factors. In the first step of the model, the seven predictors explained 47.5% of variance in psychological wellbeing ( $F(7, 216) = 27.05; p < .001$ ). After the entry of ER strategies (cognitive reappraisal, and emotion suppression) at Step 2 the total variance explained by the model was 53.8% ( $F(9, 216) = 26.74; p < .001$ ). The introduction of the ER



strategies explained an additional 6.2% variance in psychological wellbeing scores, after controlling for demographics and developmental factors ( $R^2$  Change = 6.20;  $F(2, 216) = 13.94$ ;  $p < .001$ ). In the final model, six predictor variables were uniquely associated with psychological wellbeing. Cognitive reappraisal ( $\beta = .26$ ,  $p < .001$ ) and anxiety attachments ( $\beta = -.24$ ,  $p < .001$ ) were the strongest predictors of psychological wellbeing (see Table 4 for full details).

Table 4.

*Hierarchical multiple regression results predicting mental health outcomes (N = 235)*

	Depression/Anxiety			Psychological Wellbeing		
	B (95% CI)	SE	$\beta$	B (95% CI)	SE	$\beta$
<b>Step 1</b>						
Sex	1.13 (.15, 2.0)	.49	.13**	-2.84 (-4.17, -1.5)	.68	-.22***
Age	-.06 (-.10, -.01)	.22	-.15*	.04 (-.02, .10)	.03	.08
Childhood Adversity	.34 (.15, .53)	.96	.26***	-.25 (-.50, .02)	.13	-.13
Parental supervision	.04 (-.04, .12)	.41	.07	.06 (-.06, .17)	.06	.06
Peer Rejection	.24 (.20, .36)	.06	-.25***	-.30 (-.46, -.13)	.09	-.21**
Closeness/Depend	-.02 (-.07, .04)	.03	-.05	.07 (-.00, .17)	.41	.14
Anxiety Attachment	.15 (.66, .23)	.04	.26**	-.26 (-.38, -.14)	.06	-.30***
F (df)		19.12 (7)***			27.05 (7)***	
R <sup>2</sup>		39.0%			47.5%	
<b>Step 2</b>						
F Change (df)		12.17(2)***			13.94(2)***	
R <sup>2</sup> Change		6.4%			6.2%	
Sex	1.23 (.31, 2.1)	.47	.14**	-2.96 (-4.22, -1.69)	.64	-.22**

Age	-.05 (-.09, -.00)	.02	-.13*	.03 (-.02, .09)	.03	.05***
Childhood Adversity	.39 (.17, .53)	.09	.26***	-.25 (-.49, .00)	.12	-.12
Parental supervision	.04 (-.03, .11)	.04	.06	.06 (-.04, .17)	.05	.07
Peer Rejection	.17 (.05, .29)	.06	.17**	-.19 (-.35, -.02)	.08	-.13*
Closeness/Depend	-.01 (.07, .04)	.03	-.04	.08 (.00, .17)	.04	.16*
Anxiety Attachment	-.11 (.02, .19)	.04	.19**	-.20 (-.32, -.09)	.05	-.24***
Cognitive Reappraisal	-.12 (-.16, -.06)	.02	-.25***	.18 (.11, .26)	.03	.26***
Expressive Suppression	.07 (-.00, .14)	.03	.11	.05 (-.16, .05)	.05	-.05
F (df)		19.16(9)***			26.74 (9)***	
R <sup>2</sup>		45.5%			53.8%	

*Note:* B = Unstandardized beta value; 95% CI = 95% confidence intervals for B; SE = standard error B;  $\beta$  = Standardized beta value;  $R^2$  = variance explained; Statistical significance \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

## Discussion

Previous research has demonstrated that ER is associated with many mental health problems, including depression and anxiety (Aldao et al., 2010; Schafer et al., 2017). Many factors have been identified to be related to the development of an individual's habitual use of cognitive reappraisal or expressive suppression including childhood adversities, peer-rejection, parental supervision, and parental attachment (Alink, Cicchetti, Kim & Rogosch, 2009; Eisenberg et al., 2016; Fussner et al., 2018; Hadley, Houck, Barker & Senocak, 2015; Lui & Chang 2016). However, there is a dearth of research which has simultaneously examined the relationship between these adverse developmental variables and different ER strategies in a multivariate context. Furthermore, evidence suggests that ER difficulties are integral to multiple mental health difficulties including anxiety and depression symptoms (Dvir et al., 2014; Folk, Zeman, Poon, & Dallaire, 2014). To date however, few studies have assessed whether ER strategies are associated with positive and negative mental health status, above and beyond the influence of early developmental adversity experiences. Thus, the present study was conducted with two primary objectives in mind that would redress some of these deficiencies in the extant literature. First, this study sought to determine which early developmental factors (childhood adversities, peer rejection, parental supervision, and attachment styles) were uniquely associated with adaptive (cognitive reappraisal) and maladaptive (expressive suppression) ER strategies. Second, this study aimed to determine if the two ER strategies significantly contributed to the explanation of positive (psychological wellbeing) and negative (anxiety/depression) mental health status, after controlling for sex, age, and early developmental adversity experiences. The overarching goals of this study were to add to current understandings regarding (1) the most important developmental factors associated with different ER strategies, and (2) the incremental validity of ER in relation to positive and negative mental health outcomes.

In relation to objective 1, current findings indicated that adverse developmental experiences contributed to the explanation of both adaptive and maladaptive ER strategies. However, the percentage of variance explained in expressive suppression (32.6%) was substantially higher compared to cognitive reappraisal (10.9%). This suggests that consideration of negative developmental experiences may be more relevant to understanding maladaptive ER strategies than they are to the understanding of adaptive ER strategies. Specifically, peer rejection and anxious attachments were uniquely associated with cognitive appraisal scores; while close/depend attachment scores was the only factor uniquely associated with expressive suppression.

These findings are generally consistent with the existing literature. For example, in their study of pre-adolescent children, Fussner et al. (2018) reported correlations between peer-rejection and ER difficulties ranging from .10 to .38; associations which are similar in strength to the multivariate association observed within the current sample (.28). In their meta-analysis, Pallini et al. (2018) reported weak associations between insecure attachment styles and adaptive ER strategies ranging from .10-.17. The magnitude of the multivariate association between anxious attachment styles and cognitive reappraisal (.22), in the current study, was of a similar strength. Likewise, the negative, multivariate association (-.48) between 'close/depend' attachment style and expressive suppression observed in the current study is consistent with numerous findings in the empirical literature which suggest that insecure attachments styles are associated with greater use of maladaptive ER strategies (e.g., Thompson & Meyer, 2007). Thompson and Meyer (2011) have argued that individuals who experience emotionally insensitive and unresponsive caregivers are more likely to be uncomfortable expressing emotions due to the unresponsive and usually dismissive responses from caregivers. Given the consistency of these findings to the existing literature, the current results may be reasonably generalizable.

It was noteworthy that childhood adversities, peer-rejection, parental supervision, and anxious attachments were all bivariately associated with expressive suppression but were not significantly associated when assessed in a multivariate context. These bivariately associations with expression suppression are consistent with a large number of empirical findings (e.g., Bridges, Grolnick, & Connell, 1997; Winterheld, 2016; Reijntes et al., 2006; Sandstrom, 2004; Shipman, 2005). Nonetheless, the results of the current study are important theoretically as they indicate that although childhood adversities, peer-rejection, parental supervision, and anxious attachments are all related to expression suppression, the only relevant correlate, when assessed multivariately, to expressive suppression is ‘close/depend’ attachment styles. Moreover, these results support the independent nature of cognitive reappraisal and expressive suppression as distinct types of ER, given that each ER strategy was related to a unique set of risk-factors. From a clinical perspective, interventions intended to alleviate habitual use of expressive suppression should focus on increasing the security of one’s attachment style; while interventions focused on cognitive reappraisal should focus on modifying anxious attachment representations as well as the consequences of peer-rejection in childhood. From a policy standpoint, social interventions that reduce the likelihood of peer-rejection (e.g., anti-bullying policies), and help to foster positive and secure attachments between parents and offspring will likely lead to more widespread use of adaptive ER strategies.

In relation to the study’s second objective, results from the hierarchical multiple regression analyses found that sex, age, and adverse developmental experiences (block 1) explained 39% and 47.5% of the variance in anxiety/depression and psychological wellbeing scores, respectively. In other words, these variables accounted for a substantial proportion of individual differences in levels of negative and positive mental health; findings that are consistent with a wealth of existing evidence (Aldao et al., 2010; John & Gross, 2004;

Schafer et al., 2017). The different ER strategies were added to the model in block 2 and significantly contributed 6.4% and 6.2% of additional variance in anxiety/depression and psychological wellbeing scores, respectively. These findings demonstrate the incremental validity of ER in relation to both negative and positive mental health outcomes, above and beyond that which is explained by the demographic and adverse early developmental factors.

In the final model, cognitive reappraisal was uniquely associated with both anxiety/depression, and psychological wellbeing. In terms of individual differences in ER, it appears that habitual use of cognitive reappraisal was associated with higher levels of positive psychological wellbeing whereas lower levels of cognitive reappraisal were associated with poorer mental health outcomes. This is consistently reported throughout the literature (John & Gross, 2004). In the current analyses, expressive suppression was not associated with either positive (psychological wellbeing) or negative (anxiety/depression) mental health. This is generally inconsistent with the existing literature. For example, Aldao et al.'s (2010) meta-analysis of 114 studies found positive correlations of .29 and .36 between expressive suppression and anxiety and depression, respectively; while Schafer et al.'s (2016) meta-analysis of 35 studies among adolescents reported positive correlations of .21 and .22 between expressive suppression and anxiety and depression, respectively. It should be noted that in the current study the bivariate association between expressive suppression and anxiety/depression symptomatology ( $r = .32$ ) and psychological wellbeing ( $r = -.36$ ) were significant and of a similar magnitude to those reported in prior meta-analysis. In this way, findings are consistent with the existing literature. However, when the relationship between these mental health variables and expressive suppression were assessed while also taking into account cognitive reappraisal, the effect for expressive suppression reduced to a non-significant level. Current findings therefore add important to the existing literature as they indicate that cognitive reappraisal, rather than expressive suppression, is relevant to

understanding variation in positive and negative mental health status. Recognising the tentative nature of this finding, and the need for replication, clinician's may be encouraged to target their interventions at fostering cognitive reappraisal capabilities, as opposed to reducing expressive suppression, in order to bring about a change in their patient's psychological health. Needless to say, further research with varied samples is needed to replicate the current results however current findings offer the possibility that adaptive ER strategies may be a more important factor in psychological health than maladaptive ER strategies.

The hierarchical multiples regression results also revealed that being female, being of younger age, experiencing higher levels of peer-rejection, and having higher levels of anxious attachments were all uniquely associated with higher levels of anxiety/depression symptoms, and lower levels of psychological wellbeing. These associations are consistent with numerous findings indicating that sex (Hyland, Shevlin, Elklit, Christoffersen, & Murphy, 2016), age (Kessler et al., 2010b) peer-rejection (Shin et al., 2016), and anxious-attachments (Eisenberg et al., 2016) are correlated with poorer mental health. More interesting was the finding that higher levels of childhood adversities and lower levels of close/depend attachment were only associated with symptoms of anxiety/depression. These findings suggest that childhood adversities and close/depend attachment may only be correlated with indicators of negative mental health, but not positive mental health. Indeed, trauma exposure in childhood (Bebbington et al., 2004; Carr et al., 2013; Jonas et al., 2011; Kessler et al., 2010a; Sitko et al., 2014; Varese et al., 2012,) and insure attachments (Corcoran & McNulty, 2018) have been consistently shown to be strongly associated with psychological distress, however there are considerably fewer studies which have evaluated the associations between these variable and indicators of positive mental health.

### **Limitations**



The findings of the current study should be considered in light of a number of relevant limitations. First, the cross-sectional nature of the present study means that no inferences of causation or prediction can be made regarding the observed relationships. While the data was collected cross-sectionally, the predictors variables generally focused on experiences that occurred during early development, whereas the criterion variables focused on current psychological experiences. The nature of the regression models therefore included some recognition of the assumed temporal relationships between the variables of interest in this study. Future research should ideally apply a longitudinal design to assess if the developmental experiences examined in this study predict different ER strategies in later life, and if developmental experiences and ER strategies predicts later mental health outcomes. Second, the current study was based on a predominately female sample, mainly recruited from an online self-help forum for victim's childhood abuse. The generalizability of the current findings to wider population is therefore limited. However, the majority of the current findings were consistent with the existing literature, including findings from a recent meta-analysis (e.g., Pallini et al., 2018), suggesting that the current findings may be reasonably generalisable. Future research would however benefit from attempts to replicate the current study using larger and more diverse samples that are representative of the general population. Third, the present study measured just two types of emotion regulation, one adaptive (cognitive reappraisal), and one maladaptive (expressive suppression). Literature in the area of emotion regulation has identified many more types of emotion regulation such as rumination, avoidance, and problem-solving (see Aldao et al., 2010). While this study only included cognitive reappraisal and expressive suppression, the literature in this area highlights these strategies as the most important types of ER (John & Gross, 2004). It would, nonetheless, be interesting for future work to examine relationship between the

developmental factors examined in this study and a wider range maladaptive and adaptive ER strategies.

## **Conclusion**

In conclusion, the results of this study showed that peer-rejection and anxious attachments were uniquely associated with cognitive reappraisal, and close/dependency attachments were uniquely associated with expressive suppression. Current findings also indicated that ER strategies exhibited incremental validity in relation to positive and negative mental health outcomes, above and beyond adverse developmental experiences. Cognitive reappraisal, specifically, was significantly associated with both anxiety/depression and psychological wellbeing, whereas expressive suppression was not associated with either mental health outcome, when assessed in a multivariate model. These findings suggest that scientific understandings of the development of cognitive reappraisal may benefit from a greater focus on positive early-developmental experiences. To date, most theory and research has focused on the role of negative early-life experiences in the development of emotion regulation strategies. The results from the current study indicate that negative developmental experiences, while important, have limited value in understanding cognitive reappraisal. Contrastingly, these same negative developmental experiences have substantial value in understanding expressive suppression. It may be argued therefore, that a superior understanding of adaptive ER strategies could be obtained via examination of positive developmental experiences. Given that the current findings indicated that cognitive reappraisal, rather than expressive suppression, were most important in understanding variation in mental health status, improved knowledge of the developmental experiences underlying cognitive reappraisal may well lead to improved mental health treatments.

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