REGULATION OF EMOTION SYSTEMS: ASSESSING ACTS OF DOWN-REGULATION OF
NEGATIVE EMOTIONS

by

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Abstract

Research investigating emotion regulation (ER) has failed to accomplish three goals: (1) to develop a clear understanding of how ER relates to emotion theory; (2) to reach a consensus on which actions constitute ER; and (3) to assess patterns of ER behaviours rather than only one-to-one relations between specific regulatory behaviours and aspects of well-being. The current study aimed to address these gaps in the literature through the following objectives: (1) develop a self-report measure to simultaneously assess an individual's propensity to use six regulatory acts identified by a new model of ER derived from emotion theory; (2) identify how regulatory acts cluster within individuals, and (3) identify the relation between ER groups and psychosocial outcome measures.

Using two independent samples, the first objective was achieved by creating the Regulation of Emotion Systems Survey (RESS), which was a reliable and valid measure of the six acts of regulation specified by the ER Acts Model. The second objective was achieved through Latent Profile Analysis (LPA), which determined that three distinct profiles of regulatory behaviour existed in the sample: Average ER Act Use (using the full range of ER acts), Suppression Propensity (using expressive suppression almost exclusively), and Engagement Propensity (using expressive engagement almost exclusively). Finally, the third objective was achieved through comparing psychosocial outcome measures for the three groups, which demonstrated significant differences between LPA group membership and well-being. The Average group had significantly lower levels of depression and anxiety than the Suppression and Engagement groups; however, the Engagement and Suppression groups did not differ on depression and anxiety scores. Furthermore, the Suppression group showed significantly higher family and peer relationship quality than the Engagement group.

Based on these findings, one-to-one relationships between individual regulatory acts and well-being may not be ideal as it is the pattern of ER act use that has more meaningful relations with well-being. Participants in either the Suppression or Engagement groups used these regulatory behaviours almost exclusively, thereby rendering problematic even ER acts traditionally thought of as beneficial. Consequently, the ability to flexibly utilize a variety of ER acts may lead to more successful socio-emotional outcomes.

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Chapter 1

Introduction

Emotion regulation (ER) is "the neural, cognitive, and behavioural/action processes that sustain, amplify, or attenuate emotion arousal and the associated feeling/motivational, cognitive, and action tendencies" (Izard et al., 2011, p. 45). Due to the ubiquitous nature of emotions and the societal and cultural obligations that necessitate their regulation, ER is an essential ability to master and has strong implications for development and well-being. Strong ER skills are essential for social skills (Tarullo, Mliner, & Gunnar, 2011), theory of mind (Izard et al., 2011), school success, and cognitive growth (Macklem, 2008). Moreover, poor ER has been implicated in more than half of the Diagnostic and Statistical Manual IV Axis I disorders, all of the Axis II disorders, and has been labeled a hallmark of psychopathology (Macklem, 2008). Consequently, research into ER has grown exponentially over recent decades; according to the PsycInfo database, just 43 peer-reviewed articles were published in 1994 involving emotion regulation in the keyword, title, or abstract, whereas 1,231 with the same criteria were published in 2014.

Despite the proliferation of research into ER, "enthusiasm for this topic continues to outstrip conceptual clarity, and there remains considerable uncertainty as to what is even meant by emotion regulation" (Gross, 2015, p.1). Indeed, three main gaps continue to exist in the ER literature. First, the majority of models of ER are not grounded in emotion theory, thereby ignoring the mechanisms through which regulation impacts emotions. Second, a clear consensus of exactly which behaviours constitute ER has not been reached. ER strategies have ranged from immediate reactions to an emotional experience (e.g., suppression) to coping behaviours that attempt to prevent exposure to emotional triggers (e.g., situation selection), as well as long-term attitudes towards emotionality (e.g., emotional acceptance). Therefore, what is considered regulation is ambiguous, diverse, and not of like kind with respect to time scale, making it difficult to determine exactly what regulation is and how it occurs. Third, the fact that individuals differ in their reliance on a variety of ER behaviours has largely been ignored. Many studies have examined an individual's ability or tendency to utilize one or two specific ER behaviours in response to a trigger (e.g. Gross, 2002; Gross & John, 2003; Wenzlaff & Wegner, 2000); however, this fails to evaluate the full range of ER response tendencies because the

majority of individuals engage in an assortment of regulatory behaviours (Lougheed & Hollenstein, 2012).

Therefore, to address these gaps in the literature, the objectives of the current study were to: (1) assess a new measurement tool of regulatory behaviours based on a new model of ER derived from emotion systems theory to understand the range of what individuals do to down-regulate negative emotions; (2) understand individual differences in reliance on the various regulatory acts through the use of Latent Profile Analysis; (3) assess the relationship between patterns of reliance on the various regulatory acts and measures of socio-emotional functioning, such as depression, anxiety, and relationship quality.

1.1 What is Emotion Regulation?

As individuals grow and mature, they demonstrate an increasing amount of control over their behaviour as they develop more advanced ER skills (Gross et al., 1997). Individuals are expected to implement ER processes to channel emotions into adaptive behaviours, as opposed to allowing emotions to undermine functioning (Thompson, 1994). However, when individuals are unable to regulate their emotions and resultant behaviours, they may develop patterns of emotions that jeopardize or impair overall functioning, interfere with social relationships, and lead to an inflexible experience of emotions; in other words, emotion dysregulation (Cole, Michel, & Teti, 1994).

Despite several decades of research touting the benefits of strong regulation, and the relation between dysregulation and psychopathology, these claims have been built on a framework of ER that has failed to answer the following questions: (1) how do regulatory behaviours impact emotional processes as specified by emotion theory; (2) which regulatory behaviours are most proximal to the components of emotions; and (3) how are patterns of regulation, rather than individual regulatory behaviours, related to psychosocial outcomes? The following section will elaborate these questions and the ways this study sought to answer them.

1.2 How does emotion regulation relate to emotion theory?

Emotions can be conceptualized as a coordinated interplay of cognitive, behavioural, and physiological reactions (Hollenstein & Lanteigne, 2014; Rosenberg & Ekman, 1997; Scherer, 2005). For instance, an emotional experience of anger involves a cognitive appraisal of wrongdoing or goal blockage, facial and bodily expressions of anger, and an elevation of the arousal of the sympathetic nervous system, including physiological changes such as increased bodily temperature (Levenson,

1992). Meanwhile, an emotional experience of fear is comprised of a cognitive appraisal of threat, facial and bodily expressions of fear, and a physiological response, such as lower diastolic blood pressure than that experienced during anger (Levenson, 1992). However, very few models of ER include these emotion components when discussing regulatory behaviours (for exceptions see Gross, 2001; Kappas, 2011; Mauss, Bunge, & Gross, 2007). Because emotions are an interplay of cognitive, behavioural, and physiological aspects, conceptualizations of regulatory behaviours should indicate the ways in which the regulatory act works to down-regulate one or more of these emotion components.

This study approached ER from an emotion systems theory perspective by relying on a new model of ER, the ER Acts Model (Hollenstein, De France, & Lougheed, in preparation). This model characterizes emotional processes through the impact of regulation on each specific emotion system. Specifically, it models the emotion systems of cognition, physiology, and behaviour, the mechanisms through which these components control an emotional experience, and specific regulatory acts that impact the mechanisms of each emotion component. This model will be explained in further detail in a later section.

1.3 Which behaviours are regulatory?

The second question that stems from the ER literature is exactly which behaviours are considered regulators of emotion? These behaviours are typically referred to as "strategies", however, what has been offered as an ER strategy is often ambiguous, not of like type or time scale, and/or the use of these strategies may be difficult to recognize. For example, the following have been considered ER strategies in the literature: situation selection, situation modification, attentional deployment, suppression, reappraisal, emotional awareness, rumination, distraction, social withdrawal, social support, confrontation, problem solving, avoidance, acceptance of emotions, mindfulness meditation, repair, exercise, concealing, tolerating, adjusting, cathartic expression of emotion, restraint, repression, emotional self-efficacy, self-harm, catastrophizing, self-blame, other-blame, putting into perspective, positive refocusing, planning, cognitive restructuring, denial, wishful thinking, alcohol use, cigarette smoking, drug use, escape, inaction, impulsive action, passive waiting, physical comfort seeking, information gathering, and eating (e.g., Gross, 2002; Aldao & Nolen-Hoeksema, 2010; Chaplin & Aldao, 2013; Gross, 2007; Sexton & Dugas, 2009; Verhofstadt, Buysee, De Clerq, & Goodwin, 2005; Lyvers et al., 2014). Such a broad and inclusive approach to ER essentially considers any action, or inaction, as regulatory, thereby rendering the concept of ER almost meaningless.

This overly inclusive approach to ER ignores two main ambiguities. First, this approach ignores the distinction between mood control and emotion regulation. While emotions are conceptualized as transient or temporary experiences, moods can persist for a full day or longer (Beedie, Terry, & Lane, 2005). However, scant attention has been paid to the differentiating behaviours that work to regulate mood from those employed in real-time to immediately impact an emotional experience (Hollenstein, in press). For instance, habitual behaviours such as diet and exercise can impact long-term mood and will therefore affect the probability of specific emotions arising. However, diet and exercise are not working to regulate specific emotional experiences as they are occurring, they are instead impacting general mood, which impacts the likelihood of experiencing certain emotions. Nevertheless, both long term mood-regulating behaviours and behaviours regulating short-term emotions are known as "ER strategies", thereby rendering this term ambiguous and problematic when trying to specifically refer to one type of behaviours or the other.

The second concern with this overly inclusive approach is that it fails to identify the valence of the emotions being regulated. Although there are times that individuals attempt to down- or up-regulate their positive emotions, the majority of ER literature is focused on attempts to reduce the intensity of a negative emotional experience. This focus on the down-regulation of negative emotions is understandable as the concerns of both researchers and society as a whole stem from the poor regulation of negative emotions; however, scant attention has been paid to identifying regulatory behaviours specific to the down-regulation of negative emotions.

The ER Acts Model remedies these ambiguities by (1) differentiating "acts" from previous work on "strategies," (2) identifying only regulatory acts that are used to regulate emotional experiences in the moment of emotional perturbation, and (3) focusing only on the down-regulation of negative emotions. This clearly defined and exclusive conceptualization of ER allows for a more refined definition of what is, and therefore what is not, ER.

1.4 What is regulation and dysregulation?

To date, most researchers have attempted to dichotomize specific regulatory behaviours as good or bad by identifying one-to-one associations between specific ER behaviours and well-being (Dixon-Gordon, Aldao, & De Los Reyes, 2014). This is typically accomplished by asking individuals to engage in specific regulatory behaviours within a laboratory setting and assessing the relationship between their ability to use the specified technique with various measures of emotional reactivity and/or well-being (e.g., Gross, 1998). Other studies have simply compared an individual's self-report

of his or her propensity to utilize a regulatory behaviour with measures of well-being (e.g., Flynn, Hollenstein, & Mackey, 2010). For example, Gross and John (2003) demonstrated a relationship between suppression of emotional expression and inauthenticity and a lack of mood repair through the use of a series of self-report questionnaires.

Although this type of research produces insight to the relation between specific regulatory behaviours and psychosocial outcomes, it fails to acknowledge that individuals engage in a variety of regulatory behaviours across a variety of contexts. For example, while suppression has been linked with several negative outcomes, there are some instances where suppressing a negative emotions aids in the goal of maintaining relationships, such as suppressing disappointment after receiving an unwanted gift. Moreover, simply re-evaluating every negative situation may prevent an individual from taking action within his or her environment to prevent or modify the triggering event (Christensen & Aldao, 2015). Therefore, the simple one-to-one relationships between one specific regulatory behaviours and well-being may be less meaningful than the number of regulatory behaviours an individual has access to, and how he or she deploys them across a variety of contexts (Lougheed & Hollenstein, 2012).

This conceptualization of ER as selections from a toolbox of many regulatory acts is known as ER flexibility (Bonanno & Burton, 2013), which suggests that relying on a small subset of ER behaviours is likely to increase the chances of experiencing dysregulation. Due to the diversity of environments and emotional triggers individuals are exposed to, there is a requirement for a variety and flexibility of regulatory mechanisms (Aldao, Sheppes, & Gross, 2015). Indeed, individuals who report average levels of use of a variety of ER behaviours, compared with those who report using only a select few, seem to experience less depression, anxiety, and social anxiety (e.g., Lougheed & Hollenstein, 2012). Moreover, Bonanno et al. (2004) found that the ability to cycle flexibly through various ER behaviours was predictive of later well-being, controlling for previous well-being and cognitive abilities. Therefore, reliance on a small subset of ER behaviours is associated with poor socio-emotional outcomes, however, access to, and ability to flexibly integrate, numerous ER behaviours is associated with successful regulation and well-being. Unfortunately, there is not currently a measure in existence that assesses an individual's propensity to use a range of ER behaviours. Therefore, a new measure of regulation was developed for this study to assess an individual's propensity to use a variety of ER behaviours in order to examine not only how each regulatory behaviour relates to psychosocial outcomes, but how the use of a variety of acts relative to the others relates to well-being.

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In summary, the current ER literature fails to answer the following three questions: (1) how do regulatory behaviours impact emotional processes as specified by emotion theory; (2) exactly which behaviours are regulatory; and (3) how are patterns of regulation style, rather than single regulatory behaviours, related to psychosocial outcomes? The first two of these questions can be resolved within a new conceptual model, the ER Acts Model, which has been developed to identify acts of down-regulation of negative emotions by emphasizing the cognitive, behavioural, and physiological processes that form the emotion system (Hollenstein et al., in preparation).

1.5 ER Acts: A New Model of Emotion Regulation

The ER Acts Model identifies acts of regulation by focusing on the components of each emotion subsystem -cognition, physiology, and behavior - and the mechanisms through which a regulatory act would impact the component's contribution to the emotional experience. For example, distraction is a regulatory act used to down-regulate the cognitive domain of a negative emotion by attempting to remove the trigger from one's mind.

Examining regulation from this perspective allows for the identification of exactly how emotions are being regulated by considering the specific subsystem through which the regulation is having an effect. This perspective also narrows the span of what is considered regulation by looking only at specific and deliberate behaviours that work to down-regulate negative emotional experiences in real-time, thereby not confusing general attitudes, such as emotional acceptance, or indirect mood regulation, such as diet and exercise, with acts of emotion regulation.

The ER Acts Model begins with the emotion components of cognition, physiology, and behavior, and then identifies which mechanisms are directly controlling these components (Figure 1). For instance, the cognition component of emotion is directly impacted by the control mechanisms of attention and evaluation. These control mechanisms directly influence the emotion component to either increase or decrease the intensity of the emotional experience. The model then identifies specific acts that individuals engage in during an emotional experience in order to down-regulate the intensity of the negative emotion they are experiencing. For example, the control mechanism of attention is impacted by the regulatory act of distraction, failing to attend to the emotional event, or rumination, attending intensely and repetitively to the emotional event. Therefore, each ER act works to impact the emotional experience by directly affecting the control mechanism of each emotion component. The following sections will outline the emotion components, control mechanisms, and regulatory acts included in the model and, ultimately, the new measure evaluated in the present study.
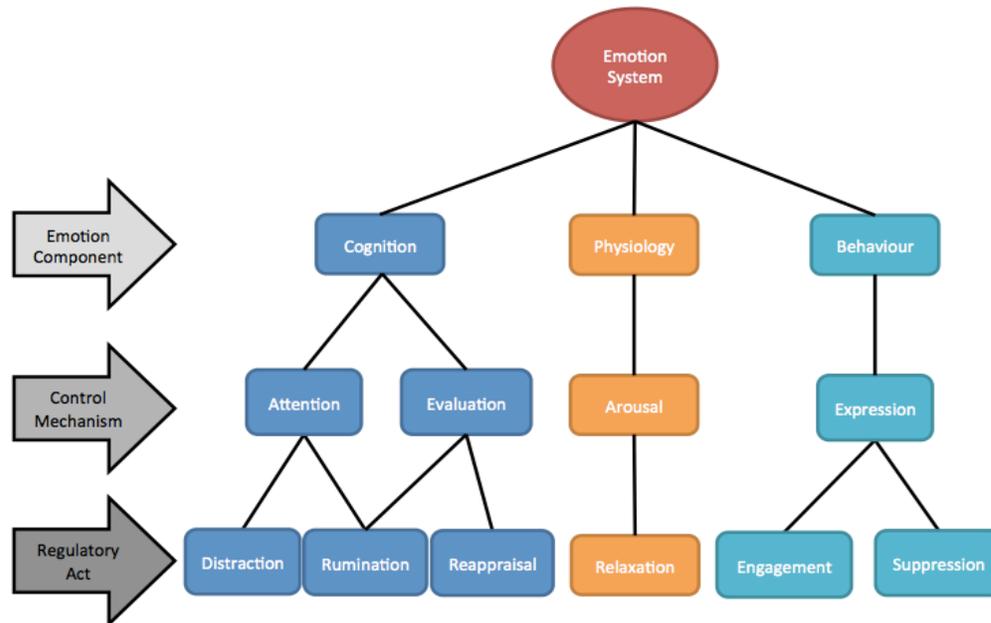
Figure 1. The ER Acts Model. A Conceptual model of emotion regulation as proposed by Hollenstein, De France, & Lougheed (in preparation).

Component 1: Cognition

The cognitive component of emotion involves thoughts, beliefs, and interpretations of a triggering event that amplify or attenuate an emotional experience (Lench, Flores, & Bench 2011). The impact of this component has largely been emphasized by appraisal theories, which posit that it is the cognitive appraisal of an event that gives the event its emotional significance (Ray et al., 2005). The control mechanisms that work to directly impact the cognitive experience of an emotion are (1) the modulation of attentional control and (2) the evaluation of the meaning or significance of the emotional situation. These are directly influenced by the ER acts of distraction, rumination, and reappraisal, reviewed below.

Cognitive Control Mechanism: Attentional control. The control of attention in regard to ER refers to how an individual directs his or her attention in order to influence his or her emotions (Gross & Thompson, 2007). It includes the ability to direct conscious awareness to different aspects of the environment (Heitz, Unsworth, & Engle, 2005), including characteristics of the triggering event, internal sensations, or aspects completely unrelated to the emotional experience. The deployment of attention away from triggering events is the first ER act to develop, utilized as early as infancy to

disengage from overly stimulating environments (Rothbart, Ziaie, & O'Boyle, 1992; Thompson, Lewis, & Calkins, 2008). As will be discussed in greater detail below, turning attention away from details of the emotional trigger is reflective of the ER act of distraction, while directing sustained attention toward the emotional event allows an individual to engage in evaluative processes and the ER act of rumination.

       Cognitive Control Mechanism: Evaluation Control*.* Appraisal theory dictates that appraisals, or evaluations, of an event initiate emotional experiences (Moors, Ellsworth, Scherer, & Frijda, 2013). However, evaluations of an event are not static but evolve as they are followed up by further appraisals, or reappraisals, of the triggering event's significance (Gross, 2015). When individuals are exerting control over their emotions through the use of evaluative control, they are assessing and reflecting on the interpretations they have about the meanings of the emotional event, thereby engaging in the ER acts of rumination or reappraisal.

       Cognitive Regulatory Act: Distraction. One aspect of the control of attention to down-regulate emotional states involves disengaging attention to the emotional trigger and attending to something else. This withdrawal of attention, or cognitive avoidance, encompasses several cognitive behaviours, including thought suppression, thought substitution, behavioural distraction, and avoidance of triggering stimuli (Sexton & Dugas, 2009). This regulatory act works to down-regulate negative emotions as individuals temporarily forget about the emotional event or trigger by engaging in other thoughts or activities. However, avoiding trigger-relevant thoughts is a cognitively taxing process (Harvey & Bryant, 1998), particularly since individuals must avoid all stimuli relevant to the trigger as they serve as cues to it, as well as anything that reminds them of those cues (Purdon, 1999).

       Successful cognitive avoidance temporarily removes the trigger from awareness, and therefore provides brief reprieve from negative emotions, however, it is an ineffective long-term strategy, particularly in situations that involve recurrent exposure to an emotional stimuli (Denson, Moulds, & Grisham, 2012). Moreover, chronically relying on distraction as a response to emotionally triggering events prevents exposure to, and therefore habituation to, unpleasant stimuli and resultant thoughts (Gosselin et al., 2007). Furthermore, the use of distraction in response to an emotionally triggering event does not allow for monitoring changes to that situation, which could allow for a natural reduction in the negative emotion (Sheppes & Meiran, 2008).

       The reliance on distraction to regulate emotions has been shown to play a causal or maintenance role in the development of generalized anxiety disorder, obsessive-compulsive disorder, phobia maintenance, depression, addiction, and post-traumatic stress disorder (Abramowitz, Tolin, &

Street, 2001; Rassin, Merckelbach, & Muris, 2000; Sexton & Dugas, 2008). These outcomes may occur when distraction attempts fail and the triggering thoughts create discomfort due to a paradoxical increase in thought frequency (Abramowitz et al., 2001). Furthermore, Bebko, Franconeri, Ochsner, and Chiao, (2011) compared several acts of emotion regulation and found that, regardless of the act used, successful ER was predicted by greater attention to the emotional regions of a scene. Therefore, although distraction temporarily allows disengagement from triggering stimuli, attention to emotional triggers is necessary for successful emotion regulation.

    Cognitive Regulatory Act: Rumination. Rumination is a tendency to consistently focus on an emotional experience, its causes, and its consequences (Aldao & Nolen-Hoeksema, 2010; Gross & John, 2003), and is differentiated from worry as it is past-oriented rather than future-oriented (Dickson, Ciesla, & Reilly, 2012). Although several distinctions have been made regarding the focus of ruminative thought (i.e., provocation-focused rumination, self-focused rumination, and emotion-focused rumination; Denson et al., 2012), and the style of rumination (i.e., brooding and reflective pondering; Treynor, Gonzalez, & Nolen-Hoeksema, 2003), each facet maintains the tendency to focus on an emotional event in a perseverative manner. Rumination tends to occur when individuals become engaged in an obsessive analysis of the emotional trigger, typically in an attempt to better understand and solve emotional problems (Aldao, Nolen-Hoeksema, & Schweizer, 2010). This regulatory act involves an increased level of attention to a trigger, coupled with attempts to re-evaluate it; thus, it involves both Attention Control and Evaluation Control mechanisms.

    Due to the increased attention paid to the triggering event, engaging in ruminative behaviours may occasionally result in problem solving or enhanced clarity of the emotional event (Aldao et al., 2010). This experience may intermittently reinforce, and therefore lead to increased levels of, ruminative behaviour. In fact, individuals usually report engaging in rumination in an attempt to better understand and solve their emotional problems; however, ironically, chronic rumination is negatively related to problem solving (Aldao et al., 2010). Instead, chronic rumination leads to increased distress via continual review of the emotional significance of the trigger (Ray et al., 2005). Furthermore, due to the strong focus on the emotional event, ruminators may be unable to engage in thoughts or behaviours that could distract from (i.e., attention control), or provide evidence against (i.e., evaluation control), negative emotions (Nolen-Hoeksema, 1991). Consequently, they may avoid taking action to ameliorate circumstances due to beliefs that these efforts would be ineffective (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008).

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Engaging in rumination also has negative implications for mental health. Women tend to engage in rumination more often than men (Johnson & Whisman, 2013), which is thought to be one of the reasons that women are more likely to experience depression (Rood et. al, 2009). Furthermore, rumination has been shown to increase negative mood-congruent thinking, drive away social support (Aldao & Nolen-Hoeksema, 2010), and is linked to increased levels of negative emotion, increased sympathetic nervous system activity with little habituation to the emotional event, depression, anxiety, substance use, eating disorders, less control over intrusive thoughts, and increased cortisol levels following a stressor (Aldao et al., 2010; Ray, Wilhelm, & Gross, 2008; Roger & Jamieson, 1988). Chronic rumination specific to anger has been found to result in self-reported domestic abuse, road rage, frequent anger experience, reduced life satisfaction, and other forms of aggression (Denson et al., 2012). Thus, although individuals may initially engage in rumination as a method of solving problems or seeking emotional clarity, when used chronically rumination tends to increase emotional intensity, and is therefore a frequently unsuccessful method of down-regulating negative emotions.

Cognitive Regulatory Act: Reappraisal. One of the best-researched forms of emotion regulation is cognitive reappraisal (Suri, Whittaker, & Gross, 2014) and is defined by Gross (2002) as "changing how we think about a situation in order to decrease its emotional impact" (p. 281). Cognitive reappraisal, consequently, involves reinterpreting the evaluation of a stimulus (Gullone, Hughes, King, & Tonge, 2010) and a reduction of distress through the generation of a neutral or positive evaluation of a stressful event (Aldao & Nolen-Hoeksema, 2010). Several types of reappraisal have been identified: positive reappraisal, which involves seeing negative stimuli more positively (Butler, Gross, & Barnard, 2014); detached reappraisal, signifying a disengagement from emotional implications of the stimuli and identifying alternate perspectives (Shiota & Levenson, 2012; Lohani & Isaacowitz, 2014); and negative functional reappraisal, which involves accepting the negative qualities of the stimuli but reducing the perceived severity of the negativity (Cristea, Tatar, Nagy, & David, 2012). Despite these differentiations, each form of cognitive reappraisal involves considering alternative interpretations of an emotional event.

Cognitive reappraisal has been touted for its strong regulatory abilities and associations with overall well-being (i.e., Troy, Shallcross, & Mauss, 2013), such as increased psychological health, optimism, the experience and expression of less depressed mood, less negative affect, enhanced life satisfaction, and more active attempts to repair negative mood (Troy et al., 2013; Gullone et al., 2010; Haga, Kraft, & Corby, 2009). Reappraisal is also recognized as the main component of cognitive behavioural therapy because it is responsible for cognitive change and the modification of

dysfunctional beliefs, two of the main determinants of change across most psychopathologies (Cristea et al., 2012). These strong associations between reappraisal and well-being have been explained by appraisal theory, which dictates that it is how an individual thinks about, or appraises, the meaning of his or her experiences that leads to the emotions they experience (Ray et al., 2005). Thus, as an individual changes the evaluation given to a situation, utilizing reappraisal, he or she also changes the emotional experience tied to it. Although it may appear that reappraisal would also engage the attentional control mechanism, research has found that attentional deployment is not a causal mechanism for the success of reappraisal (Bebko, Franconeri, Ochsner, & Chiao, 2014; Urry, 2010). Therefore, this regulatory act impacts an emotional experience by independently activating the evaluative control mechanism of the cognitive subsystem of emotion.

Emotion Component 2: Physiology

Negative emotional experiences trigger many physiological responses, such as increased heart rate, increased breathing rate, and muscle tension, all of which intensify the physiological component of an emotional experience (Luebbert, Dahme, & Hasenbring, 2001). Therefore, modulating physiological sensations in response to a trigger lessens the intensity of the emotional experience. Consequently, the physiological component of the emotional experience is impacted directly by the control mechanism of arousal, which is modulated by the regulatory act of relaxation.

Physiological Control Mechanism: Arousal. Emotional stimulation causes the heart rate to increase and transfers the body's resources away from long-term processes, such as the immune and digestive systems (i.e., parasympathetic nervous system activities), and towards short-term survival mechanisms (i.e., sympathetic nervous system activity), such as increased blood flow to muscles and the release of hormones that facilitate an immediate fight or flight response. Arousal control in the ER Acts Model therefore refers to the reduction of these physiological responses to reduce the overall degree of arousal. For example, deliberate slow and deep breathing works to reduce heart rate and sympathetic nervous system arousal independent of cognition and behaviour (Jerath, Edry, Barnes, & Jerath, 2006).

Physiological Regulatory Act: Relaxation. Physiological arousal in response to an emotional trigger focuses on activation of the sympathetic nervous system, including heart rate, increased breathing, and the release of hormones such as adrenaline (Zeman, Cassano, Perry-Parish, & Stegall, 2006). The regulatory act of relaxation works to down-regulate the control mechanism of arousal by immediately reducing the activation of these biological systems in the face of an emotional trigger.

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When individuals experience heightened physiological arousal in response to an emotion, they are more likely to deviate from normative logic and endorse logically invalid conclusions (Blanchette & Leese, 2011). Therefore, increased physiological arousal interferes with cognitive activity involved in emotional processing. However, engaging in a relaxation exercise, such as applied muscle relaxation or deep breathing, when experiencing a heightened emotional experience can reduce the intensity of the emotion and improve overall physiological functioning (Hinton et al., 2011). Although the regulatory capacities of this act have received considerably less attention than the other ER acts, the act of relaxation functions to down-regulate a negative emotional experience as it reduces the body's physiological contribution to the emotional state.

Emotion Component 3: Behaviour

Emotional behaviours allow for the outward manifestation of an experienced emotion, and thereby facilitate the communicative nature of emotions. The ER Acts Model conceptualizes the control mechanism of this emotion component as expression, which is dichotomized into the regulatory acts of expressive engagement and suppression.

Behaviour Control Mechanism: Expression. Expression control has the power to influence an emotional experience (Greenberg, 2008). Emotional behaviours and displays are largely shaped by socialization and therefore cultural, societal, and familial norms have large impacts on the propensity to overtly manifest emotional experiences or to instead suppress their display (Eisenberg, Cumberland, & Spinrad, 1998). This simple dichotomy of expressing or concealing emotions is discussed extensively in the ER literature due to its strong implications for socio-emotional well-being and interpersonal relationships (Aldao et al., 2010; Westphal, Seivert, & Bonanno, 2010). The ER Acts Model recognizes these behaviours as expressive engagement and suppression.

Behaviour Regulatory Act: Engagement: Expressive engagement refers to the outward display of experienced emotions, including verbal and non-verbal behaviours, and is an important feature of healthy socio-emotional functioning (Chaplin & Aldao, 2013). In the ER Acts Model, this regulatory act refers to the deliberate modulation of the expression of an emotion for the purpose of the emotion's down-regulation. This distinction is an important one, differentiating this regulatory act from the innate emotional component of expression. Furthermore, this ER act is not simply the absence of suppression, as it is a distinct effort to increase emotional displays, rather than simply the absence of attempts to hide them.

When an individual is limited in his or her range of expressed emotions, or is encouraged to express only particular emotions, he or she is at an increased risk for compromised socio-emotional

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functioning (Chaplin & Aldao, 2013). Conversely, increased emotional expressivity may have benefits for socio-emotional well-being, particularly due to cathartic effects. Expressing or venting emotions can be cathartic, allowing for the reduction of the perceived intensity of the emotion (Stephens, Atkins, & Kingston, 2009). However, effectiveness of this tool is questionable, as venting has also been found to extend the duration of, or increase the intensity of, the emotional state (Tice & Bratslavsky, 2000). Therefore, the effectiveness of expression as a regulatory act may depend on contextual factors, such as an individual's regulatory goals. In summary, expressive engagement has a distinct impact on an emotional experience and is much more than the lack of suppression.

Behaviour Regulatory Act: Suppression: Expressive suppression in response to an emotional event is comprised of active attempts to prevent the behavioural components of an emotional experience (Gross, 2007). Due to socially and culturally influenced emotion display rules (Morelen et al., 2012; Roberts & Strayer, 1996), the inhibition of emotional responses is, at times, a socially appropriate response to a situation. For example, when receiving an unwanted gift, hiding disappointment for the sake of maintaining social relations is often beneficial. However, engaging in suppression in an attempt to inhibit emotions and neutralize discomfort can result in an increased negative emotional experience (Gross & John, 2003; Macklem, 2011) including increased physiological indictors of arousal (Butler, Gross, & Barnard, 2014) and memory impairment of information presented while suppressing (Gross & John, 2003). Therefore, while individuals may feel that they can eliminate an emotion altogether by suppressing its expression, they are actually more likely to experience a heightened emotional response.

Individuals who chronically engage in expressive suppression exhibit diminished control of their emotions (Goldin, McRae, Ramel & Gross, 2008) and are at heightened risk for increased depression, anxiety, and substance use (Aldao et al., 2010), as well as decreased well-being, and lower peer ratings of closeness and likability (Westphal, Seivert, & Bonanno, 2010). For example, an experiment conducted by Butler et al. (2003) demonstrated that participants speaking to an individual instructed to use suppression were less willing to establish a friendship with that individual, which likely occurred because the suppressors were found to be less engaged and less responsive during conversation. Engaging in suppression may also increase the likelihood of the trigger recurring as the individual fails to respond to his or her environment in a manner that could extinguish its existence in the future (Aldao & Nolen-Hoeksema, 2010, Gross & John, 2003).

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ER Acts Model Summary

  As noted above, the ER Acts Model identifies six specific acts of regulation in the moment of a negative emotional experience. Due to the specific nature of this model, many commonly cited ER strategies were not included in this list of acts as they are not immediate responses to emotions, such as emotional awareness (e.g., Subic-Wrana et al., 2014), and could be conceptualized as more distal processes affecting an emotional experience through one or more of the six acts. For example, exercise has been cited as an ER strategy (e.g., Goodwin, Haycraft, & Meyer, 2012). However, this behaviour is almost always a delayed reaction to an emotional experience as individuals rarely instantly engage in physical activity in the response to an emotional trigger. Consequently, the questionnaire developed for this study will be focusing on the six ER acts outlined in the ER Acts Model.

1.6 The Current Study

  The current study had three main objectives. The first objective was to develop a self-report measure to assess an individual's propensity to utilize the six regulatory acts outlined above when experiencing a negative emotion. Although several measures exist that examine an individual's use of the majority of the aforementioned regulatory acts, the combination of these measures would be unwieldy. First, it would require at least four separate extant measures with a total of 80 items in order to measure the constructs being assessed in the single 48-item questionnaire developed for this study. Second, these existing measures do not consider only regulation of negative emotions but positive emotions as well. Finally, extant measures each have unique response scales, making comparisons across measures cumbersome. Therefore, the creation of a new measure facilitates the efficiency and effectiveness of measuring these constructs. The second objective of this study was to use a latent profile analysis (LPA) to identify underlying clusters of regulatory act use. LPA is a person-centered approach that uses within-individual patterns of responding across all variables to derive distinct profiles (Lougheed & Hollenstein, 2012), and determines each individual's probability of being a member of each derived profile (Zalewski et al., 2011). This approach is arguably more useful than comparing only average use of various ER behaviours because it provides a richer picture of an individual's regulatory behaviours, such as the range of ER acts an individual tends to engage in and to what extent he or she relies on them. Therefore, this objective aims to identify how individual response patterns tend to cluster together, revealing general profiles of regulation act use. Finally, the

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third objective was to determine the relationship between profile membership and several measures of well-being, such as anxiety, depression, and relationship quality.

1.7 Research Questions

Research Question 1: Is the Regulation of Emotion Systems Survey (RESS) a valid and reliable measure of the six regulatory acts outlined above? Two independent samples were recruited and asked to complete the RESS in order to confirm its factor structure. One sample completed the RESS on two separate occasions to assess test-retest reliability, as well as measures of convergent validity to assess the validity of each subsection.

Research Question 2: What are the various underlying patterns of regulatory act use? As previously mentioned, the majority of ER research looks at the relation between singular regulatory behaviours and well-being, thereby ignoring the tendency to flexibly utilize a variety of regulation styles in a variety of contexts. Therefore, a latent profile analysis (LPA) was conducted on the RESS data to identify groups (profiles) of individuals with distinct patterns of ER act use.

Research Question 3: Does profile membership have differential relations with measures of well-being? Depression, anxiety, social anxiety, personality, and relationship quality each have strong relations with ER (i.e., Butler et al., 2003; Macklem, 2008) as well as large implications for overall well-being. Therefore, this study examined how scores on these constructs differed based on ER profile membership.

1.8 Study Design

To answer these three research questions, two independent studies were conducted. The first study involved a sample of adults recruited through Amazon Mechanical Turk who completed the RESS online in order to confirm its factor structure. The second study involved a sample of late adolescents who also completed the RESS. A latent profile analysis was completed on their responses, which yielded a 3-group solution to the data. Participants who were assessed as being within the top 20% of each profile were recruited to attend a lab session where they completed convergent validity measures as well as measures of socio-emotional well-being.

Chapter 2

Study 1 Method

2.1 Participants

Participants included 574 individuals recruited from the Amazon Mechanical Turk website. Because the survey system used in this study forced individuals to provide a response for each item, missing data represented participants that quit the survey before completion, and therefore these participants were removed from the dataset. Twenty-six participants were removed from the dataset, resulting in a total of 548 participants.

Previous research using samples from Mechanical Turk has found them to be representative of the American population, and to provide data of similar or even better quality than other common samples, such as student participants (Paolacci & Chandler, 2014). The final group of participants included 548 individuals between the ages of 18 and 75 ($M = 35.96$ years, $SD = 12.5$). The majority of the sample was female (60.5% female, 38.7% male, 0.5% mixed gender, and 0.2% unknown), residing in the United States of America (99.3% USA, 0.2% other), and identified their country of origin as the United States of America (93.5% USA, 1.8% India, 1.4% South East Asia, 3.2% Other).

2.2 Procedure

A recruitment notice was created and posted on the Amazon Mechanical Turk website, inviting individuals to complete a short survey that would ask them questions regarding how they feel they respond to negative emotions. Participants were compensated 20 cents ($0.20) for completing the survey, which took roughly 15 minutes to complete. Compensation was provided once participants entered a completion code available on the last page of the survey into a section of the survey's main page.

2.3 Measures.

The Regulation of Emotion Systems Survey (RESS; Appendix A) was developed to assess an individual's propensity to use the aforementioned six acts of emotion regulation to down-regulate his or her experiences of negative emotions. Eight items were created to identify a response indicative of

each of the six ER acts described above (Distraction, Rumination, Reappraisal, Relaxation, Engagement, and Suppression), resulting in a total of 48 items. These items were created based on the available literature and previously developed scales for each act, and customized to reflect the specific down-regulation, immediate nature, and negative emotion focus of the RESS. Each item is scored using a 5-point Likert scale ranging from one (Never) to five (Always). The reliability of each subscale was high; subscale scores have Cronbach's alpha levels that range from .87 through .93. The specific alpha values for each subscale can be found in Table 1.

Table 1.

RESS subscale reliability scores for Study 1 and Study 2 (phases 1 and 2)

Subscale	Cronbach's Alpha MTurk Sample	Cronbach's Alpha Study 2 Phase 1	Cronbach's Alpha Study 2 Phase 2
Suppression	.93	.94	.98
Rumination	.91	.91	.90
Reappraisal	.93	.95	.96
Relaxation	.87	.88	.91
Distraction	.91	.89	.91
Engagement	.91	.92	.96

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Chapter 3

Study 1 Results and Discussion

3.1 Results

All items were assessed for missing values and normality of distributions. As noted above, participants with missing data points were removed from the study, therefore there was no missing data in the current dataset. A principal axis factor analysis was then conducted on all RESS items, using an oblimin rotation because it was anticipated that factors might be correlated. Individual variables were restricted to factor loadings of .40 and higher. Five items did not load onto any factors, and therefore the analysis was rerun without these items. The analysis produced six separate factors, however, four criteria were used to confirm the final factor structure. First, only six factors had an initial eigenvalue greater than one, indicating that any further factors accounted for less variability than a single variable and therefore should not be retained (Girden, 2001). Second, the scree plot demonstrated a final sharp decline in variance accounted for following the sixth factor, suggesting a six-factor solution. Third, a parallel analysis was run to determine the eigenvalues that would be predicted by chance based on the sample size and number of items. This analysis suggested a 12-factor solution, however, parallel analysis tends to overestimate the number of factors appropriate for a dataset (Glorfield, 1995). Finally, because the RESS was designed to assess six distinct constructs and each item loads strongly onto one of the six factors, model interpretability suggests a six-factor solution. Therefore, based on these four criteria, the six-factor solution was retained.

See Table 2 for factors, items, and loadings. Each factor was constructed of items indicative of a separate ER act, and was therefore labeled by the ER act it measured (Distraction, Engagement, Rumination, Reappraisal, Relaxation, and Suppression). Therefore, the factor structure obtained from this study fit the theoretical model proposed within the ER Acts Model. Moreover, based on the factor structure and mostly weak correlations among the six subscales, this study also provides evidence for the distinct and independent nature of the six ER acts (see table 3 for correlations).

Table 2.

Study 1 RESS Factor structure, eigenvalues, items, and item loadings

Factor Label	Eigen Value	Item	Loading
Reappraisal	9.68	Looking at the situation from several different angles	.87
		Identifying different angles to see the situation	.87
		Looking at the emotional event from a different perspective	.83
		Thinking of other ways to interpret the situation	.82
		Thinking of alternate ways to see the situation	.80
		Trying to see the emotional event from a different perspective	.78
		Trying to think of the emotional event in a more positive light	.65
		Trying to see the situation in a more positive light	.63
		Questioning the cause of my emotions	.60
		Analyzing the cause of my emotion	.60
Engagement	6.77	Expressing my feelings	.82
		Showing that I was upset	.81
		Outwardly showing what I was feeling	.80
		Showing my feelings	.79
		Vocalizing how I was feeling	.73
		Letting my emotions show	.72
		Telling others exactly how I felt	.62
		Using facial expressions to show that I was upset	.46
Rumination	4.63	Thinking again and again about what went wrong	.87
		Thinking about the emotional event again and again in my mind	.85
		Going over the emotional event again and again in my mind	.81
		Continually thinking about what was bothering me	.79
		Continually trying to decide what went wrong	.69
		Thinking repeatedly about what was bothering me	.68
Distraction	2.55	Engaging in activities to distract myself	.89
		Engaging in something else to keep busy	.83

		Doing something else to distract myself	.82
		Immediately working on something to keep myself busy	.61
		Trying to think about other topics	.61
		Thinking about other things	.57
		Engaging in a relaxing activity	.45
Relaxation	1.59	Trying to slow my heart rate and breathing	.94
		Focusing on slowing my heart rate and breathing	.90
		Taking deep breaths	.66
		Decreasing the tension in my body	.54
Suppression	1.32	Hiding my feelings	.84
		Being sure to hide what I was feeling	.83
		Concealing how I was feeling	.83
		Trying to pretend I wasn't upset	.83
		Making an effort to hide my feelings	.81
		Pretending I was not upset	.78
		Making sure no one could tell what I was feeling	.71
		Acting like I was not upset	.48

3.2 Study 1 Discussion

The objective of Study 1 was to identify the factor structure of the RESS with a diverse sample. Based on the results of this study, the RESS is a reliable and effective means of assessing the six ER acts outlined by the ER Acts model. Each subscale had high reliability scores, as well as strong and differentiated factors and factor loadings. Therefore, it seems that the resultant 43-item RESS independently assessed an individual's propensity to engage in each of the six ER acts to down-regulate his or her negative emotion experiences. Study 2 sought to replicate these findings with an independent sample, as well as to explore associations with indices of socio-emotional functioning and the use of a variety of combinations of these regulatory acts.

Table 3.

Study 1 correlation among RESS subscales.

	Reappraisal	Engagement	Rumination	Distraction	Relaxation	Suppression
Reappraisal	1.0					
Engagement	.07	1.0				
Rumination	.09*	.29**	1.0			
Distraction	.39**	-.11**	-.06	1.0		
Relaxation	.46**	-.08	-.07	.47**	1.0	
Suppression	.15**	-.47**	.13**	.39**	.22**	1.0

Note: * *p* < .05 ; ** *p* < .01.

Chapter 4

Study 2 Methods

4.1 Participants.

Participants included 1606 students enrolled in a first year Psychology class. Participants were asked to complete a package of questionnaires that included the RESS as part of their Psychology 100 class requirements. Twenty-four cases where participants completed less than 75% of the questions were removed from the dataset, resulting in a sample size of 1582. These participants were removed as their failure to complete the questionnaire indicated a lack of engagement with the Psychology 100 assignment. Participants were between the ages of 16 and 33 years old ($M = 18.2$, $SD = 1.2$). The majority of participants was female (75.5%) and identified as Caucasian (77.8% Caucasian, 14.4% East Asian, 5.1% South Asian, and 7.8% Other).

4.2 Procedure.

Participants completed the questionnaires during the first week of classes via an online survey site, and an electronic copy of the results was made available to the researcher. A Latent Profile Analysis was completed on the data, which reports the probability of each individual to belong to each derived profile. Because this study was interested in assessing the relationship between membership in each profile and outcome measures, only those belonging to the top 10th percentile of each resultant profile were recruited to participate in the second phase of the study. An email was sent out to each student who qualified, and they were invited to attend an hour-long session at a computer lab on campus to complete additional surveys online. A total of 1108 individuals were invited to the second phase of the study, and 108 participated. Participants used the Queen's Psychology Pool electronic sign up system to enroll in the study, and chose a timeslot convenient for them. If participants attended the session and completed the questionnaires, they were compensated with a one percent credit towards their Psychology 100 class final grade.

4.3 Measures.

Regulation of Emotion Systems Survey (RESS; Appendix A). The RESS is a 48-item, self-report questionnaire designed to assess an individual's propensity to use six acts of emotion regulation to down-regulate their experiences of negative emotions. Eight items were created to identify a response indicative of each of the six ER acts described above (Distraction, Rumination, Reappraisal, Relaxation, Engagement, and Suppression), resulting in a total of 48 items. These items were created based on the available literature and previously developed scales for each act, and customized to reflect the specific down-regulation, immediate nature, and negative emotion focus of the RESS. Each item is scored using a 5-point Likert scale ranging from one (Never) to five (Always). Participants completed the RESS once during the psychology pre-screen, and again during their laboratory session. The reliability of each subscale was high; subscales have Cronbach's alpha levels that range from .88 through .94. The specific alpha values for each subscale for phase 1 and 2 of Study 2 can be found in Table 1.

RESS construct divergent and convergent validity measures.

Reappraisal and Suppression. Emotional Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ is a 10-item self-report questionnaire that measures an individual's propensity towards using emotional suppression and reappraisal as emotional regulation strategies. Each item is scored using a 7-point Likert scale ranging from one (strongly disagree) to seven (strongly agree). In this sample, reliability was high for both the reappraisal subscale scores ($\alpha = .88$) as well as the suppression subscale scores ($\alpha = .86$).

Distraction. Cognitive Behavioral Avoidance Scale (CBAS; Ottenbreit & Dobson 2004). The CBAS is a 31-item self-report measure with four subscales assessing cognitive social, cognitive non-social, behavioural social, and behavioural non-social avoidance. In order to assess the cognitive mechanism of distraction, only the cognitive subscales were used. Each item is scored using a 5-point Likert scale ranging from one (not true at all for me) to five (extremely true for me). The CBAS subscale scores demonstrated high reliability (Cognitive Social Avoidance $\alpha = .78$; Cognitive Non-Social Avoidance $\alpha = .90$).

Rumination. Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991). The RRS is a 22-item self-report measure assessing a participant's propensity to use rumination in response to depressed mood. Items are rated using a Likert scale from 1 (almost never) to 4 (almost always). The RRS is composed of two subscales, reflection and brooding (Treynor et al. 2003).

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Because both are components of rumination, the scale's total score was used. The RRS scores demonstrated high reliability in this sample (Cronbach's α = .93).

        Expressivity. *Emotional Expressivity Scale* (EES; Kring, Smith, & Neale, 1994). The EES is a 17-item self-report tool, which assesses an individual's proclivity to openly express the emotions they experience. Items are rated on a 4-point Likert scale from 1 (never true) to 4 (always true). The EES scores demonstrated a high reliability, with a Cronbach's alpha of .92.

Outcome measures.

        Anxiety. *Beck Anxiety Inventory* (BAI; Beck, Epstein, Brown, & Steer, 1998). The BAI is a 21-item self-report inventory designed to measure the severity of cognitive and somatic symptoms of anxiety. Respondents indicated on a 4-point scale (0 = not at all; 3 = severely) the severity that they have been experiencing anxiety symptoms (e.g., heart pounding, unable to relax, nervousness). In the current sample, reliability of the Anxiety Symptoms scores was high (Cronbach's α = .92).

        Depression. *Beck Depression Inventory, second edition* (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report questionnaire assessing the extent to which someone has experienced depressive symptoms in the last two weeks, such as sadness, pessimism, and somatic complaints. Participants are asked to choose one of four statements that best reflect the extent to which they have experienced various symptoms of depression in the last two weeks (e.g., 0 = I do not feel sad; 1 = I feel sad much of the time; 2 = I am sad all of the time; and 3 = I am so sad or unhappy that I can't stand it). Two items regarding loss of interest in sex and suicidal thoughts were excluded at the request of the institutional ethics review board. In the current study, Depressive Symptoms was calculated as the mean across items and scale scores demonstrated good internal consistency, Cronbach's α= .93.

        Social Anxiety. *Self-Report Liebowitz Social Anxiety Scale* (LSAS-SR; Dos Santos, Loureiro, Crippa, De Lima Osório, 2013). The LSAS was adapted from the original clinician administered measure to a self-report version, and was found to be valid and reliable within a sample of clinical and non-clinical groups (Dos Santos et al., 2013). The LSAS-SR consists of 24 items scored on a 4-point Likert scale (0 = None to 3 = Severe). In the current sample, the LSAS scores obtained a Cronbach's alpha score of .96.

        Relationship Quality. *Inventory of Parent and Peer Attachment* (IPPA; Armsden & Greenberg, 1987). The IPPA is a 53-item self-report measure assessing specific elements of an individual's relationships in order to evaluate the strength of the relationship an individual has with parents and peers. Items are scored on a 5-point Likert Scale from 1 (almost never or never true) to 5

(almost always or always true). In the current sample, the IPPA scores demonstrated good internal consistency, Cronbach's α= .94 for both the parent and peer subscales.

      Personality Type. *Big Five Inventory* (BFI; John & Srivastava, 1999). The BFI is a 44-item self-report questionnaire measuring five facets of personality Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Hahn, Gottschling, & Spinath, 2012). Scores for each subscale of the BFI demonstrated adequate reliability across items, with Cronbach's alpha scores of .78 for Openness, .82 for Conscientiousness, .88 for Extraversion, .79 for Agreeableness, and .84 for Neuroticism.

Chapter 5

Study 2 Results

5.1 RESS Factor Analysis.

All items were assessed for missing values and normality of distributions. In total, there were 63 missing data points, which were distributed throughout individuals and items. These missing data points accounted for less than 1% of the total RESS dataset, and therefore imputation was not used. Women and men showed no significant differences in their scores on most RESS subscales, however, women scored significantly higher than men on Rumination (see Table 5). Furthermore, due to the very restricted age range of participants, age was not significantly correlated with any study variables.

A principal axis factor analysis was conducted on all 48 RESS items, using an oblimin rotation as it was anticipated that factors might be correlated. Individual variables were restricted to factor loadings of .40 and higher. Two items did not load onto any factor, therefore the analysis was re-run without them. The analysis produced seven separate factors, however, four criteria were used to confirm the final factor structure. First, only six had an initial eigenvalue greater than one, indicating that the seventh factor accounted for less variability than a single variable and therefore should not be retained (Girden, 2001). Second, the scree plot demonstrated a final sharp decline in variance accounted for following the sixth factor. Third, a parallel analysis was run to determine the eigenvalues that would be predicted by chance based on the sample size and number of items. This analysis resulted in 15 factors, however, parallel analysis tends to overestimate the number of factors appropriate for a dataset (Glorfield, 1995). Finally, while the first six factors were comprised solely of items indicative of a single ER act, the seventh factor was comprised of items indicative of several different ER acts. Therefore, model interpretability suggests a six-factor solution. Based on these four criteria, the six-factor solution was retained. The analysis was re-run without the items that loaded solely onto the seventh factor, and produced a six-factor solution. Each item loaded onto only one of the six factors, and each factor was indicative of a distinct ER act.

See Table 4 for factors, items, and loadings. Each factor was constructed of items indicative of a separate ER act, and was therefore labeled by the ER act it measured (Distraction, Rumination, Reappraisal, Relaxation, Engagement, and Suppression). Each participant was assigned a score for each subscale based on the mean of the items within each factor. See Table 5 for gender differences

Table 4.

Study 2 RESS Factor structure, eigenvalues, items, and item loadings.

Factor Label	Eigen Value	Item	Loading
Engagement	8.65	Showing my feelings	.87
		Showing that I was upset	.85
		Letting my emotions show	.84
		Outwardly showing what I was feeling	.83
		Expressing my feelings	.75
		Vocalizing how I was feeling	.66
		Telling others exactly how I felt	.63
		Using facial expressions to show that I was upset	.54
Reappraisal	7.91	Looking at the situation from several different angles	.91
		Identifying different angles to see the situation	.90
		Thinking of alternate ways to see the situation	.88
		Looking at the emotional event from a different perspective	.87
		Thinking of other ways to interpret the situation	.87
		Trying to see the emotional event from a different perspective	.84
		Trying to see the situation in a more positive light	.74
		Trying to think of the emotional event in a more positive light	.73
		Analyzing the cause of my emotions	.55
		Questioning the cause of my emotions	.55
Rumination	4.28	Thinking about the emotional event again and again in my mind	.91
		Thinking again and again about what went wrong	.85
		Going over the emotional event again and again in my mind	.80
		Continually thinking about what was bothering me	.77
		Thinking repeatedly about what was bothering me	.71
		Continually trying to decide what went wrong	.60
Distraction	2.60	Engaging in something else to keep busy	.92
		Engaging in activities to distract myself	.90
		Doing something else to distract myself	.82

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		Immediately working on something to keep myself busy	.65
Relaxation	1.88	Focusing on slowing my heart rate and breathing	.96
		Trying to slow my heart rate and breathing	.95
		Taking deep breaths	.75
		Decreasing the tension in my body	.52
Suppression	1.25	Trying to pretend I wasn't upset	.89
		Pretending I was not upset	.88
		Making an effort to hide my feelings	.88
		Concealing how I was feeling	.83
		Being sure to hide what I was feeling	.83
		Hiding my feelings	.77
		Making sure no one could tell what I was feeling	.70
		Acting like I was not upset	.65

across the RESS subscales. Due to the restricted age of Study 2, there were no significant correlations between age and any RESS subscale. RESS subscale score reliabilities ranged from Cronbach's alpha of .88 to .95. See Table 1 for subscale score reliabilities, and see Table 6 for correlations among the Study 2 RESS subscales.

5.2 Latent Profile Analysis.

In order to identify how individuals used the variety of ER acts assessed by the RESS, a series of latent profile analyses (LPA) using the Mplus software package (Muthén & Muthén, 1998–2010) were conducted on the full sample. LPA is a person-centered approach that uses within-individual patterns of responding across all variables to derive distinct profiles (Lougheed & Hollenstein, 2012), and determines each individual's probability of being a member of each derived profile (Zalewski et al., 2011). The six subscale means for each individual derived from the factor analysis of the RESS were entered into the LPA. Therefore, a total of six variables were entered into the analysis (Distraction, Rumination, Reappraisal, Relaxation, Engagement, and Suppression). A two-class model was run first and evaluated for goodness of fit. This was followed by an analysis of

Table 5.

Average scale scores and mean differences between men and women for Study 2.

	Total Mean	Mean (SD)	
		Men	Women
		(n = 21)	(n = 86)
RESS: Suppression	2.92	3.20 (1.2)	2.85 (1.2)
RESS: Rumination	3.74	3.20 (1.0)	3.88** (0.9)
RESS: Reappraisal	2.80	2.91 (1.1)	2.79 (.95)
RESS: Relaxation	2.38	2.38 (0.9)	2.37 (1.1)
RESS: Distraction	3.09	3.19 (0.9)	3.07 (0.9)
RESS: Engagement	2.68	2.47 (1.1)	2.77 (1.1)
Anxiety	.64	.45 (0.5)	.69* (0.5)
Depression	.81	.57 (0.5)	.89** (0.6)
Social Anxiety	.91	.81 (0.6)	.94 (0.6)
Family Relationship Quality	2.34	2.38 (0.8)	2.35 (0.8)
Peer Relationship Quality	2.12	2.47 (0.6)	2.06* (0.7)
Extraversion	3.23	2.99 (1.0)	3.31 (0.9)
Agreeableness	3.86	3.68 (0.6)	3.88 (0.7)
Conscientiousness	3.51	3.46 (0.6)	3.50 (0.7)
Neuroticism	3.22	2.68 (0.7)	3.35** (0.9)
Openness	3.63	3.73 (0.7)	3.61 (0.6)
Social Cognitive Avoidance	1.97	1.84 (0.6)	1.98 (0.8)
Non-Social Cognitive Avoidance	1.87	1.88 (1.0)	1.89 (0.8)
EES Expression	3.48	2.93 (0.9)	3.62** (1.0)
ERQ Reappraisal	4.63	4.93 (0.9)	4.51 (1.3)
ERQ Suppression	3.68	4.44 (1.5)	3.50* (1.6)
RRS Rumination	2.32	2.25 (0.7)	2.35 (0.7)

Note: * $p < .05$; ** $p < .01$.

Table 6.

Study 2 correlation among RESS subscales.

	Suppression	Reappraisal	Engagement	Rumination	Distraction	Relaxation
Suppression (8 items)	1.0					
Reappraisal (10 items)	.002	1.0				
Engagement (8 items)	-.56**	.15**	1.0			
Rumination (6 items)	.23**	.16**	.14**	1.0		
Distraction (4 items)	.21**	.30**	.01	.04	1.0	
Relaxation (4 items)	.07**	.36**	.07**	.01	.30**	1.0

Note: * $p < .05$; ** $p < .01$.

all models up to nine classes. The analysis was stopped at a nine-class model because all indicators of fit ceased to improve.

Several statistics were examined in order to determine the fit of each of the models. The Bayesian information criterion (BIC; Schwarz, 1978), adjusted Bayesian information criterion (adjusted BIC; Sclove, 1987), and Akaike information criterion (AIC; Akaike, 1973) are indicators of model fit provided by MPlus, with lowest values indicating the best fit (Nylund, Asparouhov, & Muthen, 2007). Entropy is another model of fit indicator that identifies how well a model classifies individuals into the derived profiles, with values closest to 1 indicating the best fit (Celeux & Soromenho, 1996). Finally, the Vuong–Lo–Mendell–Rubin (VLMR) likelihood ratio test and the Lo–Mendell–Rubin (adjusted LMR) likelihood ratio test are both significance tests that indicate whether the model provides a significantly better fit to the data when compared to the model with one fewer groups (Nylund et al., 2007). See Table 7 for fit statistics of the models tested.

Evaluation of the fit statistics of the models run indicated that a three-group model was the best fit to the data. Although the AIC, BIC, and adjusted BIC values continued to improve as the number of groups increased, entropy values declined following the three-group model. Furthermore,

Table 7.

Fit statistics for LPA models.

Number of Profiles	AIC	BIC	Adjusted BIC	Entropy	VMLR *p* value	Adj. LMR *p* value
2	32610.62	32744.78	32665.36	0.815	< .001	< .001
3	31795.01	31977.46	31869.45	0.78	< .001	< .001
4	31550.94	31781.7	31645.09	0.76	0.3329	0.3367
5	31401.27	31680.32	31515.13	0.75	0.7287	0.7298
6	31241.28	31568.63	31374.84	0.75	0.2456	0.2459
7	31124.12	31499.77	31277.4	0.76	0.6159	0.6168
8	31022.53	31446.48	31195.52	0.76	0.4587	0.4594
9	30941.32	31413.57	31134.01	0.76	0.3584	0.3583

Note**:** AIC: Adjusted Bayesian information criterion; BIC: Bayesian information criterion; VLMR: Vuong–Lo–Mendell–Rubin; Adj. LMR: Adjusted Lo–Mendell–Rubin

the VLMR and adjusted LMR ratio tests indicated that, although the three-group model was a significantly better fit than the two-group model, no further models proved to be a significantly better fit than the one before it. Therefore, the three-group model was retained as it provided the best combination of fit statistics (low information criterion statistics, high entropy, and significant likelihood ratio tests) of all models tests.

The results of the three-group model are displayed in Figure 2. The chart displays the mean of the *z*-scores of each variable entered into the LPA analysis (e.g., Distraction, Rumination). Groups were labeled according to the pattern of ER use reported: (1) *Average ER Act Use* group: all scores were within one SD of the sample mean; (2) *Suppression Propensity* group: high (> 1 SD above the sample mean) on suppression, low (> 0.5 SD below the sample mean) on engagement, and within 0.5 SD of the sample mean on the remaining variables; (3) *Engagement Propensity* group: high (> 1 SD above the sample mean) on engagement, low (> 0.5 SD below the sample mean) on suppression, and within 0.5 SD of the sample on the remaining variables.

The size, mean age, and gender distributions in each group are presented in Table 8. Exploratory analyses were conducted to assess group differences in sex and age. Chi-square analysis

Figure 2.

Three group model of RESS ER Acts.
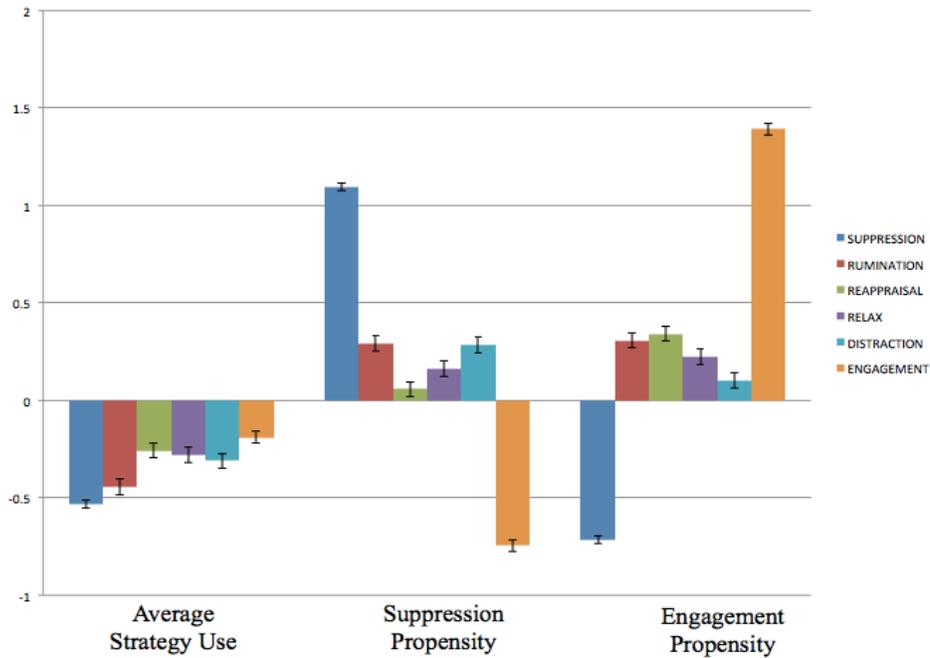
Note: Scores of each act are represented as standard deviations from the overall sample mean.

indicated that groups did not differ by sex, $\chi^2(2) = 4.50$, $p = .10$. A one-way analysis of variance test indicated that groups also did not differ by age, $F(2, 105) = 2.5$, $p = 0.09$.

5.3 Relation between Profile Membership and Outcome Measures

Based on the LPA results, conditional probabilities were provided for each individual, which indicated the likelihood that he or she belonged to each of the three profiles. Participants who were in the top 10th percentile of each profile were recruited to attend a lab session to complete the RESS for a second time, as well as measures of convergent and divergent validity, and outcome measures. As an individual's conditional probability of belonging to one profile moves away from 1.0, his or her conditional probability of belonging to another profile increases. Therefore, to be sure participants were truly reflective of the profile they were recruited to represent, only the top 10th percentile were

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Table 8.

The size, mean age, and gender distributions of each LPA group.

LPA Group	N	Mean Age (SD)	Percentage Female
1	568	18.62 (1.92)	70.8%
2	590	18.23 (1.11)	73.9%
3	424	17.91 (0.56)	85.0%

invited to participate. In total, 108 individuals participated, 34 members of profile 1, 39 members of profile 2, and 35 members of profile 3. All variables were assessed for missing values and normality of distributions. Less than 1% of the total dataset was missing, and therefore imputation was not conducted. Furthermore, because some variables were non-normally distributed, bootstrapping was used for all analyses; however, raw values are reported in text and tables where appropriate.

To test the first hypothesis, which is that the RESS is a valid and reliable measure of the constructs it was designed to assess, correlations were run between each of the RESS subscales and their corresponding pre-existing measures. Results indicated that all RESS constructs were significantly correlated with their corresponding measures, with the exception of the RESS subscale Distraction and its corresponding measures, the cognitive subscales of the CBAS. See Table 9 for correlation and significance values. See Appendix B for correlation values of all Study 2 variables. Test-retest reliability was assessed by identifying the correlation between the first administration of the RESS and a second administration two months later. Correlation values were found to be between moderate and strong for all RESS subscales (see Table 10).

To test the second hypothesis, that varying combinations of ER act use would result in differences in well-being, a General Linear Model (GLM) was conducted, controlling for age and sex, to assess how scores of Anxiety, Depression, Social Anxiety, Relationship Quality, and Personality differed between the three LPA groups. A study by Lougheed and Hollenstein (2012) found that groups who relied strongly on only a few ER strategies fared more poorly than groups who had a more extensive repertoire of ER strategies. Therefore, following each GLM, planned Helmert contrasts compared the Average ER Act Use group to the combination of the Engagement and Suppression Propensity groups, followed by a contrast comparing only the Engagement and

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Table 9.

Convergent validity: correlation values between the RESS subscales and pre-existing measures.

RESS Subscale	Corresponding Measure	Pearson Correlation Value
Suppression	ERQ – Suppression	.76 **
Rumination	RRS	.47 **
Reappraisal	ERQ – Reappraisal	.34 **
Engagement	EES	.81 **
Distraction	CBAS – Social Cognitive Avoidance	-.02
	CBAS – Non-Social Cognitive Avoidance	-.003

Note: * p < .05; ** p < .01. ERQ: Emotion Regulation Questionnaire; RRS: Ruminative Response Scale; EES: Emotional Expressivity Scale; CBAS: Cognitive Behavioural Avoidance Scale.

Suppression groups. See Table 11 for a summary of GLM and contrast results.

Internalizing Outcome Measures

There was a significant main effect of anxiety symptoms across groups, $\eta_p^2 = .10$. Planned Helmert contrasts showed that the Average ER Act Use group had significantly lower anxiety symptom scores than the Engagement and Suppression groups combined, *p* < .01, however, there were no significant differences between Suppression and Engagement groups. There was also a significant main effect of depressive symptoms across groups, $\eta_p^2 = .08$. Planned Helmert contrasts showed that, as for anxiety symptoms, the Average ER Act Use group had significantly lower depressive symptoms than the Engagement and Suppression groups combined, *p* < .01, however, there were no significant differences when comparing the Engagement and Suppression groups.

This pattern of results was slightly different when examining social anxiety symptoms. Although there was a significant main effect of social anxiety symptoms across groups, $\eta_p^2 = .12$, planned Helmert contrasts showed that there were no significant differences between the Average ER

Table 10.

Correlation scores of each RESS subscale at Phase 1 and 2 of Study 2

RESS Subscale	Correlation between Phase 1 and Phase 2 RESS completion
Reappraisal	.68**
Suppression	.87**
Rumination	.74**
Distraction	.54**
Relaxation	.67**
Expression	.85**

Note: * p < .05; ** p < .01

Act Use group and the Engagement and Suppression groups combined. However, the Suppression group reported significantly higher social anxiety symptoms than the Engagement group, $p < .01$.

Personality Dimensions

For personality dimensions, Openness, Agreeableness, and Neuroticism each showed no differences across the various groups. However, there was a significant main effect of Extraversion across groups, $\eta_p^2 = .15$. Planned Helmert contrasts showed that there was no significant difference when comparing the Average ER Act Use group to the Engagement and Suppression groups combined, however, they also showed that the Engagement group had significantly higher Extraversion scores than the Suppression group, $p < .01$. Similarly, while there was no significant difference of Conscientiousness when comparing the Average ER Act Use group to the Engagement and Suppression groups combined, the Engagement group reported significantly higher levels of Conscientiousness than the Suppression group ($p = .05$).

Relationship Quality

For Relationship Quality, Family and Peer Relationship Quality were each assessed separately. There was a significant main effect of Family Relationship Quality across groups, $\eta_p^2 = .10$. Planned Helmert contrasts showed that there was no significant difference when comparing the Average ER Act Use group to the Engagement and Suppression groups combined, however, they also showed that the Suppression group had significantly higher Family Relationship Quality than the

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Table 11.

Mean values for each LPA group, and summary of GLM and contrast results controlling for age and sex.

Scale (possible mean score range)	Average Use Group (n = 34)	Suppression Group (n = 39)	Engagement Group (n = 35)	GLM	Helmert Contrast 1 : 2 & 3	Helmert Contrast 2 : 3
Depression (0 – 3)	.60	1.01	.84	4.47*	**	
Anxiety (0 – 3)	.43	.81	.67	5.82**	**	
Social Anxiety (0 – 3)	.76	1.19	.77	6.66**		**
Extraversion (1 – 5)	3.23	2.79	3.73	9.10**		**
Agreeableness (1 – 5)	3.80	3.73	3.99	1.17		
Conscientiousness (1 – 5)	3.51	3.34	3.66	2.01		*
Neuroticism (1 – 5)	3.04	3.26	3.35	.81		
Openness (1 – 5)	3.50	3.60	3.77	2.10		
Family Relationship Quality (1 – 5)	2.23	2.71	2.13	5.50**		**
Peer Relationship Quality (1 – 5)	2.00	2.55	1.83	11.79**		**

Note. * $p < .05$; ** $p < .01$. Empty contrast cells indicate a non-significant comparison.

Engagement group, $p < .01$. There was also a significant main effect of Peer Relationship Quality across groups, $\eta^2_p=.19$. Planned Helmert contrasts showed that there was no significant difference when comparing the Average ER Act Use group to the Engagement and Suppression groups combined, however, they showed that the Suppression group had significantly higher Peer Relationship Quality than the Engagement group, $p < .01$.

Chapter 6

Discussion

The current study had three objectives. The first was to develop a self-report measure, the Regulation of Emotion Systems Survey (RESS), to assess an individual's propensity to utilize the six regulatory acts outlined in the ER Acts model to down-regulate a negative emotion. The second objective of this study was to use a latent profile analysis (LPA) to identify underlying groupings of regulatory act use across participants. Finally, the third objective was to determine the relation between group membership and several measures of well-being, such as anxiety and depression.

Overall, the current study used two independent samples to assess the effectiveness of the developed RESS. The results from both samples demonstrated that the RESS is a reliable and effective measure of the six ER acts it aimed to assess. As hypothesized, the factor structure of the RESS was maintained across both studies, with almost identical item distribution between the two samples. More items loaded onto the Distraction subscale in the MTurk sample compared to the student sample, however, which could be reflective of demographic differences of the two samples. Elements such as age, SES, and culture may impact individual ER differences, particularly in regards to tendencies to attend to or distract away from emotional experiences (Barrett, Lane, Sechrest, Schwartz, 2000; Grossmann, Ellsworth, & Hong, 2011), and therefore may account for these factor differences between samples. Furthermore, the subsection of Relaxation contained slightly less items in both samples than the other RESS subsections, which could reflect less engagement with relaxation behaviours across samples, or a less conscious use of this regulatory behaviour. Future research will focus on providing elucidation to these two aspects of the RESS.

Study 2 demonstrated that the RESS is a valid measure of the ER Acts. The subscales of Rumination, Reappraisal, Engagement, and Suppression were each significantly correlated with their corresponding measure of convergent validity. Furthermore, the RESS is a much more effective and efficient way to assess these six constructs than previously existing questionnaires, as relying on them would be cumbersome and ambiguous because they do not focus solely on down-regulation or on negative emotions. Therefore, the results of Study 2 provide support for the validity of the RESS and its subscales, making the RESS the first measure to specifically measure the tendency to use the six

ER acts to down-regulate the experience of negative emotions. Moreover, some RESS subscales, such as Suppression, were better predictors of anxiety and depression than the previously existing and more widely-used measures, (see Appendix B).

This study also examined the relation between patterns of ER act use and well-being by identifying subgroups of the sample with similar profiles of ER Act use. There were three distinct profiles of regulatory act use within this sample: Average Act Use, Suppression Propensity, and Engagement Propensity. Although the Average Act Use group reported average use of all regulatory acts, the Suppression and Engagement Propensity groups used one behaviour almost exclusively. Therefore, individuals in these groups relied almost solely on one regulatory behaviour to respond to all negative emotions. Lougheed and Hollenstein (2012) conducted a study with a similar sample and also found ER profiles representative of average regulatory behaviour use and high suppression use. Therefore, it is possible that these two patterns of regulatory behaviours are common among this age range.

Membership in the various ER profiles had distinct implications for well-being, such that the Average group had significantly lower depression and anxiety scores than the other two groups combined. Furthermore, the Suppression group had significantly better peer and family relationship quality than the Engagement group. Three possible interpretations can be drawn from these findings. The first possible interpretation of the results of this study is that the focus on the six ER acts is unnecessary, as it is only expressive engagement and suppression use that were related to well-being. However, an important distinction must be made between being high in expressive engagement or suppression, and being in the Suppression Propensity or Engagement Propensity profiles. Individuals in these LPA groupings were high on either suppression or engagement at the expense of the other five ER acts. Over-reliance on one act at the expense of other ER acts is not the same as simply reporting high levels of that one behaviour. Consequently, measuring only one regulatory behaviour ignores the extent to which the other regulatory behaviours are relied upon. For example, measuring only the extent to which an individual relies on suppression ignores how much he or she relies on other acts. This individual could be high on all ER acts, high on a combination of acts or, as seen in this study, high only on suppression. Therefore, ER profiles may provide additional insight into the regulation and well-being relationship. This conclusion could be tested in future studies by comparing the effect size of the correlation between one act, such as suppression, and outcome measures with the effect size of the group differences on outcome measures. Unfortunately, this was not testable within the constraints of the current study.

A second possible interpretation is that the differential patterns of ER act use could be due to a fundamentally different experience of emotions themselves. Although all individuals use emotion regulation to down-regulate their experience of emotion to some extent, it is possible that some individuals feel the need to do so more than others. Two potential individual difference factors are emotional reactivity, how often an individual has strong positive and negative emotional responses (Nelson & Perry, 2015) and emotional intensity, how intensely an individual feels the emotions he or she experiences (Rojas et al., 2015). It is plausible that individuals who experience high emotional reactivity and intensity may require more deliberate and extensive attempts to regulate their emotional experiences. In this study, the Average Act Use group showed slightly lower than average use of every ER act assessed. Therefore, it is possible that this group of participants also experienced negative emotions less often and of a less intense nature than participants in the other two groups.

Experiencing emotions at a heightened intensity, on the other hand, may increase the need for emotion regulation, which may have implications for regulation style and, in turn, well-being (Mennin, McLaughlin, & Flanagan, 2009). The relation between membership in the Engagement Propensity group and poor relationship quality may be explained by the tendency of these highly expressive individuals to experience negative emotions more strongly and more often than others, thereby exhausting the individuals to which they are expressing their negative emotions. Emotion regulation is strongly associated with relationship quality (Tani, Pascuzzi, & Raffagnino, 2015), therefore, if individuals have difficulty regulating their emotions due to their highly intense and frequent nature, they may also have difficulty maintaining high quality relationships. Interestingly, ER and relationship quality may have a reciprocal association, in that poor ER leads to poor relationship quality, which in turn increases the likelihood of negative emotions and dysregulation.

Finally, a third interpretation is that the restricted age range of Study 2's sample may have allowed for a unique assessment of the regulatory abilities, or reporting styles, specific only to late adolescents. The emergence of ER profiles indicative of only the behavioural component of regulation indicates that these individuals either experience, or report, regulation differentially than other age groups. These late adolescents may have an ER repertoire unique to their age for two possible reasons. First, there may be a difference in the reporting style of this age group, such as a proclivity to recall behavioural, rather than cognitive or physiological, responses. Therefore, participants may have more readily identified with the expressive engagement and suppression items on the RESS as they can more quickly access memories of the use of these behaviours.

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Alternatively, there may be a much more limited range of regulatory abilities being used by these individuals when compared to older adult populations. A recent study demonstrated that participants aged 19 and above reported higher rates of using what was referred to as "adaptive emotion regulation", which includes behaviours such as relaxation and cognitive problem-solving, than participants aged 17 and younger (Zimmerman & Iwanski, 2014). As the current study's participants were almost exclusively between the ages of 17 and 18, the use of these cognitive ER acts may not be as pronounced, or their use may be less conscious and deliberate, than other less cognitively taxing regulatory acts. Therefore, the lack of high levels of more cognitively taxing approaches to regulation, such as reappraisal, may be due to a lack of ability to successfully use, or awareness of, these regulatory behaviours. If this is the case, the current study may provide a developmental snapshot of the ER tendencies of individuals between the ages of 17-18 years. Future projects should focus on tracking the use of ER acts across development to identify the patterns of their use across various ages.

6.1 Implications

The RESS represents the first measure of emotion regulation grounded in emotion systems theory, and therefore will be beneficial for future research aimed at assessing ER from an emotion systems perspective, as well as clinicians wishing to better understand the ER practices of their clientele. This new ER measure can be used to examine each subscale independently, such as in a standard variable-centered way, and can also be used to develop a more holistic person-centered approach by identifying the range of ER behaviours an individual tends to engage in.

As ER deficits underlie many psychopathologies (Macklem, 2008), understanding how individuals regulate their negative emotions in relation to the specific components of an emotional experience would provide valuable insight to clinicians and guide treatment goals in three ways. First, using the RESS, clinicians can quickly assess which regulatory behaviours their client is using, as well as which ones he or she is not using, which would serve as a guide for treatment planning and goal setting. Second, clinicians can compare their client's self-reported ER behaviours with the ER behaviours their client discusses during individual therapy sessions to identify the level of a client's insightfulness to his or her ER behaviours. Third, although reappraisal is the main component of cognitive behavioural therapy (Cristea et al., 2012), relying on only one regulatory behaviour typically has negative implications for well-being (Dixon-Gordon et al., 2014). Using the RESS, clinicians will be able to quickly and effectively assess the diversity of ER acts their clients engage in,

thereby assisting them in working towards a more flexible, and likely more successful, pattern of regulation.

6.2 Limitations

Although this study was able to produce several interesting results, it was not without limitations. First, the subscale of Distraction was not significantly correlated with its measure of convergent validity, the Cognitive Behavioural Avoidance Scale (CBAS; Ottenbreit & Dobson 2004). Although this measure was the closest fit to the construct of Distraction being measured in the RESS, it seems these two measures were actually assessing quite different forms of cognitive distraction, likely due to differing focal events used by each scale. The RESS's Distraction subscale focuses exclusively on deliberate attempts to distract attention away from a specific event and negative emotion being experienced in the moment, whereas the CBAS focuses on avoiding vague stimuli or situations and thoughts that, for the most part, have not yet taken place. For example, a sample RESS Distraction item is "At the time I experience a negative emotion, I usually respond to it right away by engaging in activities to distract myself", while a sample CBAS item is "I avoid making decisions about my future". The anticipatory versus reactionary difference of these two scales is evidenced by a strong relation between CBAS scores and anxiety symptoms (see Appendix B), whereas no such relation exists between RESS Distraction scores and anxiety symptoms. Therefore, while this scale was chosen as a validity measure due to its prevalence in assessing cognitive avoidance, it seems that the RESS and the CBAS may actually be capturing differential aspects of cognitive distraction. Moreover, correlations between the RESS and CBAS should not be relied upon to assess the validity of the RESS's Distraction subscale. A second, while related, limitation is because the ER Acts Model, and the subsequent RESS subscales, differ in their focus from previously established measures, such as the immediacy of the regulatory behaviour, and the focus on negative emotions, each validity measure used in this study may be underestimating the validity of the RESS subscales.

A third limitation of this study was the inability to use conditional probability information from the LPA (Zalewski et al. 2011) in Study 2. Because only those participants who had very high conditional probabilities for each LPA group were recruited for the second phase of study 2, there was a very distinct skewed distribution of conditional probability scores. That is, members of each group had very high conditional probabilities of belonging in their own group, and as a result had probabilities close to zero of being in one of the other two groups. Due to this strong bimodal pattern, correlations could not be conducted between the conditional probabilities of group membership and

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outcomes to determine it the group membership probability is a better predictor of outcomes than a single ER act. For example, it was not possible to determine if the probability of being in the Suppression Propensity group was a better predictor of problematic outcomes than simply the subscale of suppression. Having outcome measures for an entire sample would have allowed this type of analysis, and to determine if group membership (i.e., a person-centered approach)is a better predictor of outcomes than any one regulatory behaviour (i.e., a variable-centered approach). This will serve as a main tenet for future research.

Finally, the fourth limitation of the current study is one typical of all studies that rely on self-report data. Although individuals report responding to their negative emotions in a certain way, it is unclear if individuals are reporting accurately, and if accuracy varies between participants. Some participants may have a stronger emotional awareness, and therefore may be more cognizant of the techniques they use to down-regulate their negative emotions. Moreover, some ER acts may require a more deliberate use and therefore individuals are more aware of their use of these acts than others. Future studies will focus on bridging the gap between self-report, historical ER behaviour and real-time regulatory behaviour through the use of experience sampling.

6.3 Future Directions

This study served as a foundation for future studies looking to assess regulatory patterns. Three studies are currently under way that seek to continue to validate the RESS, as well as to overcome some of the limitations listed above. The first of these studies will re-assess the participants involved in Study 2 in order to track changes in their regulatory patterns across a four year period. This longitudinal study will provide novel insight into how individuals modify their regulatory patterns across time, as well as how these changes impact socio-emotional outcomes, such as anxiety, depression, and relationship quality. The second of these studies will serve to replicate the present study, while adding an experience-sampling method (ESM) component. Participants in this ESM study will be provided with an experience-sampling app for their cellular phones that will prompt them to fill out a short survey asking them whether they experienced a negative emotion in the last several hours, which regulatory acts they engaged in to regulate the negative emotion, and how successful they felt this act was. This real-time measurement of regulation will provide valuable information regarding how accurate participants are when completing retrospective self-reports of their ER behaviours, while also providing novel information regarding the relation between emotional intensity, regulatory act use, and the success of the selected act. Finally, a third study will look to

broaden the age range of the original study, and will seek out young adolescents, late adolescents, and mature adults to complete the RESS to identify developmental differences in regulatory behaviour reporting. The combination of these studies will seek to not only provide further validation to the RESS, but also provide valuable insight into the developmental distinctions of regulation throughout the lifespan.

There are also several other streams of possible future research involving the RESS. First, future studies can focus on the development and assessment of a short-form version of the RESS that could effectively measure its six subsections while using fewer items. This short-form measure would be helpful in adapting the RESS to research studies, as well as clinical settings, in which time is limited. Second, future studies could focus on investigating the relationship between the RESS subsections and many commonly cited ER "strategies". For example, emotional awareness is commonly referred to as a main tenet of ER (Subic-Wrana et al., 2014). However, having an increased level of awareness to your emotional experiences does not dictate the ways in which you will respond to your negative emotions once you become aware of them. Future studies could focus on identifying the ER profiles that could capture popular ER "strategies", such as emotional awareness, emotional acceptance, and emotional clarity. For example, perhaps emotional acceptance can be represented as a regulatory profile with low levels of distraction and high levels of reappraisal. Finally, future research could also focus on identifying relations between patterns of ER act use and outcomes within various different contexts, such as physical health, workplace stress, and academic outcomes.

6.4 Conclusion

Emotion regulation is a crucial component of psychosocial functioning (Macklem, 2008), however, its examination has been stymied by an overly inclusive approach to ER behaviours. This has been remedied by the ER Acts Model and the new Regulation of Emotion Systems Survey, both of which focuses solely on immediate acts of down-regulation of negative emotions and add much needed clarity to the field of ER. Moreover, examining ER as a one-to-one relation between specific regulatory behaviours and well-being lacks depth as it ignores the tendency to, and importance of, a diverse set of ER behaviours. Indeed, as shown in the current study, relying exclusively on one ER act, even those conventionally seen as beneficial for well-being such as expressive engagement, is related to poor psychosocial outcomes. Future investigations of ER would benefit from using this

person-centered approach to identify patterns of ER behaviours, particularly in examining the development of ER diversity and efficacy among different populations and across the lifespan.

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Regulation of Emotion Systems Survey

Please indicate how you respond **right away to negative emotions as they arise**. Do not choose your answers based on what you think you should do or wish you do. Instead, choose your answers thoughtfully, and make your answers about what you *actually* do. Please answer *every* item. There are no "right" and "wrong" answers, so choose the most accurate answer for YOU – not what you think "most people" would say or do. For each statement below, please circle the appropriate number to indicate how frequently you did the following things in response to feeling a negative emotion, such as anger, sadness, or stress.

At the time I experience a negative emotion, I usually respond to it <u>right away</u> by…

	Never	**Some times**	**Half of the time**	**Most of the time**	**Always**
1. Thinking repeatedly about what was bothering me	1	2	3	4	5
2. Using facial expressions to show that I was upset	1	2	3	4	5
3. Trying not to think about what was bothering me	1	2	3	4	5
4. Acting like I was not upset	1	2	3	4	5
5. Letting my emotions show	1	2	3	4	5
6. Vocalizing how I was feeling	1	2	3	4	5
7. Focusing on slowing my heart rate and breathing	1	2	3	4	5
8. Showing my feelings	1	2	3	4	5
9. Trying to slow my heart rate and breathing	1	2	3	4	5
10. Immediately working on something to keep myself busy	1	2	3	4	5
11. Doing something to relax	1	2	3	4	5
12. Continually thinking about what was bothering me	1	2	3	4	5
13. Outwardly showing what I was feeling	1	2	3	4	5
14. Making sure no one could tell what I was feeling	1	2	3	4	5
15. Doing something else to distract myself	1	2	3	4	5
16. Trying to reduce any tension I was feeling	1	2	3	4	5
17. Trying to see the emotional event from a different perspective	1	2	3	4	5
18. Pretending I was not upset	1	2	3	4	5
19. Telling others exactly how I felt	1	2	3	4	5
20. Going over the emotional event again and again in my mind	1	2	3	4	5
21. Looking at the emotional event from a different perspective	1	2	3	4	5
22. Analyzing the cause of my emotion	1	2	3	4	5
23. Expressing my feelings	1	2	3	4	5
24. Identifying different angles to see the situation	1	2	3	4	5
25. Questioning the cause of my emotion	1	2	3	4	5
26. Thinking of other ways to interpret the situation	1	2	3	4	5

27. Engaging in something else to keep busy	1	2	3	4	5
28. Showing that I was upset	1	2	3	4	5
29. Looking at the situation from several different angles	1	2	3	4	5
30. Hiding my feelings	1	2	3	4	5
31. Being sure to hide what I was feeling	1	2	3	4	5
32. Taking deep breaths	1	2	3	4	5
33. Continually trying to decide what went wrong	1	2	3	4	5
34. Engaging in activities to distract myself	1	2	3	4	5
35. Decreasing the tension in my body	1	2	3	4	5
36. Making an effort to hide my feelings	1	2	3	4	5
37. Concealing how I was feeling	1	2	3	4	5
38. Thinking about the emotional event again and again in my mind	1	2	3	4	5
39. Thinking again and again about what went wrong	1	2	3	4	5
40. Immediately finding something relaxing to think about or do	1	2	3	4	5
41. Thinking about something other than what was bothering me	1	2	3	4	5
42. Trying to pretend I wasn't upset	1	2	3	4	5
43. Thinking about other things	1	2	3	4	5
44. Thinking of alternate ways to see the situation	1	2	3	4	5
45. Engaging in a relaxing activity	1	2	3	4	5
46. Trying to think of the emotional event in a more positive light	1	2	3	4	5
47. Trying to see the situation in a more positive light	1	2	3	4	5
48. Trying to think about other topics	1	2	3	4	5

Correlations of all Study 2 variables

	Age	Anxiety	Depression	Extraversion	Agreeableness	Conscientiousness
Age	1.00					
Anxiety	-.07	1.00				
Depression	-.12	.75**	1.00			
Extraversion	-.10	-.13	-.17	1.00		
Agreeableness	-.05	-.20*	-.31**	.19	1.00	
Conscientiousness	.01	-.27**	-.37**	.09	.45**	1.00
Neuroticism	.07	.66**	.64**	-.14	-.34**	-.36**
Openness	-.01	.01	-.03	.17	.20*	-.19
Family Relationship Quality	.05	.31**	.43**	-.20*	-.19	-.26**
Peer Relationship Quality	-.03	.34**	.44**	-.46	-.47**	-.30**
Social Anxiety	-.07	.53**	.60**	-.55**	-.24*	-.30**
Expression (EES)	-.02	-.13	-.14	.58**	.32**	.16
Reappraisal (ERQ)	.06	-.41**	-.47**	.12	.29**	.31**
Suppression (ERQ)	.01	.13	.15	-.51**	-.16	-.11
Social Cognitive Avoidance (CBAS)	.01	.58**	.63**	-.21*	-.31**	-.23*
Non-Social Cognitive Avoidance (CBAS)	.05	.43**	.59**	-.36**	-.34**	-.44
Rumination (RRS)	.04	.69**	.64**	-.24*	-.11	-.26**
RESS Suppression	.04	.23*	.22*	-.41**	-.07	-.08
RESS Rumination	-.12	.42**	.33**	.01	-.11	-.13
RESS Reappraisal	.09	-.11	-.16	-.08	.18	.11
RESS Relaxation	-.06	.05	-.11	-.08	.14	.10
RESS Distraction	-.16	-.06	-.07	.10	.09	.20*
RESS Engagement	-.14	-.02	-.09	.53**	.15	.12

	Neuroticism	Openness	Family Relationship Quality	Peer Relationship Quality	Social Anxiety	Expression (EES)	Reappraisal (ERQ)
Neuroticism	1.00						
Openness	-.18	1.00					
Family Relationship Quality	.29**	-.14	1.00				
Peer Relationship Quality	.26**	-.15	.33**	1.00			
Social Anxiety	.47**	-.20*	.22*	.43**	1.00		
Expression (EES)	.09	.13	-.30**	-.57*	-.35**	1.00	
Reappraisal (ERQ)	-.53**	-.22*	-.24*	-.23*	-.28*	.02	1.00
Suppression (ERQ)	-.08	-.16	.30**	.42**	.36**	-.81	-.06
Social Cognitive Avoidance	.37**	-.18	.51**	-.39**	.50**	-.27**	-.37**
Non-Social Cognitive Avoidance	.29**	-.12	.44**	.47**	.59**	-.31**	-.32**
Rumination (RRS)	.52**	.12	.25**	.34**	.45**	-.12	-.34**
RESS Suppression	-.02	-.11	.29**	.42**	.40**	-.72**	-.02
RESS Rumination	.54**	-.03	.02	.10	.25**	.24	-.35**
RESS Reappraisal	-.25**	.31**	-.14	-.01	-.11	-.04	.34**
RESS Relaxation	-.25**	.23*	-.04	.01	.02	-.08	.27**
RESS Distraction	-.27**	.17	-.11	-.02	-.01	-.47	.42**
RESS Engagement	.10	.23*	-.32**	-.38**	-.34**	.81**	.04

	Suppression (ERQ)	Social Cognitive Avoidance	Non-Social Cognitive Avoidance	Rumination (RRS)	RESS Suppression	RESS Rumination	RESS Reappraisal
Suppression (ERQ)	1.00						
Social Cognitive Avoidance	.36**	1.00					
Non-Social Cognitive Avoidance	.28**	.54**	1.00				
Rumination (RRS)	.15	.42**	.38**	1.00			
RESS Suppression	.76**	.41**	.34**	.20*	1.00		
RESS Rumination	-.14	.25*	.16	.47**	.00	1.00	
RESS Reappraisal	.01	-.16	-.06	.07	.13	-.04	1.00
RESS Relaxation	.05	-.12	.01	.09	.12	-.11	.43**
RESS Distraction	.11	-.02	-.003	-.09	.17	-.16	.23*
RESS Engagement	-.75**	-.23*	-.28**	-.003	-.73**	.28**	.05

	RESS Relaxation	RESS Distraction	RESS Engagement
RESS Relaxation	1.00		
RESS Distraction	.34**	1.00	
RESS Engagement	.01	.03	1.00