

IMPACTS OF RESPONSE-FOCUSED STRATEGIES

**Exploring the Impacts of Response-focused Emotion Regulation Strategies on
Psychophysiology, Cognition, Affect, and Social Consequences**

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ABSTRACT

Researchers have categorized emotion regulation strategies generally as adaptive or maladaptive, depending on impacts of the strategy on psychophysiological, cognitive, and emotional outcomes. A strategy that is widely considered to be maladaptive is expressive suppression, which refers to inhibiting one's facial expression, to appear neutral. Another emotion regulation strategy that is commonly used but infrequently studied is expressive dissonance, which refers to showing the opposite of how one feels. There is limited research on expressive dissonance, but the longstanding facial feedback hypothesis suggests that facial expressions can further enhance or lower one's mood; if this is the case, then smiling, even when feeling anxious, may be more adaptive than showing no emotion at all.

The objective of my thesis was to examine whether using expressive dissonance was more adaptive than expressive suppression, for regulating negative emotions. To determine adaptiveness, I examined the effect of these two strategies on both intrapersonal factors (i.e., impacts of the strategy on one's own psychophysiology, memory accuracy, and affect) and interpersonal factors (i.e., impacts of the strategy on social qualities like friendliness and likeability). In the first study, I tested the intrapersonal impacts of expressive suppression and expressive dissonance, compared to a control condition, while women participants ($n = 144$) viewed negatively arousing images. In the second study, I expanded on the first study by examining intrapersonal *and* interpersonal qualities (e.g., friendliness, likeability, warmth), in an ecologically valid context (i.e., a conversation with an unacquainted opposite gender confederate). Across both studies, I found no effect of strategy on intrapersonal factors; however, there were effects on interpersonal factors in Study 2. Participants engaging in expressive dissonance were rated more positively, and people in the expressive suppression condition were

rated more negatively on interpersonal qualities, relative to the control condition. Taken together, our findings suggest that neither strategy impacted the participant intrapersonally, but both strategies influenced the observer's impression of the participant. Based on the findings, I encourage a shift from conceptualizing strategies as overall maladaptive or adaptive, to considering specific strategies as helpful or unhelpful based on the regulation's goal.

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CONTENT OF THESIS AND CONTRIBUTION OF AUTHORS

The present thesis comprises two manuscripts:

Study 1 (Chapter 2): Bahl, N. & Ouimet, A. (under review). Smiling won't make you feel better: Response-focused emotion regulation strategies have little impact on cognitive, behavioural, physiological, and subjective outcomes. Pre-print available on PsyArXiv: <https://doi.org/10.31234/osf.io/9a2gn>

Study 2 (Chapter 4): Bahl, N. & Ouimet, A. (under review). Smiling won't make you feel better, but it might make people like you more: Interpersonal and intrapersonal consequences of response-focused emotion regulation strategies. Pre-print available on PsyArXiv: <https://doi.org/10.31234/osf.io/bgfwq>

For both studies, I conducted the literature review, conceptualized the thesis, developed the study design (e.g., selected the validated measures, created and submitted the ethics applications), oversaw data collection, performed the data analyses, and wrote the original draft of the manuscripts and the dissertation. Dr. Ouimet participated in the conceptualization of the thesis, development of the study design, reviewing and editing drafts, overall supervision of the dissertation, and provided funding for resources. Members of my thesis committee, Dr. Andrea Ashbaugh, Dr. Charles Collin, and Dr. Maria Rogers, contributed significantly to my study design through feedback on my research proposal. Dr. Dwayne Schindler provided consultation on statistical analyses for Study 1. Data collection for both studies took place in the INSPIRE lab at the University of Ottawa.

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CHAPTER 1: GENERAL INTRODUCTION

Emotion regulation is an integral component of our everyday experiences, as it strongly influences the ways in which we handle stress, the quality of our social interactions and relationships with others, and our overall well-being (Gross, 1998). It is a popular area of research, as evidenced by a surge in articles on emotion regulation in the last 15 years. Research on emotion regulation is multidisciplinary in nature, encompassing the areas of developmental, cognitive, social, personality, and clinical psychology (Dan Glauser & Gross, 2011).

Emotion regulation strategies have been categorized based on when they are used – antecedent-focused strategies are implemented before an emotion is evoked, whereas response-focused emotion regulation strategies are used to alter or modify an already experienced emotion (Gross, 1998). Researchers have also categorized emotion regulation strategies as either adaptive or maladaptive based on their affective, behavioural, and cognitive outcomes. Generally, expressive suppression, or inhibiting one's facial expression, is considered a maladaptive response-focused emotion regulation strategy. The use of suppression is associated with depression (e.g., Nolen-Hoeksema et al., 2008), anxiety disorders (e.g., Werner et al., 2011), eating disorders (e.g., Evers et al., 2010), and borderline personality disorder (e.g., Dixon-Gordon et al., 2011). Another emotion regulation strategy that is widely used but very infrequently studied is expressive dissonance: showing the opposite of how one feels. Despite the limited research on expressive dissonance, the longstanding facial feedback hypothesis (Buck, 1980); feedback from facial expressions (e.g., smiling, pouting) affects emotional experience and behaviour), suggests that expressive dissonance may be adaptive. The lack of research on response-focused strategies other than expressive suppression is an unfortunate gap in the

literature, given the need to identify and understand adaptive strategies to modulate emotions that are already underway.

Not only is there a lack of research on the intrapersonal impacts (i.e., the impacts of emotion regulation on one's self) of some emotion regulation strategies, there is an even deeper gap in the literature on the *interpersonal* impacts of emotion regulation strategies. Interpersonal emotion regulation broadly refers to the impacts of emotion regulation on one's self, as well as the receiver during a social interaction. We know little about the personal or social outcomes that accompany response-focused strategies during social exchanges. This gap is very unfortunate, as the strategies that we use to regulate our emotions strongly influence our interpersonal emotion regulation abilities, thereby impacting the quality of our interactions and relationships (Gross & John, 2003). My goal in my dissertation, therefore, was to directly compare the effects of two response-focused emotion regulation strategies—expressive suppression and expressive dissonance—on indicators of affect, cognition, psychophysiology, and social consequences. In this way, I sought to investigate the interpersonal *and* intrapersonal consequences of using these strategies.

Many theories of emotions encompass the *functionalist approach*, which contends that human emotions have evolved to facilitate adaptive responses to environmental settings, and are used to meet an individual's needs and goals (Cosmides & Tooby, 2000). For example, a baby's expression of emotions (e.g., crying) allows for their mother to attend to their needs. Emotions play a significant role in healthy adaptation (Gross, 1998); as such, it is vital to understand the ways in which people regulate their emotion, and the consequences of the different strategies they use.

Emotion regulation refers to a set of automatic and controlled processes that influence which emotions we have, when we have them, and how we experience and express those emotions (Gross, 1998). It involves the initiation, maintenance, and modification of the manifestation, intensity, and length of emotional states (Gross & Thompson, 2007). A variety of situations can trigger emotions, and the strategies that we use to regulate these emotions can then lead to changes in experiential, behavioural, and physiological response systems (Gross, 2015). We can use emotion regulation strategies for *hedonic* goals – that is, to decrease negative states and increase positive states; or for *contrahedonic* goals – that is, to intensify emotions (i.e., increase or decrease a positive/negative state) (Larsen, 2000). The changes in our own response systems are referred to as intrapersonal emotion regulation (see Zaki & Williams, 2013). Interpersonal emotion regulation, in contrast, occurs in interpersonal interactions and involves the regulation of one's self along with the regulation of the receiver during that interaction (Zaki & Williams, 2013).

One of the most widely used intrapersonal emotion regulation models is the *Process Model of Emotion Regulation*, developed and updated by Gross (1998; 2015). In this model, Gross emphasizes that the timing of regulating emotions is crucial, as it will dictate the type of emotion regulation strategy one will use. Depending on the point of the emotion-generation process at which people engage a particular strategy, there will be different consequences for the way they feel, think, and act (Gross 2015). People use *situation selection* when they deliberately decide to attend or avoid a situation (i.e., choosing to miss a party to prevent feeling anxious). People engage in *situation modification* when attending to an emotion-eliciting situation, but choosing to change features of the environment to regulate emotions. For example, people may refer to a script while giving a presentation to manage social anxiety. *Attentional deployment*

occurs when people direct attention towards or away from aspects of a situation (e.g., distraction or rumination). People use *cognitive change* (also referred to as cognitive reappraisal) to alter the interpretation of a situation, to modify its emotional impacts. For example, one may use reappraisal while at a funeral (e.g., “the person lived a long, fulfilling life”) to manage sadness. According to the process model, emotion regulation strategies are based on timing (a temporal dimension). Situation selection, situation modification, attentional deployment, and cognitive change are categorized as *antecedent-focused* strategies. Antecedent strategies include behavioural and cognitive strategies, which are used before an emotional response is evoked.

The fifth and last emotion regulation process is response modulation, or strategies that change an emotional expression that is already underway. Response modulation is a *response-focused* emotion regulation strategy. Response-focused strategies include expressive suppression (inhibiting facial expressions), exaggeration (enhancing an expression), or expressive dissonance (showing the opposite of how one feels).

Gross’ original process model (1998) contends that emotion regulation strategies can be understood as adaptative or maladaptive, given impacts of each emotion regulation on thoughts, emotions, and behaviours. In particular, cognitive change (i.e., cognitive reappraisal) is considered to be a healthier strategy than expressive suppression, based on its impacts on one’s psychophysiology, memory, affect, and social consequences. Gross (2015) published an updated emotion regulation framework, the *Extended Process Model of Emotion Regulation*, with a modified perspective: emotion regulation strategies can be harmful or helpful depending on the *context*; strategies can be maladaptive if they elicit emotions of inappropriate intensities, duration, and frequency. Gross (2015) described three stages of emotion regulation: a) identification – making the decision whether or not to regulate emotions; b) selection – choosing

a strategy in response to an emotion-eliciting situation, and c) implementation – implementing the strategy chosen.

Koole (2009) also presents a model that shifts away from classifying emotion regulation strategies as adaptive versus maladaptive. In this model, people choose emotion regulation strategies based on the *target* and *function* of the regulation. There are three types of emotional targets: 1) attention (e.g., the parts of the situation an individual attend to); 2) knowledge (e.g., of using emotion regulation strategies, like cognitive reappraisal) and 3) embodiments (e.g., facial expressions, psychophysiological responses). Furthermore, emotion regulation strategies are compartmentalized into serving one or more of the following functions: 1) hedonic needs (e.g., promoting pleasure, avoiding pain), 2) goal-orientated functions (e.g., suppress positive affect at someone's misfortune to display empathy), 3) person-orientated functions (e.g., the overall personality system, consisting entirety of a person's needs, goals, motives). Koole's model thus comprises nine cells, and emotion regulation strategies can be categorized into the cells. Expressive suppression, for example, is organized into a goal-oriented strategy, targeting bodily responses.

Researchers have used a variety of research designs to study the impacts of emotion regulation strategies. A widely used design for examining emotion regulation involves manipulating the use of an emotion regulation strategy by instructing participants to use only the strategy assigned during emotional provocation. These provocations can include (i.e., watching negative emotion-eliciting images or engaging in a speech task (e.g., Bebkco et al., 2011; Dunn et al., 2009; Demaree et al., 2006). Researchers then measure state intrapersonal consequences (i.e., changes in psychophysiology, memory accuracy, self-reported affect) associated with the different assigned emotion regulation strategies.

Some researchers have compared the use of one strategy relative to control (i.e., impacts of expressive suppression *versus* a control condition; Gross & Levenson 1993, 1997). The type of control condition varied depending on the study, and included no instruction, instructions not to regulate in a specific manner (e.g., “do not reappraise the stimulus”), and instructions to experience naturally (e.g., “respond naturally to the stimulus”). Others have compared antecedent-focused strategies to single or multiple response-focused emotion regulation strategies (cognitive reappraisal *versus* expressive suppression; e.g., Gross, 1998, Hofmann et al., 2009). Few studies, however, have compared the consequences of different response-focused emotion regulation strategies to each other (expressive suppression vs. expressive exaggeration e.g., Demaree et al., 2006, Robinson & Demaree, 2009).

Expressive suppression is the most widely studied response-focused strategy (Webb et al., 2012). Expressive suppression is characterized by inhibiting an emotional expression following the onset of an affective experience, leading one to display a “neutral” facial expression (Gross, 1998). Some researchers have found that using expressive suppression leads to an increase in sympathetic nervous system arousal (i.e., anxiety), including increased heart rate, blood pressure, perspiration, and finger temperature) (see Webb et al., 2012). Researchers consider this relationship as paradoxical because outwardly, people are displaying a neutral or “emotionless expression”, while physiologically, they are highly aroused (Gross, 1998).

Researchers who compared expressive suppression to a control condition generally found that people who suppress their emotional expression in response to negative stimuli experience sympathetic nervous system activation compared to those asked simply to observe the stimuli. For example, Gross and Levenson (1997) examined the psychophysiological outcomes of inhibiting both positive and negative emotions using expressive suppression. Using a within-

subjects design, the researchers asked female participants ($N = 180$) to watch sad, neutral, and amusing films. One condition ($n = 90$) was asked to suppress their expressive behaviours while watching the films, while the other condition ($n = 90$) was told to simply watch the films.

Relative to control, those who were asked to suppress their emotions demonstrated significantly increased sympathetic activation, (i.e., greater electrodermal activity and greater cardiac interbeat interval), during the sad and amusing films, but not during the neutral films. Gross and Levenson (1993) asked participants ($N = 85$) to watch a short disgust-eliciting film while physiological responses were recorded. Forty-three participants were asked to suppress their expressions, while the other participants ($n = 42$) were asked to just watch the film. Relative to those in the control condition, people who were told to suppress showed a greater increase in electrodermal activity and finger pulse amplitude, as well as shorter pulse transmission time to the finger – all indicators of sympathetic nervous system activation.

Researchers have also compared antecedent-focused versus response-focused emotion regulation strategies on sympathetic nervous system arousal. Gross (1998) examined the impacts of cognitive reappraisal versus expressive suppression versus control on indicators of sympathetic nervous system arousal (i.e., finger temperature, finger pulse amplitude, and skin conductance level), while watching a disgusting film-clip. People who viewed a disgust-eliciting film while suppressing emotions, experienced increased finger pulse amplitude, finger temperature, and skin conductance, compared to those who naturally watched or reappraised. Both reappraisal and suppression lead to reduced facial expressions. Participants who reappraised did not demonstrate changes in their physiological activation, but reported reduced disgust experience; people who suppressed demonstrated greater physiological activation, but it did not impact self-reported affect. Hofmann et al. (2009) randomly assigned undergraduate

students into reappraisal ($n = 68$), suppression ($n = 67$), and acceptance ($n = 67$) (i.e., “try to experience your feelings fully and do not try to control or change them in any way”) conditions, and asked participants to present an impromptu speech. Those who suppressed showed a greater increase in heart rate from baseline than did those in the reappraisal or acceptance conditions.

Comparisons of two response-focused strategies, expressive exaggeration (i.e., to embellish one’s affective expression to an emotional experience) and expressive suppression, show a mix of findings in response to sympathetic nervous system arousal. Demaree et al. (2006) found decreased pre-ejection period (i.e., increased sympathetic arousal) while watching disgusting film clips, among participants instructed to use suppression or exaggeration, relative to control, but no differences between the three conditions on electrodermal activity. Robinson and Demaree (2009) used a within-subjects design to compare the differences between suppression versus exaggeration among undergraduate students ($N = 109$). Participants were asked to watch three sad film clips, each preceded by a 10-second slide, which informed the regulation strategy to use (natural-watch, exaggerate, or suppress). Exaggeration was associated with increased sympathetic activation (i.e., increased galvanic skin conductance level and shortened pre-ejection period), or an increase of anxiety. Suppression, on the other hand, was associated with greater reduction in sympathetic activation (i.e., decreased galvanic skin conductance level and longer pre-ejection period), or a decrease in anxiety. These findings highlighted the potential differences in psychophysiological responses to sadness when suppressing or exaggerating expressions. The authors pointed out that future research should examine regulation strategies using a similar design, but exploring other emotions.

Research findings suggest that suppression may significantly reduce memory accuracy for information presented (i.e., individual names and occupations) while engaging in the film-

watching tasks (see Gross, 2002, for a detailed review). Richards and Gross (1999) asked female participants ($N = 85$) to view slides eliciting low negative affect (i.e., men at work) and high negative affect (i.e., badly wounded men), as well as listen to information presented about the men (i.e., individual's name, occupation, and cause of injury). Participants were asked to watch naturally ($n = 44$), or to use suppression ($n = 41$). The authors then issued a cued-recall and cued-recognition task, based on the visual and auditory details presented in the slides. They found that those who suppressed were less accurate on the cued-recall and cued-recognition visual and auditory tasks for both low and high negative affect slides, relative to participants who were asked to watch naturally.

Researchers have also compared memory accuracy differences between response-focused emotion regulation strategies. Robinson and Demaree (2009) administered a memory test at the end of each sad film clip to assess the impact of suppression versus exaggeration, on retention of social information. Both suppression and exaggeration led to reduced memory accuracy. These results were further supported by Bonanno et al. (2004) who also found impaired memory of negative images in those who exaggerated and suppressed negative emotions, relative to control.

Researchers suggest that the reduction in memory accuracy during suppression may be related to the theory that suppression requires a continuous source of cognitive resources (Pyszczynski & Greenberg, 1987). Specifically, suppression requires self-monitoring and self-focusing throughout an emotional event, which may include an internal dialogue in which individuals remind themselves to suppress and self-monitor for signs of unwanted emotional facial responses. Thus, this regulation strategy may consume attentional resources that otherwise could have been directed toward the stimulus (Wegner & Zanakos 1994), thereby reducing memory for the stimulus. In support of this theory, Richards and Gross (2006) found that self-

reported self-monitoring efforts were significantly heightened among those who were told to suppress, relative to a control condition, who were not given any instructions on how to regulate their emotions. Furthermore, increases in self-monitoring predicted decreases in memory accuracy in participants who were asked to suppress their emotions, while engaging in a conversation task with their romantic partner (Richards & Gross, 2006).

In addition to psychophysiological responses and memory accuracy, researchers have also explored the effects of suppressing emotions on positive and negative emotions. Expressive suppression leads to decreased positive emotion in all studies (Gross & Levenson, 1993, 1997; John & Gross, 2004; Strack et al., 1988). In negative emotion contexts, however, the effects are less clear, with some reports of no effects on subjective experience (Gross & Levenson, 1993, 1997; Gross, 2002, Robinson & Demaree, 2009; Roberts et al., 2008) and other reports of reduced levels of negative emotion experience (Dunn et al., 2009; Goldin, et al., 2008). Contrary to these experimental studies, Brans et al. (2013) and Kashdan and Steger (2006) examined the use of emotion regulation strategies in daily life through experience-sampling over 7 and 21 days, respectively, and found that people who reported using suppression more often also reported greater negative affect (e.g., angry, stressed, anxious, depressed) and lower positive affect (e.g., happy, relaxed). The reason for the discrepancy in the effects of suppression on negative affect is unclear. It may be that changes in negative affect are not an immediate consequence of suppression, but rather may need more time to develop, which is why we see significant findings in experience-sampling studies (which collect data over time). In terms of positive affect, however, research findings consistently suggest that suppressing emotions leads to decreased positive affect, relative to reappraisal or to a control group (see Webb, Miles, & Sheeran, 2012).

Suppression and Mental Health Difficulties

Emotion dysregulation is a transdiagnostic vulnerability factor for mood and anxiety disorders (Hofmann et al., 2012). Indeed, expressive suppression is conceptualized as an avoidance strategy in the literature (see review by Amstadter et al., 2008). Aldao et al. (2010) found that psychopathology was positively correlated with maladaptive strategy use (i.e., avoidance, suppression, and rumination). Furthermore, maladaptive emotion regulation strategy use moderated the relationship between adaptive emotion regulation strategy use and psychopathology; at low levels of maladaptive strategy use, adaptive strategy use was unrelated to psychopathology, but at high levels of maladaptive strategy use, people who used more adaptive strategies also reported lower levels of psychopathology. Aldao et al. (2010) also found that some emotion-regulation strategies were more strongly related to overall psychopathology. Specifically, the effect size for rumination was large, medium to large for avoidance, problem solving, and suppression, and small to medium for reappraisal and acceptance. Gross and John (2003) suggested that people who consistently engaged in suppression as a regulatory strategy experienced impaired social functioning and well-being.

Researchers have found that people with social anxiety disorder use expressive suppression more frequently than people without social anxiety disorder, such that individuals with high social anxiety (as well as people with diagnosed social anxiety disorder) reported more frequent use of expressive suppression on a trait, state, and daily basis than did those with low social anxiety (e.g., Aldao et al., 2010; Amstadter, 2008; Helbig-Lang et al., 2015; Spokas et al., 2009). Social anxiety is characterized by an interpersonal style of avoidance; particularly, inhibiting and controlling the expression of emotions (Kashan & Breen, 2008). People with social anxiety tend to endorse unhelpful beliefs that controlling emotions (both positive and

negative) is crucial, and that expressing emotions demonstrates weakness (and likely negative evaluation and social rejection from others) (Spokas et al., 2009). Indeed, undergraduate students with higher baseline expressive suppression reported higher social anxiety three months later (Kashdan & Breen, 2008). Additionally, people with social anxiety disorder reported using expressive suppression to regulate their anxiety both during a speech task and in recent social situations (Werner et al., 2011). Researchers have also conducted experience-sampling studies. Kashdan and Steger (2006) found that undergraduate students with high social anxiety reported fewer positive events on the days when their social anxiety and use of expressive suppression were elevated. In a daily diary study, O'Toole et al. (2014) found that increased engagement of expressive suppression strongly predicted reduced positive affect for undergraduate students high in social anxiety compared to those low in social anxiety. Farmer and Kashdan (2012) implemented a two-week daily diary study and found that for undergraduates high in social anxiety, suppressing positive emotions resulted in lower positive affect and fewer positive social experiences the following day.

Researchers have also found an association between suppression use and depressive symptoms. Cross-sectional studies have found a relationship between frequent use of expressive suppression (to positive *and* negative emotions) and increased depressive symptoms in undergraduate (e.g., Aldao & Dixon-Gordon, 2014), community (e.g., Fergus & Bardeen, 2016), and inpatient populations (e.g., Beblo et al., 2012; Forkmann et al., 2014). Expressive suppression may, therefore, be an attempt to avoid the experience of emotions – positive or negative. In exploring the association between expressive suppression and experience of depression, Dryman and Heimberg (2018) suggested that cognitive processing deficits may impact the relationship. Indeed, people who have difficulty implementing cognitive strategies,

like cognitive reappraisal, may depend on expressive suppression. Given the research on the use of expressive suppression and the prevalence of mood and anxiety difficulties, it is even more crucial to explore if other response-focused strategies exert negative impacts on our well-being.

Expressive Dissonance – The More Adaptive Response-Focused Strategy?

Whereas expressive suppression is the process of inhibiting an emotional expression from appearing on the face, expressive dissonance refers to the incongruence between an emotional state (e.g., sadness) and a behavioral expression (e.g., a smile) (Robinson & Demaree, 2007). Some findings suggest that positive facial muscle activity (i.e., generating a smile-related expression) on its own can significantly increase positive mood states (see Strack, 2016). Coined ‘the facial feedback hypothesis’, one theory suggests that feedback from facial expressions (e.g., smiling, pouting) affects emotional experience and behaviour (Tourangeau & Ellsworth, 1979). Strack et al. (1988) randomized participants ($N = 92$) into three conditions and asked them to rate the funniness of cartoons while holding a pen with either 1) the nondominant hand; 2) teeth; or 3) lips. In line with the facial feedback hypothesis, participants who held the pen with their teeth (i.e., inducing a smile), rated the cartoons as significantly funnier than the other two conditions.

A number of research findings have supported the facial feedback hypothesis (see Strack, 2016, for a review). For example, Soussignan (2002) used a variation of Strack et al.’s (1988) pen-holding procedure with four conditions (jaw dropping – control; lips pressing; lips corner pulling – non-Duchenne smile, and lips corner pulling with raised cheeks, and wrinkle corners of eye – Duchenne smile). One of the objectives was to test whether distinct patterns of smiles (non-Duchenne smile vs. Duchenne smile) differentially influenced subjective responding, as Levenson et al. (1990) suggested that feedback effects should be stronger when facial configurations most closely matched pure emotional expressions. During a pencil-holding task,

participants were shown both negative and positive video-clips, and were asked to rate their emotional reactions on a scale ranging from -9 (*very negative*) to 9 (*very positive*). Participants who displayed Duchenne smiles rated the humorous cartoons and pleasant scenes as more positive, relative to the other conditions. These results support the facial feedback hypothesis and suggests that facial feedback is more effective when facial configurations truly represent emotional expressions.

The facial feedback hypothesis has also been supported in the treatment of depression using Botulinum toxin (Botox) (see review by Alves et al., 2016). Specifically, injections of Botox temporarily paralyze the corrugator (eyebrow) facial muscles leading to reduced movement and the inability to frown/scowl (Finzi & Rosenthal, 2014). According to the facial feedback hypothesis, people who received such injections would not receive feedback from the frowning muscles, making it more difficult to maintain negative affect. Finzi and Wasserman (2006) treated 10 people who had symptoms of depression with Botox injections into the corrugator muscles. Subsequently, nine participants showed a complete reduction of their depressive symptoms whereas the tenth showed a marked reduction in symptoms.

In the first randomized controlled trial (RCT) comparing Botox to placebo in the treatment of depression, Wollmer et al. (2012) recruited 30 patients who were living with mild to moderate, treatment resistant, major depressive disorder. Patients were randomly assigned to receive a single treatment of Botox or a saline solution (placebo). Compared to placebo, the Botox treated condition showed significant improvement on self-reported symptoms of depression as early as two weeks after the injection.

Similar to Wollmer et al. (2012), Finzi and Rosenthal (2014) randomly assigned 74 participants who were living with moderate to severe major depressive disorder to receive a

single treatment of Botox ($n = 33$) or saline ($n = 41$). Those who received Botox reported significantly reduced symptoms of depression after six weeks. There was a significantly higher remission rate of depressive symptoms in the Botox condition (27%) compared to placebo (7%) (Finzi & Rosenthal, 2014).

In contrast to the strong evidence supporting the facial feedback hypothesis, Wagenmakers et al. (2016) completed a Registered Replication Report (RRR) in which 17 laboratories ($N = 1,894$) directly replicated the methodology in Strack et al. (1988), and found that overall, the results were inconsistent with the original results. The original study reported a difference between the “smile” and “pout” conditions of 0.82 units on a 10-point rating scale; the results of the RRR reported a difference of 0.03 units. In response to this replication study, Strack (2016) pointed out some methodological discrepancies between the original study and the replication. For instance, deviating from the original study, cameras were directed at participants in the RRR studies. It is possible that the camera induces a subjective self-focus, which could suppress emotional responses. Additionally, Strack (2016) pointed out that the cartoons, which were iconic and funny in the 1980s, may not evoke the same reactions in the current times. Given the discrepancies presented, one of the goals of this dissertation is to test the facial feedback hypothesis in the context of emotion regulation research.

To my knowledge there are only two studies in the emotion regulation literature that examine the intrapersonal consequences of expressive dissonance. Robinson and Demaree (2007) asked undergraduate students either to use expressive dissonance ($n = 27$) or gave them no instructions ($n = 28$) while watching negative film-clips. Those who used expressive dissonance displayed greater sympathetic nervous system arousal and performed worse on subsequent memory tasks assessing social and visual information presented in the film-clips. Pelt

et al (2018) implemented a research design similar to Robinson and Demaree (2007) and found lower memory accuracy in those who engaged in expressive dissonance ($n = 32$) versus a control condition ($n = 32$). Pelt et al. (2008) expanded the research design in Robinson and Demaree (2007) and found the same effect for negative *and* positive film-clips, suggesting that the impacts of expressive dissonance were based on the inconsistency between the emotion felt and the emotion expressed, independently of the valence of the emotion elicited. As such, both expressive suppression and expressive dissonance may lead to similar physiological and cognitive outcomes; however, with only two studies (to my knowledge) exploring expressive dissonance, conclusions are premature. In line with the facial feedback hypothesis, expressive dissonance may be a more adaptive response-focused strategy to use, if it does indeed increase positive mood states. The research on expressive dissonance, however, is very limited.

Interpersonal Qualities of Emotion Regulation

So far, we understand that expressive suppression may impact people maladaptively, and we are not so sure of the consequences of using expressive dissonance. But how do these strategies help or hinder our relationships? How people perceive us? The quality of our social interactions may be affected by the emotion regulation strategies that we use (Gross, 1998). The area of interpersonal emotion regulation has not been widely studied in the literature.

Zaki and Williams (2013) defined *interpersonal* emotion regulation as one's desire to share emotional states with others, modify negative affect in the presence of others, and change others' affective states. Interpersonal emotion regulation occurs in a live social interaction and/or in pursuit of a regulatory goal. Interpersonal impacts of emotion regulation include the impacts on oneself, the communication partner, and the quality of the social interaction and relationship. For example, one can seek the support of others to manage stress and increase positive mood,

and one can also impact the regulation of others through exhibiting empathy, active listening, and prosocial behaviours (Dixon-Gordon et al., 2015).

Interpersonal emotion regulation involves a set of exchanges during a social interaction: one can engage in a social interaction with the goal of regulating their emotion and/or influencing the regulation of others (see Dixon-Gordon et al., 2015, for a review; Zaki & Williams, 2013). Zaki and Williams (2013) further defined interpersonal emotion regulation into intrinsic *versus* extrinsic interpersonal regulation. Intrinsic emotion regulation includes regulation of one own's emotion; the goal of extrinsic emotion regulation is to regulate another person's emotion. You can do both at the same time – like soothe a crying baby to keep yourself from feeling overwhelmed. Intrinsic and extrinsic emotion regulation can be response-dependent or response-independent. A social interaction is response-dependent if the regulation relies on a specific response from the other person (e.g., talking to a friend about a break-up will only reduce one's sadness if the best friend responds supportively), or response-independent if the regulation does not require the interaction partner to respond in a particular way (e.g., talking to a friend about a break-up and simultaneously reappraising the situation, which regulates one's affect regardless of how the friend responds). Overall, Zaki and Williams' (2013) model outlines a bidirectional communication process, wherein the sender's goal is encoded through the interaction, and then decoded by the receiver. The receiver then sends back a message in response to the sender.

Social Consequences of Expressive Suppression

The quality of our social interactions may be affected by the emotion regulation strategies that we use (Gross, 1998). This area of emotion regulation has not been widely studied in the literature. We know a lot about suppression, and to some degree, exaggeration in an

intrapersonal context, but we know much less about the impacts of those strategies in an interpersonal context. This gap is important to further explore, as expressive suppression is very common during social interactions, and evidence suggests that there are important links between emotion expression, social relationships, and health (Gross & John, 2003).

The negative outcomes (e.g., memory difficulties, increased physiological arousal, heightened self-reported anxiety) related to response-focused strategies are especially important when exploring the potential social consequences of using these maladaptive emotion regulation strategies. For instance, if expressive suppression or expressive dissonance increases cognitive load (as suggested by Pyszczynski & Greenberg, 1987), it likely distracts the regulator from his/her partner, leading to reduced ability to retain or remember pieces of the conversation, and subsequently to a disrupted interaction (Lieberman & Rosenthal, 2001).

We know little about the individual or interpersonal consequences that result from response-focused strategies during social exchanges. Butler et al. (2003) asked unacquainted pairs of women to discuss an upsetting topic. In all 36 pairs, one partner was instructed (unbeknownst to the other) to either suppress their emotional expression during the discussion ($n = 12$), cognitively reappraise their emotions ($n = 12$), or were given no instructions on how to regulate their emotions ($n = 12$). Compared to people in the reappraisal and no-instruction conditions, those who suppressed their emotions reported feeling more negative emotions (e.g., anger, anxiety) during the conversation. In addition, suppression increased blood pressure in *both* the regulators and their partners, relative to the other two conditions. The partners of suppressors also reported less rapport and willingness to form a friendship. These findings suggest that suppressing emotions disrupts emotional communication with a social partner, and consequently, has the potential to significantly undermine social functioning. In research with romantic couples

Ben-Naim et al. (2013) asked couples to suppress emotions or think about positive aspects of the relationship while discussing an issue rated highly distressing by both partners. Similar to Butler et al. (2003), suppression increased cardiovascular arousal, increased negative affect, and decreased positive affect of the suppressor and the partner.

Given that expressive suppression involves proactively modulating one's facial expressions, it may significantly impact the quality of interactions and relationships. Researchers of healthy communication styles suggest that responsivity is one of the basic requirements for successful communication (Berg & Derlega, 1987). Responsivity is presented in verbal (responding) and nonverbal cues (i.e., nodding, eye contact). The lack of expressivity communicated while engaging in expressive suppression could suggest less willingness to establish or maintain a relationship (Riggio & Friedman, 1982).

Similarly, Peters et al., (2014) asked participants to use suppression or exaggeration (two response-focused strategies) while discussing a negative emotion-eliciting video with an unacquainted opposite-sex partner. Partners of those who suppressed reported that suppressors were poor communicators and demonstrated fewer facial expressions, emotions, and gestures. Additionally, both participants of the suppression dyad exhibited increased sympathetic nervous system arousal (i.e., flight or fight system – an indicator of anxiety), during the conversation task. These findings suggest that suppressing expressions during an interpersonal interaction can have potential physiological and affective consequences for both the regulator and the partner. Richards et al. (2003) examined the cognitive consequences of engaging in suppression and found that people who were asked to suppress when discussing relationship conflict with their partner remembered less of the discussion, relative to those who reappraised or were given no specific instructions to regulate. These findings in the literature suggest that suppressing

emotions has the potential to significantly undermine social functioning and quality of relationships. Although there is some research regarding the effects of suppression in a social interaction, we still know little about the consequences of interpersonal emotion regulation from different response-focused strategies during social exchanges.

Researchers have demonstrated that smiling in social interactions predicts friendship development (e.g., Chen et al., 2015), likeability (e.g., Clark et al., 1996), and stronger social bonds (e.g., Keltner & Bonanno, 1997). Expressing positive emotions communicates approachability and desire to affiliate, which contributes to feelings of closeness and intimacy (Harker & Keltner, 2001). If smiling has positive *intrapersonal* and *interpersonal* effects, it is noteworthy to explore whether smiling during a stressful task is more advantageous than showing no emotion at all.

Szczurek et al. (2012) explored the social consequences of displaying affect incongruent to the situation (e.g., like expressive dissonance). Participants ($N = 70$) were asked to display incongruent or congruent expressions in response to positive, neutral, or negative pictures. There were 10 participants in each condition (incongruent/congruent by affect, and one control condition). Participants who displayed affect incongruent to the images were judged more negatively on personality traits. This effect was moderated by valence: people were judged more negatively if they showed flat affect to *positive* than to *negative* images. Also, smiling during negative images was rated more poorly than grimacing during happy images. A limitation to the Szczurek et al. (2002) study is the lack of ecological validity. It is therefore unclear whether interpersonal consequences exist when people engage in expressive dissonance in a social interaction that is distressing for the regulator but potentially considered “positive” by an observer or partner (like a first meeting).

The Current Studies

To address the noted gaps in the emotion regulation literature, I conducted two experimental studies to investigate the impacts of two response-focused emotion regulation strategies (expressive suppression and expressive dissonance) compared to a natural expression control condition on psychophysiology, memory accuracy, affect (i.e., positive and negative mood and anxiety), and qualities of a social interaction. According to the existing literature, suppression is considered a maladaptive emotion regulation strategy. Although outwardly people display a neutral or “emotionless expression” when engaging in expressive suppression, researchers have found that using expressive suppression leads to an increase in sympathetic nervous system arousal (i.e., anxiety), including increased heart rate, blood pressure, perspiration, and finger temperature (see Webb et al., 2012). Researchers have also found that people who use expressive suppression also present difficulties in retaining information presented during the regulation, suggesting that suppression requires a continuous use of cognitive resources (Pyszczynski & Greenberg, 1987). People who suppressed their expressions of positive and negative emotions also reported feeling decreased positive emotions (Gross & Levenson, 1997).

Expressive dissonance is another response-focused emotion regulation strategy that may be more adaptive than expressive suppression, but that has received limited attention in the literature. The only two studies that have examined the impacts of expressive suppression suggested that expressive suppression and expressive dissonance may lead to similar physiological and cognitive outcomes. Although research focused specifically on expressive dissonance is limited, we can draw from the ‘facial feedback hypothesis’ which suggests that generating emotional expressions (e.g., a smile-related expression) can increase mood states

(e.g., positive mood). If positive facial muscle activity increases positive mood states, it is possible that smiling, even when feeling distressed, is more adaptive than suppressing emotions, and perhaps even more adaptive than reacting naturally.

It is important to identify adaptive response-focused emotion regulation responses, given the association between mental health difficulties (i.e., depression, anxiety, and difficulties with emotion regulation) and long-standing use of expressive suppression. Moreover, because these strategies may hold consequences at both an intrapersonal and interpersonal level, it is vital to investigate their impact on people at an individual level (intrapersonal) and in terms of their experiences with others, and others' perceptions (interpersonal).

In Study 1, I examined the intrapersonal consequences of response-focused emotion regulation strategies. Women participants were randomly assigned to one of three conditions (expressive suppression, expressive dissonance, and a control condition), and received instructions to use only the emotion regulation strategy assigned while watching negative emotion-eliciting images. Before and after the task, participants completed self-report questionnaires assessing current positive and negative emotions and anxiety. Electrodermal activity (EDA; a measure of sympathetic nervous system arousal) data was collected throughout the task. Following the task, participants completed a recall task (a measure of recollection) and a recognition task (a measure of familiarity), to assess their ability to retain social and visual information presented during the slides.

The major limitation in Study 1 was that my study was only *somewhat* ecologically valid, in that it was limited specifically to watching negative images. Indeed, watching images in a lab context may not tap the same dynamic processes involved in real-time emotion regulation. Although this type of paradigm allows researchers to hold multiple confounding variables stable

across experimental conditions, it limits the generalizability of the findings. As such, I created a study that more closely resembled daily interactions, to understand whether our findings extended to everyday experiences.

I designed Study 2 with the intention of exploring the impacts of emotion regulation in an interpersonal interaction to explore emotion regulation strategy use in 1) an ecologically valid research design and 2) within the area of interpersonal emotion regulation. Please see Chapter 3 (Bridge) for a detailed description of the formulation and development of Study 2. In Study 2, women participants were randomly assigned to one of three experimental conditions: expressive suppression, expressive dissonance, or control, and were instructed to use the assigned strategy while engaging in an unstructured conversation with an opposite-gender confederate (to induce anxiety). Participants completed self-report questionnaires assessing positive and negative emotions, and anticipatory and peak anxiety, before and after the conversation task. EDA was collected throughout the task. After the conversation task, participants completed three memory tasks (i.e., free recall, cued recall, and recognition) to assess their memory for verbal information presented by the confederate. Conversations were videotaped, and coded for qualities of social interaction (i.e., friendliness, likability, approachability, and easy-goingness).

Overall, the two studies aimed to answer a few important questions in emotion regulation research: 1) Do the findings for the impacts of expressive suppression reflect the current literature?; 2) Is the facial feedback hypothesis supported in an emotion regulation context measuring interpersonal and intrapersonal impacts?; and 3) What are some important methodological considerations for studying emotions regulation strategies in a lab-based, experimental paradigm?

I pre-registered the hypotheses, methods, and data analysis plan for both studies on the

Open Science Framework. Study 1 was registered after data collection started, but before conducting any data analyses

(https://osf.io/9nx3k/?view_only=9df5e9d3c599476e9f81e8a748b05431). I registered Study 2 before data collection (https://osf.io/yu94e/?view_only=f805e89b83bc4482b54fae1aefd971b1), and received participants' consent to share the de-identified, raw data set publicly (https://osf.io/sg8fa/?view_only=e5f8eb66ddb84c78b35f5ecc74364761).

CHAPTER 2:**Smiling Won't Make you Feel Better: Response-focused Emotion Regulation Strategies have Little Impact on Cognitive, Behavioural, Physiological, and Subjective Outcomes****Abstract**

Background and Objectives. Response-focused emotion regulation (RF-ER) strategies may alter people's evoked emotions, influencing psychophysiology, memory accuracy, and affect. Researchers have found that participants engaging in expressive suppression (ES; a RF-ER strategy) experience increased sympathetic nervous system arousal, increased negative affect (i.e., higher subjective anxiety and negative emotion), and lowered memory accuracy. It is unclear, however, whether all RF-ER strategies exert maladaptive effects. Expressive dissonance (ED; displaying an expression opposite from how one feels) is a RF-ER strategy, and thus likely considered "maladaptive". As suggested by the facial feedback hypothesis, however, smiling may increase positive emotion, suggesting that ED may be an adaptive strategy for dealing with negative affect. We compared the effects of ED and ES to a control condition on psychophysiology, memory accuracy, and affect, to assess whether ED is an adaptive RF-ER strategy, relative to ES. **Methods.** One hundred and forty-four female participants were randomly assigned to engage in ED, ES, or to naturally observe, while viewing negative and arousing images. Electrodermal activity and self-reported affect was recorded throughout the experiment and participants completed memory tasks. **Results.** There were no differences between conditions across outcomes. **Conclusion.** Engaging in ES or ED may not lead to negative or positive impacts, shedding doubt on the common conclusion that specific strategies are categorically adaptive or maladaptive.

Smiling Won't Make you Feel Better: Response-focused Emotion Regulation Strategies have

Little Impact on Cognitive, Behavioural, Physiological, and Subjective Outcomes

Emotion regulation (ER) involves automatic and controlled processes that impact the type and duration of emotional expression (Gross, 1998). We regulate our emotions using ER strategies, like masking a facial expression of sadness by smiling. These strategies are classified into two categories, *antecedent-focused* and *response-focused* strategies, based on when the strategy is used (Gross, 1998). Antecedent-focused ER strategies are primarily cognitive strategies that occur *before* an emotion is provoked (e.g., cognitive reappraisal – altering one's appraisal of a situation to modify its emotional impacts) (Gross, 1998). Response-focused strategies modify an emotional response *after* an emotion is provoked (e.g., expressive exaggeration – amplifying an evoked facial expression).

Overview of Impacts of Response-Focused Emotion Regulation Strategies

To examine the differential impacts that ER strategies have on psychophysiology, memory, and affect, researchers manipulate strategy use experimentally during emotional provocation (i.e., engaging in the assigned emotional regulation strategy during an emotion-eliciting task; e.g., Bebkco et al., 2011; Demaree et al., 2004; Demaree et al., 2006; Gross & Levenson, 1997), and also implement “manipulation checks” to ensure participants adhere to the specific regulation instructions (e.g., participants are rated on facial expressivity by video coders blind to the hypotheses).

A widely studied response-focused strategy is expressive suppression – inhibiting an emotional facial expression to mask an emotion (Gross, 1998). Researchers have found maladaptive consequences when suppression is experimentally manipulated during emotional provocation. For psychophysiology, those engaging in suppression demonstrated increased

sympathetic nervous system arousal (e.g., increased skin conductance, greater cardiac interbeat interval, greater finger pulse amplitude –indicators of heightened arousal), relative to a control condition (Gross & Levenson, 1997) and cognitive reappraisal (Gross, 1998). Additionally, presumably due to the constant self-monitoring of one's own facial displays, people are less able to retain information using suppression (Richards & Gross, 2005). Richards and Gross (2005) found that increased self-monitoring predicted decreased memory for parts of a conversation among participants who suppressed their facial expression, relative to those who were not given instructions. Engaging in suppression also leads to changes in affect. Participants who suppressed their expression reported significantly greater subjective anxiety after a speech task relative to people in reappraisal and acceptance conditions (Hofmann et al., 2009). Suppressing emotions also leads to decreased positive affect, relative to reappraisal or control (i.e., instructions to watch the film) (Gross, 1998). Researchers further suggest that people with mood and anxiety disorders tend to use expressive suppression more so than do people without clinical diagnoses (Aldao et al., 2010), highlighting the potential long-term maladaptiveness of this strategy.

Expressive Dissonance and the Facial Feedback Hypothesis

A response-focused ER strategy frequently used but very infrequently studied is expressive dissonance: showing the opposite of how one feels (Robinson & Demaree, 2007). Despite this gap in the ER literature, the longstanding facial feedback hypothesis (FFH; see Strack et al., 1988) suggests that expressive dissonance may actually be adaptive. Indeed, researchers interested in the FFH suggest that feedback from facial expressions (e.g., smiling or pouting) affects emotional experience and behaviour. As such, positive facial muscle activity (i.e., generating a smile-related expression) can significantly increase positive mood states

(Strack et al., 1988). Strack et al. (1988) found that participants rated cartoons as funnier when they held a pen with their teeth (simulating a smile) compared to when they held a pen with the nondominant hand (control) or lips (simulating a frown).

In contrast to research supporting the FFH, Wagenmakers et al. (2016) conducted a Registered Replication Report (RRR) in which 17 laboratories directly replicated the methodology in Strack et al. (1988), and overall, failed to replicate the original results. In response, Strack (2016) pointed out some methodological discrepancies between the original study and the replications (e.g., cartoons shown in the 1980s may not evoke the same reactions when viewed now).

Despite the similarities between the FFH and expression-related ER research, there are two studies to our knowledge that have attempted to integrate the relevant theories. Robinson and Demaree (2007) found that relative to a control condition, participants who used expressive dissonance while watching negative film-clips showed greater sympathetic nervous system arousal and performed worse on a memory task assessing social and visual information presented in the film-clips. Pelt et al (2018) implemented a research design similar to Robinson and Demaree (2007) and found lower performances in memory accuracy in those who engaged in expressive dissonance ($n = 32$) versus a control condition ($n = 32$), while watching negative and positive film-clips. Thus, both expressive suppression and expressive dissonance may lead to similar physiological and cognitive outcomes; however, with only two studies exploring expressive dissonance, conclusions are premature.

In our current study, we compared the impacts of two response-focused ER strategies, expressive dissonance and expressive suppression, relative to a control condition, during a distressing situation, to explore whether one response-focused strategy is more adaptive than the

other. Given that men use expressive suppression more than women, and that women demonstrate greater emotional physiological reactivity (see Gross & John, 2003; Gross, 1998), only women were recruited to avoid potential gender confounds while maximizing sample size and statistical power. Participants were randomly assigned to one of three conditions: expressive suppression, expressive dissonance, or a control condition, and asked to engage in the assigned ER strategy while watching negative emotion-eliciting images. Electrodermal activity (EDA; a measure of sympathetic nervous system arousal) was collected throughout the task, and participants completed several questionnaires assessing affect (i.e., positive and negative emotions and anxiety). Facial-electromyography (*f*-EMG; electrical activity of muscle tissue) was recorded throughout the experiment as part of the manipulation check to assess whether participants engaged in the strategy assigned. Following the picture-watching task, participants completed two memory tasks, assessing their ability to retain the visual information presented. Our hypotheses (pre-registered in Open Science Framework; OSF; Bahl & Ouimet, 2019: https://osf.io/9nx3k/?view_only=9df5e9d3c599476e9f81e8a748b05431) were:

H1. Participants in the Expressive Suppression condition would show greater sympathetic nervous system arousal, measured by electrodermal activity, during the picture task, relative to those in the Control condition, who in turn, would show greater sympathetic nervous system arousal than those in the Expressive Dissonance condition.

H2. Participants in the Expressive Suppression condition would report more negative mood and increased anxiety, and people in the Expressive Dissonance condition would report more positive mood and decreased anxiety, measured by the modified Self-Assessment Manikin, during the picture task, relative to those in the Control condition.

H3. Participants in the Expressive Suppression and Expressive Dissonance conditions would

perform worse on memory tasks, relative to the Control condition.

Method

We pre-registered our methods and data analysis plan after data collection started, but before conducting any data analyses (see link above).

Participants. Our study was approved by the University of Ottawa’s Research Ethics Board. We recruited 144 (see power analysis below) female undergraduate students ($M_{\text{age}} = 19.70$ years, $SD = 4.60$) through the psychology participant pool. Most participants identified themselves as White (57.6%) (see Table 1). Approximately 8% reported a current mood or anxiety disorder diagnosis by a mental health professional. Consistent with best practice for f-EMG (Cacioppo et al., 2007), people who reported having a past/current neurological disorder or a major injury or surgery around their facial area were not eligible to participate. Participants were required to understand English well and were compensated with two course credits.

Materials

Stimuli

International Affective Picture System (IAPS; Lang et al., 1997). The IAPS is a set of emotional and neutral images with normative ratings for all images. Each image was normed on *Valence* (i.e., how positive or negative an image is), *Arousal* (i.e., how alerting or calming an image is), and *Dominance* (e.g., a viewer’s perceived level of control in relation to the stimulus shown). We selected 40 images that were rated low in pleasantness and high in arousal. These images were selected using a cluster algorithm by Constantinescu et al. (2017), which grouped IAPS images into categories of emotion and arousal (very positive, positive, neutral, negative, very negative). We selected thirty “negative” images ($Valence = 3.1$, $Arousal = 5.7$, $Dominance = 3.9$) for the picture task and 10 “negative” images ($Valence = 3.7$, $Arousal = 5.6$, $Dominance =$

4.2) for the baseline measure. During the baseline and picture tasks, participants viewed each image for 6 seconds, followed by an 8-second inter-trial interval before the next image. After

Table 1

Descriptive Data of the Racial and Ethnic Identities of Participants

Race/Ethnicity	Percentage (%)
White	57.6
Black	10.4
Latinx	.70
Asian	12.5
South Asian	6.3
Indigenous	2.8
Pacific Islander	.70
Middle Eastern	8.3
Caribbean	2.8
European	9.7
Other	3.5
Preferred not to answer	.70

every 10 images, participants were reminded how to regulate their emotions during the task. The IAPS pictures and all other questionnaires were shown on a Dell Optiplex 990 computer with a 22-inch (30 cm X 48cm) monitor. The images appeared in the center of the screen, in 32-bit colour, with a black background.

Questionnaires

See Table 2 for descriptive data and between condition differences for baseline measures.

Depression Anxiety Stress Scale – Depression Subscale (DASS-DEP; Lovibond &

Lovibond, 1995). The DASS is a 21-item questionnaire that measures depression, anxiety, and stress on a 4-point Likert-type scale (0 = “Did not apply to me at all”, 3 = “Applied to me very much, or most of the time”). The Depression subscale (7 items) contains items such as “I felt I was pretty worthless.” This subscale demonstrates excellent internal consistency ($\alpha = .97$; Antony et al., 1998). We included this scale to control for depression symptomatology in a

separate set of analyses, as people with depression generally engage in suppression more than people without (Aldao et al., 2010).

Table 2*Descriptive Data and Between Condition Differences for Baseline Measures*

Variables	Expressive Suppression <i>Mean (SD)</i>	Expressive Dissonance <i>Mean (SD)</i>	Control <i>Mean (SD)</i>	<i>Total</i> <i>Mean (SD)</i>	α	F	p
Age	18.8 (1.3)	20.5 (4.8)	20.1 (6.5)	19.7 (4.6)	-	1.56	.22
DASSDEP	5.3 (4.5)	4.9 (4.9)	3.9 (3.6)	4.7 (4.4)	.88	1.37	.26
DERSTOT	90.6 (23.9)	90.5 (24.3)	86.7 (19.2)	89.2 (22.4)	.93	.45	.64
SPIN	26.0 (13.2)	22.2 (12.5)	22.9 (11.9)	23.8 (12.6)	.90	1.22	.30
ERQSUP	13.8 (4.8)	14.2 (4.6)	13.4 (4.8)	13.8 (4.7)	.73	.30	.74
ERQREA	29.5 (7.8)	29.8 (6.6)	29.1 (7.4)	29.5 (7.3)	.87	.11	.90
ERQDIS	18.9 (6.3)	19.7 (5.9)	18.4 (6.4)	18.9 (6.2)	.80	.42	.66
EDA1	.81 (.61)	.93 (.77)	.65 (.48)	.77 (.62)	-	1.72	.18
mSAMAC1	4.3 (2.2)	3.9 (2.2)	4.0 (2.3)	4.1 (2.2)	-	.35	.70
mSAMHU1	6.4 (1.5)	6.5 (1.4)	6.8 (1.6)	6.5 (1.5)	-	.84	.44

Note: DASS-DEP = Depression Anxiety Stress Scale, Depression Subscale, DERSTOT = Difficulties in Emotion Regulation, Total Scale; SPIN = Social Phobia Inventory; ERQSUP = Emotion Regulation Questionnaire, Suppression Subscale, ERQREA = Emotion Regulation Questionnaire, Reappraisal Subscale, ERQDIS = Emotion Regulation Questionnaire, Dissonance Subscale, mSAMHU1 = Modified Self-Assessment Manikin Happy/Unhappy Scale, before baseline mSAMAC = Modified Self-Assessment Manikin – Anxious/Calm Scale, before baseline

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36-item self-report questionnaire that measures emotion dysregulation. The items are rated using a 5-point Likert-type scale (1 = “Almost never, 0-10%”, 5 = “Almost always”, 91-100%) across six subscales: Non-acceptance of emotional responses (e.g., “When I’m upset, I feel guilty for feeling that way”; 6 items), Difficulties engaging in goal-directed behaviour (e.g., “When I’m upset, I have difficulty concentrating”; 5 items), Impulse control difficulties (e.g., “When I’m upset, I lose control over my behaviours”; 6 items), Lack of emotional awareness (e.g., “I am attentive to my feelings” [reverse-scored]; 6 items), Limited access to emotion regulation strategies (e.g., “When I’m upset, I believe that I’ll end up feeling very depressed”; 8 items), and Lack of emotional clarity (e.g., “I have difficulty making sense out of my feelings”; 5 items). The six subscales and total scale demonstrate good to excellent internal consistency ($.80 \leq \alpha \leq .93$) and adequate construct and predictive validity (Gratz & Roemer, 2004).

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ is a 10-item self-report questionnaire that measures the degree to which one engages in Cognitive Reappraisal (e.g., “I control my emotions by changing the way I think about the situation I’m in”; 7 items) and Expressive Suppression (e.g., “I control my emotions by not expressing them”; 4 items), on a 8-point Likert scale (0 = “Strongly disagree”, 7 = “Strongly agree”). The Cognitive Reappraisal subscale (ERQ-REA) demonstrates good internal consistency ($\alpha = .82$; Gross & John, 2003), and the Suppression subscale (ERQ-SUP) demonstrates acceptable internal consistency ($\alpha = .76$; Gross & John, 2003). The ERQ shows good convergent as well as discriminant validity and approaches acceptable test-retest reliability ($r = .69$; Gross & John, 2003). We modified the ERQ to also measure the degree to which participants engage in expressive dissonance. We added three items: “When I want to feel less negative emotion (such

as sadness or anger), I try to smile in order to feel happier”; “I control my emotions by expressing the opposite of how I am really feeling (e.g., showing happiness when feeling sad).”; “When I want to feel more positive emotion (such as joy or amusement), I try to smile in order to feel happier.”

Social Phobia Inventory (SPIN; Connor et al., 2000). The SPIN is a 17-item self-report measure that assesses degree of distress by symptoms of social anxiety over the past week. Items are sorted into three subscales: fear (e.g., “I am afraid of doing things when people might be watching”; 6 items), avoidance, (“I avoid going to parties”; 7 items) and physiological arousal (“Sweating in front of people causes me distress”; 4 items), and rated on a 5-point Likert-type scale (0 = “Not at all”, 4 = “Extremely”). We included the SPIN as a covariate measure in a separate set of analyses, as researchers suggested that people with social anxiety have the tendency to use suppression inflexibly (Aldao et al., 2010). The SPIN shows good convergent validity, discriminant validity, and test-retest reliability ($.78 \leq r \leq .89$), and good to excellent internal consistency in people with social anxiety disorder ($.87 \leq \alpha \leq .94$) and healthy participants ($.82 \leq \alpha \leq .90$; Connor et al., 2000).

Modified Self-Assessment Manikin (mSAM; Bradley & Lang, 1994). The original SAM is a self-report measure of state emotional experience. It includes a valence (mSAM-HU; happy-unhappy) and arousal (mSAM-AC; excited-calm) scale. Each scale consists of five figures that mimic human emotions and four boxes, one between each figure to finely-tune ratings of emotional experience. Throughout the task, participants were asked to place an “X” on the appropriate figure for each scale. In our study, we modified one of the scales, from “excited-calm” to “anxious-calm”, as we noticed during piloting that “excited” was being mistaken for a positive emotion. We therefore called the measure the modified SAM (mSAM). Backs et al.

(2005) found the SAM to have good to excellent internal consistency for the arousal and mood dimensions ($\alpha = .98$ and $\alpha = .63$, respectively).

Tasks

Memory task. Participants completed a free-recall task by describing in detail as many images as they could, receiving one point for each correctly identified image. Participants then completed a recognition task; they viewed 10 new IAPS images and 10 from the picture task, and indicated on the keyboard whether they recalled seeing the picture earlier.

Psychophysiological Equipment

Electrodermal activity (EDA). EDA is a measure of sympathetic nervous system activity, as it measures electrical conductance created by sweating (Roy et al., 2012). EDA is measured in microsiemens. We collected EDA *via* Biopac TSD203 transducers filled with Biopac Skin Conductance Electrode Paste. Two electrodes were placed on the thenar and hypothenar muscles of the non-dominant palm. Data was amplified using Biopac's GSR100C amplifier using a gain of 10 Hz and a low-pass filter of 10Hz. EDA measures have been used extensively in physiological research and have demonstrated both construct and concurrent validity (Roy et al., 2012) as well as acceptable test-retest reliability ($r = .72$; Waters et al., 1987). All event-related responses were defined as a $0.2\mu\text{S}$ increase in skin conductance.

Facial electromyography (f-EMG). F-EMG measures facial muscle activity through electrical impulses created by muscle fibers when they contract (Cacioppo et al., 2007). We used f-EMG as an objective manipulation check to assess whether participants employed the ER strategy assigned. Electrodes were 4mm Ag-AgCl sensors – two electrodes were placed on the left zygomaticus major (cheek); two electrodes were placed on the left corrugator supercilia (brow) muscle regions; one ground electrode was placed on the forehead; and one “dummy”

electrode was placed on the neck, to divert attention from the face as the primary area of interest. Data was sampled at 1000Hz with a 10Hz high-pass and a 500Hz low-pass filter. The signal was rectified and smoothed using a 16Hz filter. Impedance was kept under 10 Ω . Facial EMG measures have demonstrated good construct validity (Fridlund & Cacioppo, 1986), and excellent test-retest reliability ($r = .90$; Arena et al., 1983).

Manipulation Check

We took a stepped approach to checking for efficacy of the manipulation, using three separate phases (questionnaire, video, *f*-EMG).

Manipulation Check Questionnaire. Participants completed a 7-item questionnaire after the picture task, and rated the degree to which they engaged in specific behaviours during the picture task. Items on a 5-point scale (0 = “Not at all”; 4 = “Always”) included: “How often did you show an expressionless or neutral expression throughout the task?”; “How often did you look away from the image?” If participants in the expressive suppression and expressive dissonance condition reported that they did not consistently engage in the strategy assigned (i.e., a score of 0 = “Not at all” or 1 = “Rarely” or 2 = “Somewhat”) on the strategy-specific item, their data were considered for exclusion. Please see Table 3 for participant responses to the manipulation check questionnaire.

Video. We reviewed the videos of participants who indicated that they did not consistently engage in the strategy assigned. If those participants appeared not to have followed the instructions in the video, then we examined their *f*-EMG recording.

***f*-EMG.** We compared the group means of the zygomatic and corrugator muscle to those of each participant considered for exclusion. Please see the **Manipulation Check and Missing Data** section in **Data Preparation** for further details.

Table 3*Frequencies and Percentages for Questions (#) in the Manipulation Check Questionnaire*

	Expressive Suppression					Expressive Dissonance					Control				
	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)
#1	0 (12.8)	6 (4.3)	2 (4.3)	23 (48.9)	16 (34.0)	7 (17.1)	13 (31.7)	12 (29.3)	8 (19.5)	1 (2.4)	1 (2.1)	2 (4.3)	3 (6.4)	34 (72.3)	7 (14.9)
#2	32 (68.1)	12 (25.5)	3 (6.4)	0	0	3 (7.3)	5 (12.2)	7 (17.1)	14 (34.1)	12 (29.3)	28 (59.6)	13 (27.7)	5 (10.6)	1 (2.1)	0
#3	9 (19.1)	6 (12.8)	17 (36.2)	13 (27.7)	2 (4.3)	5 (12.2)	8 (19.5)	8 (19.5)	13 (31.7)	7 (17.1)	15 (31.9)	11 (23.4)	12 (25.5)	9 (19.1)	0
#4	19 (40.4)	14 (29.8)	10 (21.3)	4 (8.5)	0	19 (46.3)	11 (26.8)	9 (22.0)	2 (4.9)	0	18 (38.3)	12 (25.5)	11 (23.4)	6 (12.8)	0
#6	0 (2.1)	1 (2.1)	14 (29.8)	21 (44.7)	11 (23.4)	1 (2.4)	11 (26.8)	9 (22.0)	16 (39.0)	4 (9.8)	1 (2.1)	3 (6.4)	16 (34.0)	18 (38.3)	9 (19.1)
#7	0 (6.4)	3 (6.4)	3 (6.4)	27 (57.4)	14 (29.8)	3 (7.3)	6 (14.6)	14 (34.0)	14 (34.1)	4 (9.8)	1 (2.1)	0	9 (19.1)	24 (51.1)	13 (27.7)

Note: Responses: 0 = Not at all, 1 = Rarely, 2 = Somewhat, 3 = Very Often, 4= Always; Items:
 #1 = "...maintained a neutral expression?", #2 "...maintained a smile?", #3 = "...changed the
 meaning of images to make them less distressing?", #4 = "...looked away to avoid images?", #6
 = "...success at controlling emotions?", #7 = "...success at controlling facial expression"

Procedure

Please see Figure 1 for a procedural diagram. The study took place at the Integrated Neurocognitive & Social Psychophysiology Interdisciplinary Research Environment (INSPIRE Lab; <https://socialsciences.uottawa.ca/inspire/>), a well-equipped psychophysiology laboratory at the University of Ottawa. Participants were told that the study aim was to understand the relationships between thinking and feeling. After providing informed consent, participants completed a sociodemographic questionnaire, the mSAM, and baseline self-report questionnaires (DASS, SPIN, ERQ, and DERS).

We then placed EMG electrodes and EDA equipment onto the participant's face and hand, respectively. Participants completed a baseline task to assess their natural psychophysiological reactivity, which included 10 high negative valence and high arousal pictures, similar to the pictures included in the picture task. After the baseline task, participants completed the mSAM, wherein they reported how they felt *while* watching the previous images. Then, participants were randomly assigned to one of three conditions, and received one of the following instructions: Suppression condition ($n = 54$): *"In a few minutes, you will be asked to view a slideshow with a series of pictures. This task may produce a range of negative feelings, like anxiety. People tend to show or not show these feelings in different ways. For the purposes of this study, please behave in such a way that I will not be able to see that you are feeling anything at all by watching these slides. Remember, do not show your emotions every time you see a new picture, until the image comes off the screen."* The Dissonance condition ($n = 54$) received the exact same instructions with exception of: *"For the purposes of this study, please behave in such a way that I will see that you are feeling happy by watching these slides. Remember, smile – with teeth to show happiness, every*

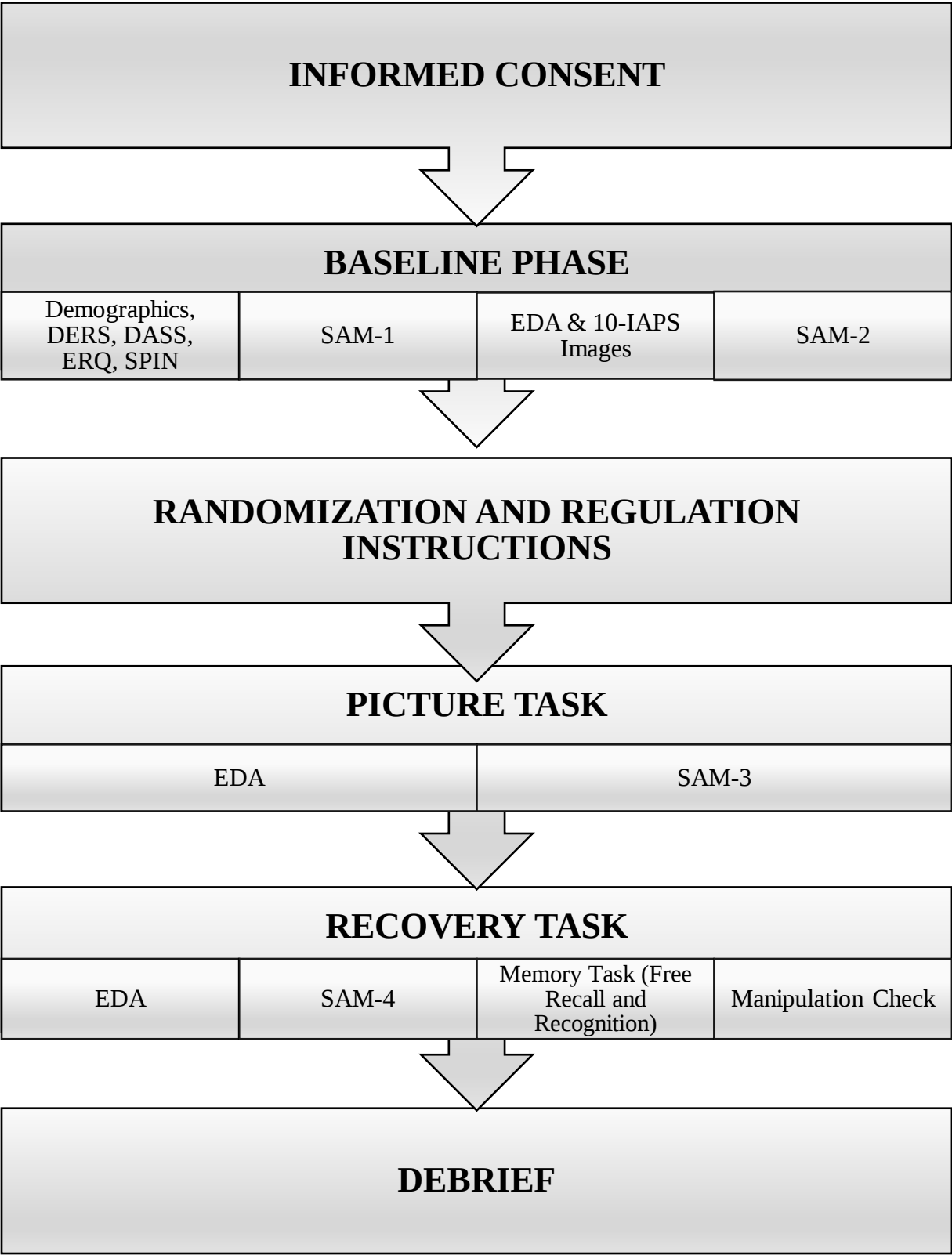


Figure 1: Visual Diagram of Procedure

time you see a new image, until the image comes off the screen.” The instructions for the Control condition ($n = 54$) were: *“For the purposes of this study, please behave as you normally would when watching these slides. Again, show or don’t show your emotions every time you see a new image, until the image comes off the screen.”* Participants were then shown 30 IAPS images and completed the mSAM afterwards to indicate how they felt while watching those images.

Participants completed a 60-second rest recovery period followed by a final mSAM.

Following the tasks, we removed all electrodes from the palm and face. Participants then completed the unanticipated free recall memory task followed by the recognition memory task. Finally, participants completed the manipulation check questionnaire and were fully debriefed.

Data Preparation

Power. We used G*Power 3 (Faul et al., 2009) to estimate the sample size necessary to observe a significant effect. We conducted two power analyses: one was conducted *a priori* and the second was an updated power analysis after data from 80 participants were collected to calculate correlations among repeated mSAM administrations. The total estimated sample size for a Repeated Measures ANOVA, within-between interaction, was 135 ($n = 45$ for each condition), using the following parameters: $\eta^2 = 0.09$ (medium effect; based on Hofmann et al., 2009); p -value = .05; power = 0.80; number of conditions = 3; number of measurements = 4; correlation among repeated measures = 0.69 and nonsphericity correction was kept at 1. To account for participant data that may be excluded (e.g., EDA malfunction), we recruited 144 participants (additional 10%).

Electrodermal Activity. For the baseline and picture task, we computed the mean skin conductance response for each image, and then calculated the average of all images for each

task. For the recovery task, we computed the mean skin conductance response value for 60 seconds in 10 second segments.

Manipulation Check and Missing Data. Twenty-nine participants (20 participants in the expressive dissonance and 9 participants in the expressive suppression condition) reported that they did not consistently engage in the strategy assigned during the task. After watching the video recordings of the participants during the picture task, we found that 17 participants (suppression: $n = 9$; dissonance: $n = 8$) did indeed follow the instructions (i.e., consistently maintained a neutral expression or smiled, respectively). We believe that some participants may have misunderstood the instructions of the manipulation check quiz, (as some participants indicated that they thought the instructions asked if their smile was actually genuine) or underestimated their success at following those instructions. The remaining 12 participants considered for exclusion were in the expressive dissonance condition.

f-EMG. We calculated a mean waveform peak (i.e., amplitude) and integrated waveform score for the zygomatic major and the corrugator supercilia muscle for each slide of the picture task for each participant. We then computed group means (excluding the participants considered for exclusion) of the waveform peak and the integrated waveform score for the zygomatic major and the corrugator supercilia picture task.

Because the 12 participants considered for exclusion were in the expressive dissonance condition, we compared the means of the waveform peak and integrated waveform score of the zygomatic muscle (i.e., “frowning” muscle) during the picture task of each participant selected, to the group mean. We excluded participants if they were one standard deviation lower than the group means (indicating a more neutral expression). We excluded five participants.

We also excluded four participants for incomplete data as they left the experiment after completing the baseline questionnaires. The final sample size was 135 participants (expressive dissonance: $n = 41$, expressive suppression $n = 47$, control $n = 47$).

Data Analysis Plan

To assess the effect of condition on psychophysiological arousal, we conducted a 3 (condition) x 3 (time: baseline, picture task, recovery task) repeated measures ANOVA, with condition as the independent variable and EDA as the repeated dependent variable. To assess the effect of condition on self-reported affect scores, we conducted two 3 (condition) x 4 (time: before baseline, baseline, picture task, recovery task) repeated measures ANOVAs for the mSAM-HU (happy/unhappy) and mSAM-AC (anxious/calm) subscales. We conducted pairwise planned comparisons using the Least Squares Difference (LSD). We conducted a set of exploratory analyses to measure the effect of condition on psychophysiological arousal and affect, while controlling for social anxiety and depression symptoms.

To assess the effect on condition on memory, we conducted two one-way ANOVAs with free recall and recognition memory as the dependent variables.

Results

Descriptive Statistics and Baseline Differences. Participants across conditions did not differ on baseline measures (Table 4).

ER Strategy Effects. We used Huynh-Feldt to interpret the ANOVA, due to violation of the assumption of sphericity (EDA; $\chi^2(2) = 20.95, p < .001$; mSAM-AC: $\chi^2(5) = 66.81, p > .001$; mSAM-HC: $\chi^2(5) = 51.91, p = .000$). There was no significant interaction between time and condition on EDA ($F_{2, 147} = .66, p = .60, \eta^2 = .01$), mSAM-HU ($F_{4.79, 313.68} = .64, p = .66, \eta^2 = .01$), or mSAM-AC ($F_{4.71, 308.25} = .85, p = .51, \eta^2 = .01$), nor a main effect of condition on EDA,

Table 4*Descriptive Data for Outcome Variables*

	Expressive Suppression			Expressive Dissonance			Control		
	EDA	mSAMHU	mSAMAC	EDA	mSAMHU	mSAMAC	EDA	mSAMHU	mSAMAC
	<i>Mean (SD)</i>								
Before Baseline		.81 (.62)	.79 (1.5)		.93 (.77)	.61 (.36)		.65 (.48)	.67 (.55)
Baseline	6.4 (1.5)	4.9 (1.5)	3.9 (1.4)	6.5 (1.4)	4.4 (1.5)	3.5 (1.9)	6.8 (1.6)	4.9 (1.4)	3.9 (1.6)
Picture Task	4.3 (2.2)	4.7 (1.9)	4.9 (2.2)	3.9 (2.2)	5.0 (2.1)	5.4 (2.34)	4.0 (2.3)	4.5 (2.1)	5.3 (2.3)
Recovery	.55 (.55)	5.2 (1.67)	3.9 (2.1)	.56 (.49)	5.1 (1.5)	4.1 (2.3)	.40 (.49)	5.5 (1.4)	3.6 (2.1)

Note: EDA = Electrodermal Activity, mSAMHU = Modified Self-Assessment Manikin Happy/Unhappy Scale, mSAMAC = Modified Self-Assessment Manikin – Anxious/Calm Scale.

Table 5*Pairwise Comparisons Between Repeated Measures*

	EDA			mSAMHC			mSAMAC		
	<i>Mdiff</i>	<i>p</i>	<i>g</i>	<i>Mdiff</i>	<i>p</i>	<i>g</i>	<i>Mdiff</i>	<i>p</i>	<i>g</i>
Before Baseline – Baseline				1.79	<.001	1.19	-.66	.002	0.30
Before Baseline – Picture Task				2.78	<.001	1.78	-1.11	<.001	0.49
Before Baseline – Recovery				1.30	<.001	0.85	.240	.249	0.12
Baseline – Picture Task	.11	.35	0.13	.99	<.001	0.64	-.45	.004	0.21
Baseline – Recovery	2.91	.001	0.52	-.49	<.001	0.32	.89	<.001	0.43
Picture Task – Recovery	.19	.07	0.24	-1.48	<.001	0.93	1.35	<.001	0.61

Note: EDA = Electrodermal Activity, mSAMHU = Modified Self-Assessment Manikin
Happy/Unhappy Scale, mSAMAC = Modified Self-Assessment Manikin – Anxious/Calm Scale

Table 6*Main Analyses with DASS-DEP and SPIN as Covariates*

Predictor	Sum of Squares	df	Mean Square	F	p	η^2
EDA	1.74	1.75	1.00	2.04	.14	.02
EDA*SPIN	.97	1.75	.56	1.14	.32	.01
EDA*Condition	1.17	3.35	.33	.68	.59	.02
Error	75.31	153.53	.491			
EDA	2.84	1.76	1.62	3.38	.04	.04
EDA*DASSDEP	2.27	1.76	1.29	2.70	.08	.03
EDA*Condition	1.69	3.51	.48	1.00	.40	.02
Error	74.02	154.63	.48			
mSAMAC	28.69	2.45	11.72	3.68	.019	.03
mSAMAC*SPIN	7.90	2.45	3.23	1.01	.38	.008
mSAMAC*Condition	12.71	4.89	2.60	.82	.53	.012
Error	1013.34	318.13	3.19			
mSAMAC	91.45	2.46	37.11	11.79	.000	.08
mSAMAC*DASSDEP	12.83	2.46	5.21	1.65	.19	.01
mSAMAC*Condition	12.64	4.93	2.57	.82	.54	.01
Error	1008.41	320.37	3.15			
mSAMHU	107.57	2.50	43.08	24.73	.000	.16
mSAMHU*SPIN	1.16	2.50	.47	.27	.81	.002
mSAMHU*Condition	5.58	4.99	1.12	.64	.67	.01
Error	564.44	324.62	1.74			
mSAMHU	334.00	2.53	131.85	78.64	.000	.37
mSAMHU*DASSDEP	14.45	2.53	5.70	3.40	.02	.03
mSAMHU*Condition	5.53	5.07	1.09	.65	.66	.01
Error	552.15	329.32	1.68			

Note: DASS-DEP = Depression Anxiety Stress Scale, Depression Subscale, SPIN = Social Phobia Inventory, EDA = Electrodermal Activity, mSAMHU = Modified Self-Assessment Manikin Happy/Unhappy Scale, mSAMAC = Modified Self-Assessment Manikin – Anxious/Calm Scale

Table 7*Outcome and Descriptive Data for the Recall and Recognition Memory Task*

Condition	Recall				Recognition			
	<i>Mean</i>	<i>SD</i>	Min	Max	<i>Mean</i>	<i>SD</i>	Min	Max
Suppression	11.3	4.9	2	22	29.0	1.3	24	30
Dissonance	12.4	3.8	5	19	28.9	1.1	26	30
Control	11.0	4.3	3	21	28.9	2.1	18	30

($F_{2,89} = .71, p = .49, \eta^2 = .02$), mSAM-HU ($F_{2,131} = 1.94, p = .15, \eta^2 = .03$), or mSAM-AC ($F_{2,131} = .32, p = .73, \eta^2 = .005$) subscales. We found a main effect of time on EDA ($F_{1.65, 146.89} = 4.66, p = .02, \eta^2 = .50$), mSAM-HU ($F_{2.40, 313.68} = 123.65, p < .001, \eta^2 = .49$), and mSAM-AC ($F_{2.35, 308.25} = 19.38, p < .001, \eta^2 = .13$) subscales. See Table 4 for descriptives on outcome measures. Participants reported lower positive emotion and higher anxiety during the picture task, relative to before baseline and recovery task (Table 5). When controlling for depression and social anxiety symptoms, there were no significant interactions between time and condition on EDA, mSAM-HU, or mSAM-AC, nor main effects of time or condition (see Table 6). There were no statistically significant differences between conditions on recall ($F_{2, 132} = 1.20, p = .31$) or recognition ($F_{2, 130} = .15, p = .86$). Table 7 includes outcome descriptive data for the memory tasks. There were no statistically significant differences between conditions on recall ($F_{2, 132} = 1.20, p = .31$) or recognition ($F_{2, 130} = .15, p = .86$). Table 7 includes outcome descriptive data for the memory tasks.

Discussion

We tested whether participants engaging in expressive suppression would experience more negative outcomes than those engaging in expressive dissonance during a stressful task. Although our manipulation was successful (i.e., people generally reported engaging in their assigned strategy), it was not impactful; engaging in expressive suppression and expressive dissonance during a distressing task did not have negative or positive outcomes, respectively, contrary to the literature.

This lack of significant findings is important, given the methodological strengths of our study. We addressed many common limitations of past experimental research, including recruiting a large sample based on an *a priori* power analysis, pre-registering our hypotheses and

analysis plan, and implementing a multi-stepped manipulation check to exclude data on an individual, rather than group level basis. As such, we are confident that our findings likely do not reflect an anomaly borne out of methodological error, but rather a potentially important limited impact of short-term strategy use on multiple indicators of distress.

We wonder about the validity and usefulness of making inferences from studies exploring “pure” or “single” ER strategies, as participants—when asked—endorse using more than one strategy at one time. Reviewing our manipulation check questionnaire, we found that over half of participants in the suppression and dissonance conditions also reported using cognitive reappraisal (Table 2), and just less than one third in both conditions reported also using distraction (i.e., an antecedent-focused strategy). These findings align with those of Demaree et al. (2006) and Bebko et al. (2011), who also found that participants engaged in cognitive strategies and distraction during experimental tasks. Moreover, given that ER can occur at multiple points in the emotion generation process, people may employ both antecedent- and response-focused strategies simultaneously (Gross & Thompson, 2007). Given the paucity of research on co-active ER use (Demaree et al., 2006) we encourage researchers to measure combination ER strategy use during an emotional-eliciting task, such as *f*-EMG for ER strategies involving facial muscle modulation, eye-tracking devices for distraction (Bebko et al., 2011), and think-aloud protocols or stream of consciousness methods to gauge cognitive reappraisal (Richards & Gross, 2005).

From the manipulation post-event questionnaire, we found that our control group endorsed using multiple emotion regulation strategies. Indeed, 87.2% ($n = 41$) of participants in the control group reported displaying a neutral or expressionless facial display during the picture task. Researchers suggest that people use emotion regulation strategies spontaneously when in a

distressing situation. Egloff et al. (2006) explored the use of spontaneous emotion regulation strategies during an emotion-eliciting speech task, by asking participants to complete the Emotion Regulation Questionnaire (see ERQ) after the task. The authors found most participants engaged in either reappraisal or expressive suppression and some participants used a hybrid of both strategies during the speech. The authors suggested that during stressful emotion-eliciting tasks, most participants are able to regulate their emotions using suppression or reappraisal.

The instructions given to the control group (i.e., instructing participants to show or not show emotions as they usually would) may have ironically promoted regulation by at least some participants (Wegner et al., 1993). That is, when given no instructions, many participants may have simply dealt with the emotional stimulus in their usual manner. Even a no-instruction control condition would have encouraged participants to employ their own habitual emotion regulation strategies, questioning the usefulness of a control condition when experimentally manipulating emotion regulation strategies. To measure the impacts of a control group on regulation, future studies should examine the different emotion regulation control strategies: no instruction, instructions not to regulate in a specific manner (e.g., “do not reappraise the stimulus”), and instructions to experience naturally (e.g., “respond naturally to the stimulus”).

The additional strategies that participants use during a regulation task may reflect their level of ER flexibility – or the ability to choose between a variety of strategies depending on the given situation (Bonanno et al., 2004). This framework shifts the emphasis from categorizing ER strategies as *maladaptive/adaptive* to *flexible/inflexible* use of diverse ER strategies. Indeed, suppression can be adaptive in some circumstances (e.g., stifling a laugh at someone’s misfortune), but may lead to long-term emotional, social, cognitive, and health costs when used habitually or inflexibly (Gross & John 2003). The ability to flexibly modulate emotions to align

with situational demands may reflect well-being more so than emphases on any particular expressive regulation strategy (Bonanno et al., 2004).

Our findings highlight important differences in our manipulation check process compared to those used in similar experiments. Whereas previous work has tested whether the manipulation was successful *between conditions*, we wanted to know whether the manipulation was successful for each individual, to help determine which participants to exclude from our analyses. We used a multiple-step process, including implementing a novel technique by comparing mean *f*-EMG to the group means of the regulation group assigned. For future studies, we strongly recommend including *f*-EMG as a method to determine group and individual differences in adherence to ER instructions.

This study was the second to examine the FFH, or expressive dissonance in an ER context. Consistent with Wagenmakers et al.'s (2016) RRR, our findings suggested that smiling may not induce positive emotion (or reduce negative emotion). Although expressive dissonance is not widely explored in the literature, a few studies explore the impacts of positive and/or negative exaggeration while watching emotion-eliciting films (Demaree et al., 2004; Demaree et al., 2006; Robinson & Demaree, 2009). Exaggerating positive expressions increased positive affect whereas exaggerating negative affective expressions less reliably increased negative affect (Demaree et al., 2004; Strack et al., 1988). We wonder whether regulating emotions hedonically (i.e., decreasing an emotional state – like expressive dissonance) versus contrahedonically (i.e., intensifying an emotional state – like exaggeration) impacts affect differentially. Future research focused on the impacts of expressive dissonance versus exaggeration may further clarify which response-focused strategies are (un)helpful.

We also wonder whether our results were impacted by our selection of images. We asked participants informally during debriefing what they thought of the images; many reported anecdotally that they did not consider the images distressing. Although validated for their negative valence and arousal, perhaps these images were not as emotionally eliciting as we expected.

Notably, we selected images that were categorized as “negative” in cluster analyses by Constantinescu et al. (2016), given the need to balance ethical concerns with distress induction. There was another category labelled “very negative”, which may have elicited stronger feelings of distress. Also, the IAPS images are about 25 years old, and may be outdated. These images may not be as distressing in today’s zeitgeist. Researchers suggest that an increase in graphic and violent images presented in current films and television (Richmond & Wilson, 2008) have led to desensitization to such material.

More research is required in exploring the impacts of emotion regulation strategies using an updated picture system, such as the Nencki Affective Picture System (NAPS; Riegel et al., 2016). The NAPS include 1,356 images divided into five categories (e.g., animals, people, faces, objects, and landscapes) and consistent with the IAPS, the NAPS also include standardized norms, albeit from fewer ($N = 204$) participants, who rated the images on mood, arousal, and approach-avoidance dimensions.

It is particularly important to assess the impacts of engaging in response-focused ER strategies in a clinical sample, to further improve ER strategies and skills taught in treatment. Using initial findings of the FFH, a half-smile (i.e., upturning the corners of the mouth to a smile when feeling distressed), along with psychoeducation of the FFH are skills taught in treatment for people experiencing emotion dysregulation (Linehan, 1993). Recently, Chung et al. (2020)

examined the effects of a facial feedback manipulation by asking participants to hold chopsticks between their teeth to simulate a smile or a neutral expression during a cognitive-motoric distress task. The researchers found no support for FFH effects on distress tolerance or affect among people with elevated borderline personality features. Given the findings from Chung et al. (2020) and the failed RRR (Wagenmakers et al., 2016), we have reservations about the efficacy of implementing the half-smile technique among people seeking help for emotion dysregulation. It is important to note, however, that holding chopsticks may not best represent a half-smile, as it may also cause participants to feel additional emotions like self-consciousness and embarrassment. Moreover, the half-smile technique is taught as a conscious ER strategy, whereas experimental paradigms such as the ones described above typically attempt to induce a smile unconsciously. As such, consistent with Chung et al. (2020), we suggest more research in ecologically valid distress tolerance settings (e.g., social rejection), to establish a better understanding of the affective processes associated with facial feedback.

We recruited women solely, to reduce gender-related variations on the impacts of emotion regulation strategies. We were also limited to including undergraduate (i.e., predominately young) women only to maximize our sample size. As such, we are limited in the generalizability of our findings. Future research should extend our research and explore the impacts and differences of emotion regulation strategies to other ages and genders.

In conclusion, we found no differences amongst undergraduate women, between expressive suppression, expressive dissonance, and a control condition on EDA, memory performance, or self-reported positive/negative emotions and anxiety. We question the usefulness of examining ER strategies in isolation, as participants appear to spontaneously engage in diverse and co-active forms of ER, despite the manipulation instructions. We strongly

encourage researchers to consider implementing objective (e.g., f -EMG, eye tracking) and subjective manipulation checks to examine the variability of strategies that may arise in future ER experiments. Additionally, further exploration of these strategies to other genders and in an ecologically valid setting (e.g., speech-task) is warranted.

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CHAPTER 3 BRIDGE

In my review of the literature on emotion regulation strategies, it was evident that almost all of the available research on response-focused strategies was focused on the seemingly maladaptive and negative impacts of expressive suppression, and to some degree, expressive exaggeration. It was unclear whether all response-focused emotion regulation strategies had negative impacts on the intrapersonal variables measured. The gap in the literature is unfortunate, given the need for adaptive response-focused strategies to modulate emotions that are already underway. Although there is limited research on expressive dissonance (only two studies to my knowledge), it may be possible to draw from the facial feedback hypothesis (i.e., feedback from facial expressions (e.g., smiling, pouting)). Based on the hypothesis, it is possible that smiling, even when distressed, may be more adaptive than suppressing negative emotions.

I developed Study 1 to examine the impacts of expressive dissonance and expressive suppression (relative to control), on psychophysiology, memory accuracy, and affect. Participants ($N = 135$) watched a slideshow of negative emotion-eliciting pictures while engaging in the emotion regulation strategy assigned, and outcome variables (i.e., EDA, recall and recognition memory, and self-reported positive and negative emotions) were measured. There was no impact of condition on any of the measured outcomes.

This surprising lack of significant findings in this study is important, given the methodological rigour. Study 1 included a strong sample size, which was generated using *a priori* G*Power Analyses. The study also included a multi-stepped manipulation check process to exclude data on an individual, rather than group level basis. Additionally, by including a baseline task that measured people's pre-manipulation responses to 10 negative IAPS images rather than simply a baseline rest period, I controlled for individual differences in EDA and self-

reported affect towards the images and thus isolated the impact of the emotion regulation strategy on multiple outcomes.

The inclusion of a manipulation check questionnaire revealed interesting information not discussed in past experimental studies. I found that over half of participants in both conditions used multiple emotion regulation strategies (e.g., the assigned strategy and cognitive reappraisal) during the picture task. In Study 1, I highlighted a potential gap in the research – whether it was accurate to be interpreting data from studies exploring “pure” or “single” emotion regulation strategies. Given the findings on multiple emotion regulation strategy using the manipulation check questionnaire, I made sure to include the manipulation check questionnaire in Study 2, to examine whether more participants reported the phenomenon of “coactive” emotion regulation.

The major limitation, which influenced the development of Study 2, was that Study 1 did not use an ecologically valid paradigm. That is, unless people are watching a movie, faced with distressing images and intentionally try not to show emotions on their face (using expressive suppression), people will most likely not be in real-life situations where they would be distressed by viewing images and are instructed to use a certain emotion regulation strategy. As such, the experimental design in Study 1 had *some* ecological validity, but my objective for Study 2 was to create a study that more closely resembled our everyday experiences.

My goal in developing Study 2 was two-fold: I wanted to create a study that was considered more ecologically valid, *and* I wanted to explore the impacts of the two emotion regulation strategies (expressive suppression and dissonance) in an interpersonal interaction. The majority of experimental studies on emotion regulation measure *intrapersonal* impacts of emotion regulation, or the ways in which emotion regulation impacts one’s self. We cannot neglect, however, that emotion regulation impacts the quality of our social interactions, known as

interpersonal emotion regulation, as it serves a function of communication. (Gross, 2002). For example, responsivity is presented in verbal (responding) and nonverbal cues (i.e., nodding, eye contact). The lack of expressivity communicated while engaging in expressive suppression could suggest less willingness to establish or maintain a relationship (Riggio & Friedman, 1982).

As mentioned earlier, the findings from experimental research suggest that suppressing emotional expression has the potential to significantly undermine social functioning and relationship quality, via its effects on communication, psychophysiology, cognition, and affect among both conversation participants. Expressing positive emotions (i.e., smiling) communicates approachability and desire to affiliate, which contributes to feelings of closeness and intimacy (Harker & Keltner, 2001). Although there is some research regarding the effects of suppression in a social interaction, it is unclear whether smiling has positive *intrapersonal* and *interpersonal* effects. Thus, it is important to explore whether smiling during a stressful task, a response-focused emotion regulation strategy, is more optimal than showing no emotion at all.

I developed Study 2 with the goal of expanding on Study 1 and examining whether expressive dissonance is more adaptive intrapersonally *and/or* interpersonally than expressive suppression. Study 2 explored and compared the intrapersonal and interpersonal impacts of two response-focused emotion regulation strategies, expressive suppression and expressive dissonance, on EDA, memory accuracy (i.e., free recall, cued recall, and recognition), self-reported affect (i.e., positive and negative emotions, anticipatory and peak anxiety), and interpersonal qualities (i.e., likability, friendliness, approachability, and easy-goingness), among women engaging in a conversation task with an unacquainted male confederate. Participants were randomly assigned to engage in suppression, dissonance or control and engaged in an unstructured “getting to know you” task with an unacquainted male confederate.

My decision to include a conversation task with an opposite-gender unacquainted confederate was determined by a literature review (unpublished) conducted by our research volunteer, Molly Rooyakkers. She explored the methodological components that heighten anxiety during a conversation task. I intended the behavioural task to be anxiety-inducing, to explore the adaptiveness of the two emotion regulation strategies in distressing situations. Molly found 15 articles that implemented behavioural tasks to induce anxiety. She found that study designs that included an opposite gender confederate, an unstructured approach to the conversation, and leaving the burden of conversation to the participant, more reliably produced anxiety in the participant.

Based on the findings from the informal literature review, I decided to include a male confederate in the design (as opposed to another participant) to allow for controllability. By including a confederate, I could keep the memory task standardized, (i.e., vocalizing the same pieces of information needed to complete the memory tasks). To contribute to a distressing situation, all confederates were asked to act more “aloof” with minimal emotional expression and to leave the onus of the conversation to the participant.

It was crucial to include the manipulation check again in the second study, to explore the degree to which participants believed they engaged in the strategy assigned during the conversation task. I included an item in the manipulation check to examine whether participants engaged in reappraisal (i.e., “How often did you try to change your interpretation of the conversation task to make it less distressing?”), in order to examine whether participants may have engaged in multiple emotion regulation strategy use. This could provide support for future research to explore the usefulness of studying “single” or “pure” emotion regulation strategies.

Additionally, the manipulation check contributed towards a multistep manipulation check process to exclude participants who did not engage in the strategy assigned.

Expanding from Study 1, I included video coders to mainly assist in two processes. The first was contributing towards the manipulation check, by recording the number of positive, neutral, and negative facial expressions each participant in the expressive suppression and expressive dissonance engaged in during the conversation tasks. Secondly, video coders were asked to judge participants' social interaction qualities, like likeability, friendliness, approachability, and easygoingness. I hypothesized that participants in the expressive condition would show more adaptive intrapersonal qualities and be rated more positively on interpersonal qualities, relative to the expressive suppression and control conditions.

CHAPTER 4

Smiling Won't Make You Feel Better, But It Might Make People Like you More: Interpersonal and Intrapersonal Consequences of Response-focused Emotion Regulation Strategies

Abstract

Emotion regulation (ER) is integral to well-being and relationship quality. Experimental studies tend to explore the *intrapersonal* effects of ER (i.e., impacts of ER on oneself), and leave out the *interpersonal* impacts (i.e., the bidirectional impact of ER on the regulator and partner). The ER strategy expressive suppression shows maladaptive *interpersonal* and *intrapersonal* consequences during distressing conversations. We aimed to explore whether other ER strategies that modify facial expressions (i.e., expressive dissonance) have similar consequences to suppressing emotions. We randomly assigned 164 women participants to use expressive dissonance, expressive suppression, or to naturally express emotions, while engaging in a conversation task with a confederate. We observed intrapersonal outcomes, including electrodermal activity and self-reported affect throughout the experiment, and memory performance after. Blinded video coders assessed the conversation on interpersonal qualities (e.g., friendliness and likeability). There were no differences between conditions on intrapersonal outcomes. Participants engaging in expressive dissonance, however, were rated more positively, and participants in the expressive suppression condition were rated more negatively on interpersonal qualities, relative to the control condition. Although neither strategy appeared to impact the participant, intrapersonally, both notably influenced the observer's impression of the participant.

Smiling Won't Make You Feel Better, But It Might Make People Like you More: Interpersonal and Intrapersonal Consequences of Response-focused Emotion Regulation Strategies

Emotion regulation (ER) involves using strategies to modulate emotional expressions to meet individual goals or to abide by social norms (e.g., showing happiness when receiving an undesired gift; Gross, 1998). In most experimental studies on ER, researchers measure *intrapersonal* impacts of ER strategies—the impact on oneself. Given that ER strategies can serve a communication function and impact the quality of our social interactions (Gross & John, 2002), *interpersonal* ER may be particularly important to understand.

Interpersonal ER involves a set of exchanges during a social interaction, specifically having others assist in regulating one's emotion and/or influencing others' emotion (Zaki & Williams, 2013). For example, people can seek support from others to manage stress and increase positive mood, and can also impact others' regulation through empathic responding, active listening, and prosocial behaviours.

The strategies that people use to regulate their own emotions strongly influence their interpersonal ER abilities, thereby impacting the quality of their interactions and relationships (Gross & John, 2002). A widely-studied ER strategy in interpersonal ER research is expressive suppression (see review by Dixon-Gordon et al., 2015). Expressive suppression involves inhibiting outward displays of affect (i.e., displaying a poker or neutral facial expression; Gross, 1998). Expressive suppression is a *response-focused ER strategy* used once an emotion is already underway, with the goal of altering an emotional output. Other examples of response-focused strategies include, exaggeration (i.e., enhancing a facial expression) and expressive dissonance (i.e., showing the opposite facial expression to what one is feeling).

Although research in this area is limited, there are a few experimental studies in which researchers examined the physiological, cognitive, affective, and social consequences of expressive suppression during social interactions of unacquainted pairs. Butler et al. (2003) recruited unacquainted pairs of women to discuss an upsetting topic; one partner was given instructions on the strategy to use to regulate their emotions. Those who suppressed their expressions reported feeling more negative emotions during the conversation, relative to those who reappraised or received no instructions. Crucially, suppression was shown to increase blood pressure in *both* the regulators and their partners, relative to the other two conditions. The partners of suppressors reported less rapport and willingness to form a friendship. Peters et al. (2014) asked participants to use either suppression or exaggeration while discussing a negative emotion-eliciting video with an unacquainted opposite-sex partner. The partners reported that suppressors were poor communicators and expressed fewer facial expressions, emotions, and gestures. Additionally, both participants of the suppression dyads exhibited increased sympathetic nervous system arousal, during the conversation task.

Memory accuracy is also negatively impacted by expressive suppression. Richards and Gross (2005) found that people who suppressed their expressions while discussing a relationship conflict with their partner remembered less of the discussion, relative to those who reappraised or received no specific instructions to regulate. The authors attributed these findings to the constant self-monitoring of one's own facial displays, which may distract the regulator from his/her partner, reducing their inability to retain or remember pieces of the conversation (Richards & Gross, 2005).

Taken together, the findings from experimental research suggest that suppression has the potential to significantly undermine social functioning and relationship quality, via its effects on

communication, psychophysiology, cognition, and affect among both conversation participants. As expressive suppression is a response-focused strategy that may be associated with social consequences, it is crucial to examine whether other response-focused ER strategies (i.e., strategies that modulate facial expressions) lead to similar impacts. Indeed, researchers have typically categorized response-focused strategies as maladaptive (e.g., Gross, 1998); however, we need to understand when and how it may be adaptive to regulate emotions that are already underway.

Expressive dissonance occurs when one displays the opposite of how one feels (e.g., smiling when feeling sad). We found one study that focused on the intrapersonal impacts of expressive dissonance; Robinson and Demaree (2007) found that people engaging in dissonance while watching emotion-eliciting film-clips experienced increased sympathetic nervous system arousal and performed worse on memory tasks assessing social and visual information presented in the film-clips. Pelt et al. (2018) implemented a research design similar to Robinson and Demaree (2007) and found lower performances in memory accuracy in those who engaged in expressive dissonance ($n = 32$) versus a control condition ($n = 32$), while watching negative and positive film-clips.

Engaging in expressive dissonance may also result in negative interpersonal consequences. Participants were judged more negatively by observers when showing incongruent affect (i.e., smiling while watching negative images), relative to congruent affect (Szcurek et al., 2012). It is unclear, however, whether interpersonal consequences exist when engaging in expressive dissonance in a social interaction that is distressing for the regulator but potentially considered “positive” by an observer or partner (like a first meeting). This is an unfortunate gap, given the strong theoretical and practical implications of altering facial

expressions in interactions (i.e., smiling in social interactions predicts likeability; Clark et al., 1996).

In the current study, we investigated whether expressive dissonance is a more adaptive intrapersonal and/or interpersonal strategy than expressive suppression, given the documented positive consequences of smiling during social interactions. Participants self-identifying as women were randomly assigned to the expressive suppression, expressive dissonance, or control condition, and engaged in an unstructured “getting to know you” task with an unacquainted male confederate. We selected a conversation task as the social-evaluative task, given its documented effectiveness creating stress in a laboratory setting (see Dickerson & Kemeny, 2004). The conversation confederate partners were men, given evidence that opposite-gender dyads create more objective and subjective levels of anxiety than same-gender dyads (Mendes et al., 2003). We collected electrodermal activity (EDA) as an indicator of sympathetic nervous system arousal and administered self-report questionnaires to measure pre- and post-conversation positive/negative affect, anticipatory anxiety, and peak anxiety. After the conversation task, participants completed three memory tasks (free recall, cued recall, recognition) for facts disclosed by the confederate. Participants also completed a manipulation check questionnaire, to assess the degree to which they believed they engaged in the strategy assigned during the task. We registered our hypotheses, methods, and analysis plan on the Open Science Framework (OSF) before data collection began (Bahl & Ouimet, 2019; https://osf.io/yu94e?view_only=f805e89b83bc4482b54fae1aefd971b1), and uploaded our original dataset (i.e., before any data cleaning) to OSF.

We hypothesized that participants in the Expressive Suppression condition would show greater sympathetic nervous system arousal (H1), reduced positive mood (H2), and increased

peak anxiety (H3) during the conversation task, relative to those in the Control condition, who in turn, would show greater sympathetic nervous system arousal, reduced positive mood, and increased peak anxiety relative to those in the Expressive Dissonance condition. We also hypothesized that participants in the experimental conditions would perform worse on memory tasks (i.e., free-recall, cued-recall, and recognition task), relative to the Control condition (H4). Finally, we hypothesized that the judges unaware of the study goals, design, or hypotheses would rate people in the Expressive Dissonance condition higher and the Expressive Suppression condition lower on interpersonal qualities (e.g., friendliness), relative to the control condition.

Method

Participants. All methods and procedures were approved by the University of Ottawa's Research Ethics Board prior to beginning data collection. We recruited 162 women participants ($M_{age} = 18.68$ years, $SD = 1.96$) via the participant pool at the university. Most participants identified themselves as White (59.2%) (see Table 1 for self-identified racial/ethnic characteristics). Approximately 8% reported currently living with a clinically diagnosed mood or anxiety disorder. Participants were compensated with one course credit.

Materials

Questionnaires

Along with our hypotheses, we pre-registered our methods and data analysis plan after data collection started, but before conducting any data analyses (Bahl & Ouimet 2019, (https://osf.io/32nxk/?view_only=07a105f9310b413ea3fe24a5a715114f)). Please see Table 2 for internal consistencies and descriptive data for all measures.

Table 1*Racial and Ethnic Identities Reported by Participants*

Race/Ethnicity	Percentage (%)
White	59.2
Black	6.8
Latinx	4.1
Asian	12.2
South Asian	10.2
Indigenous	4.1
Middle Eastern	9.5
Caribbean	3.4
European	10.9
Other	4.1
Preferred not to answer	.70

Table 2

Descriptive Data, Internal Consistencies, and Between Condition Differences for Baseline Measures

Variables	Expressive Suppression (Mean, SD)	Expressive Dissonance (Mean, SD)	Control (Mean, SD)	Total (Mean, SD)	α	F	p
Age	18.8 (1.9)	18.4 (1.4)	18.9 (2.5)	18.7 (2.0)	-	.87	.42
DASSDEP	4.9 (4.9)	5.6 (5.5)	5.7 (4.6)	5.4 (4.9)	.91	.46	.63
DERSTOT	97.5 (15.2)	96.8 (18.4)	98.9 (17.4)	97.7 (16.9)	.85	.19	.83
SPIN	24.3 (12.9)	27.6 (12.4)	27.7 (15.2)	26.4 (13.5)	.92	1.1	.35
ERQSUP	13.4 (4.8)	14.1 (5.0)	13.8 (5.4)	13.8 (5.1)	.77	.22	.81
ERQREA	30.3 (5.9)	29.3 (6.3)	28.0 (4.7)	29.3 (5.7)	.83	1.9	.14
ERQDIS	17.9 (6.2)	20.5 (6.2)	18.4 (5.3)	18.9 (5.9)	.77	2.6	.08
EDA1	.41 (.31)	.43 (.63)	.43 (.36)	.42 (.45)		.027	.97
EEPOS1	35.3 (16.8)	35.1 (16.6)	33.6 (14.7)	34.7 (15.9)	.79	.14	.86
EENEG1	13.8 (9.9)	15.2 (10.9)	17.6 (14.4)	15.4 (11.8)	.90	1.3	.27

Note: DASS-DEP = Depression Anxiety Stress Scale, Depression Subscale, DERSTOT = Difficulties in Emotion Regulation, Total Scale; SPIN = Social Phobia Inventory; ERQSUP = Emotion Regulation Questionnaire, Suppression Subscale, ERQREA = Emotion Regulation Questionnaire, Reappraisal Subscale, ERQDIS = Emotion Regulation Questionnaire, Dissonance Subscale, EDA1 = Electrodermal Activity, baseline EEPOS1 = emotional experience positive subscale at baseline; EENEG1 = emotional experience, negative subscale at baseline

Depression Anxiety Stress Scale – Depression Subscale (DASS-DEP; Lovibond & Lovibond, 1995). The depression subscale of the DASS is a 7-item self-report questionnaire, which measures depression symptomatology (e.g., “I felt that I had nothing to look forward to” on a 4-point Likert scale (0 = “Did not apply to me at all”, 3 = “Applied to me very much”, or “most of the time”). The DASS-DEP subscale demonstrated excellent internal consistency ($\alpha = .92$; Antony et al., 1998). Aldao et al. (2009) found that people with depression tend to engage in expressive suppression significantly more than a control condition. As such, we included depressive symptomatology as a covariate in a separate set of our main analyses.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36-item self-report questionnaire that measures the degree of emotion dysregulation. The DERS includes six subscales: Non-acceptance of emotional responses (e.g., “When I’m upset, I become angry with myself for feeling that way”; 6 items), Difficulties engaging in goal-directed behaviour (e.g., “When I’m upset, I have difficulty focusing on other things.”; 5 items), Impulse control difficulties (e.g., “When I’m upset, I lose control over my behaviours”; 6 items), Lack of emotional awareness (e.g., “I care about what I am feeling.” [reverse-scored]; 6 items), Limited access to emotion regulation strategies (e.g., When I’m upset, it takes me a long time to feel better.; 8 items), and Lack of emotional clarity (e.g., I am confused about how I feel.”; 5 items). The items are on an 5-point Likert scale (1 = “Almost never”, 0%-10%, 5 = “Strongly agree”, 91-100%). The individual subscales and total scale score demonstrated good to excellent internal consistency ($.80 \leq \alpha \leq .93$), and the DERS has documented adequate construct and predictive validity (Gratz & Roemer, 2004).

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ measures people’s use of two emotion regulation strategies: Cognitive Reappraisal (ERQ-REA; e.g.,

“When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about”; 4 items) and Expressive Suppression (ERQ-SUPP; “When I am feeling negative emotions, I make sure not to express them”; 6 items). The 10-item self-report questionnaire includes an 8-point Likert scale (0 = “Strongly disagree”, 7 = “Strongly agree”). The ERQ demonstrated good convergent and discriminant validity; the reappraisal ($\alpha = .82$) and suppression ($\alpha = .76$) subscales demonstrated good and acceptable internal consistency, respectively (Gross & John, 2003). To measure the degree to which people engage in expressive dissonance, we added three items to the ERQ questionnaire (ERQ-DIS) in a previous study (Bahl & Ouimet, 2021; revision requested): “When I want to feel less negative emotion (such as sadness or anger), I try to smile in order to feel happier”; “I control my emotions by expressing the opposite of how I am really feeling (e.g., showing happiness when feeling sad)”; “When I want to feel more positive emotion (such as joy or amusement), I try to smile in order to feel happier.” The ERQ-DIS subscale showed good internal consistency ($\alpha = .82$; Bahl & Ouimet, 2021; revision requested).

Social Phobia Inventory (SPIN; Connor et al., 2000). The SPIN is 17-item self-report questionnaire, which assesses social anxiety symptoms experienced over the past week, on a 5-point Likert scale (0 = “Not at all”, 4 = “Extremely”). The SPIN comprises three subscales: fear (e.g., “I am afraid of people in authority”; 6 items), avoidance, (“I avoid talking to people I don’t know”; 7 items), and physiological arousal (“Heart palpitations bother me when I am around people”; 4 items). The SPIN demonstrated good convergent validity, discriminant validity, and test-retest reliability ($.78 \leq r \leq .89$), and good to excellent internal consistency in people with social anxiety disorder ($.87 \leq \alpha \leq .94$) and healthy participants ($.82 \leq \alpha \leq .90$; Connor et al.,

2000). Because people with social anxiety reported inflexible use of suppression (Aldao et al., 2009), we included the SPIN as a covariate in a separate set of our main analyses.

Emotion Experience Scale. The emotional experience (EE) scale is a 16-item questionnaire, used in Butler et al. (2003) to assess 8 negative emotions (negative emotion subscale: anger, anxiety, fear, disgust, sadness, frustration, guilt, shame) and 8 positive emotions (positive emotion subscale: amusement, happiness, joy, love, interest, excitement, pride, pleasantness). The questionnaire is on 11-point Likert scale. This measure was administered four times (before baseline, anticipation, conversation task, and recovery task). The emotion experience scale demonstrated good internal consistency on the Negative ($\alpha = .87$) and Positive ($\alpha = .78$) Emotion scale (Butler et al., 2003).

Subjective Units of Distress Scale (SUDS; Wolpe, 1958). The SUDS measures state distress. It is widely used in behavioral research and therapy to measure feelings of anxiety (e.g., Milosevic & Radomsky, 2008). Respondents rated the extent to which they felt distressed on a scale from 0 (“totally relaxed”) to 100 (“highest anxiety/distress that you have ever felt”) by drawing a line through a visual thermometer and writing a number from 0-100 at the bottom on the page. The SUDS is correlated with physiological measures of stress (Thyer et al., 1984). Participants completed the SUDS twice in the experiment: once before the conversation task (after instructions of the task were given) to measure anticipatory anxiety, and again after the conversation task to measure peak anxiety during the task.

Measure of Interpersonal Functioning

Video Coding. Undergraduate volunteers unaware of the study goals, design, or hypotheses coded the conversation task videos for emotion-expressive behaviours: affective expressions (i.e., positive, negative, neutral expressions), non-responsiveness (i.e., when the

confederate finished an utterance and the participant did not respond in 2 seconds), and social interaction qualities (i.e., friendliness, likeability, warmth, approachability, easy to get along with).

Similar to Butler et al. (2003), we used an adapted version of the Specific Affect Coding System (SPAFF; Gottman et al., 1992) to code affect. Volunteers coded facial expressions during utterances (i.e., statements until a turn of speech – either the confederate jumped in or the participants’ affect changed) and sorted them into *Positive Affect* (i.e., displays of enjoyment, smiling), *Neutral* (i.e., neutral facial expression) and *Negative Affect* (comprising *internalizing* negative affect—displays of fear/anxiety, and *externalizing* negative affect—displays of frustration/aggression/anger). Because conversation length varied between participants, we calculated proportions to assess the frequency of different facial expressions and unresponsiveness (i.e., divided the number of positive, negative, or neutral expressions by the total number of expressions, and divided the number of seconds of responsiveness by the length of the conversation).

To measure the participants’ interpersonal qualities, we selected characteristics from the *Reysen Likeability Scale* (Reysen, 2005). Research assistants rated the participants on friendliness, likeability, warmth, and approachability on a 7-point Likert scale (“Very strongly disagree” = 0 to “Very strongly agree” = 6). We added an additional characteristic related to likeability - “easy to get along with” – making it five characteristics.

We calculated interrater reliability using interclass correlation coefficient (ICC) for 10% of our coded videos. The ICC ranged from .19 (poor reliability for determining negative expressions) to .78 (good reliability for coding positive expressions). Given the poor reliability of negative expressions, we excluded that variable from our analyses. We found excellent

reliability for unresponsiveness (.97). Across the interpersonal qualities, the overall ICC reliability was 0.82, and ranged from .75 to .97 (see Table 3).

Tasks

Memory task. Participants completed three memory tasks: spontaneous recall, cued recall, and a multiple-choice recognition task. The questions included in the cued and recognition tasks assessed social information provided by the confederate (i.e., name,

Table 3*Outcome and Descriptions Data for the Recall and Recognition Memory Task and Facial**Expression Video Coding*

Condition	Expressive Dissonance			Expressive Suppression			Control			ICC	
	Mean (SD)	Min	Max	Mean (SD)	Min	Max	Mean (SD)	Min	Max		
Memory Task											
Hits	10.9 (4.0)	2	25	12.0 (4.1)	0	20	10.6 (4.6)	0	21	.93	
Misses	.62 (.83)	0	3	.8 (1.1)	0	5	.61 (.86)	0	3	.72	
Standard Information	2.8 (1.0)	0	5	2.9 (1.2)	0	4	2.9 (1.2)	0	5	.96	
Cued Recall	3.6 (.85)	2	5	3.5 (1.1)	0	5	3.7 (1.1)	2	5		
Recognition	4.3 (.73)	3	5	4.3 (.97)	1	5	4.3 (.82)	2	5		
Facial Expressions											
Positive	.46 (.23)	0	1	.12 (.17)	0	.62	.30(.19)	.02	.73	.78	
Neutral	.50 (.21)	0	.93	.85 (.17)	.38	1	.64(.19)	.28	.98	.72	
Negative	.04 (.05)	0	.21	.03 (.06)	0	.26	.05(.07)	0	.26	.19	
Responsiveness	15.9	0	132	20.9	0	95	19.8	0	73	N/A	
Interpersonal Qualities											
Friendly	4.9 (.79)	3	6	3.5 (.83)	2	5	4.4 (.91)	2	6	.97	
Likeable	4.9 (.88)	3	6	3.9 (.89)	2	6	4.3 (.94)	3	6	.95	
Warm	4.3 (1.2)	1	6	2.8 (.90)	1	5	3.7 (1.1)	1	6	.75	
Approachable	4.6 (1.1)	2	6	3.4 (1.1)	1	5	4.1 (1.0)	2	6	.86	
Easy to get along with	4.6 (1.1)	2	6	3.9 (1.1)	2	6	4.4 (1.1)	2	6	.77	

university program, career aspiration, birth month, and favourite TV show), during the conversation. The memory task was also coded by raters unaware of the study goals, design, or hypotheses for the number of hits (i.e., number of correctly identified statements), number of misses (i.e., number of incorrectly added statements) and the recall of standardized information (i.e., the five statements presented by the confederate to everyone).

We calculated an interrater reliability score (using ICC) for the number of hits, misses, and standardized information, using 10% of our videos. The agreement between hits (.93) and standardized information (.96) showed excellent reliability. The ICC for misses (.72) had good reliability.

Psychophysiological Equipment

Electrodermal activity (EDA). EDA measures electrical conductance from sweating (an indicator of sympathetic nervous system arousal; Roy et al., 2012). We collected EDA via a portable ambulatory device. Two electrodes were placed on the thenar and hypothenar muscles on the non-dominant palm. The electrodes were Biopac TSD203 transducers filled with Biopac Skin Conductance Electrode Paste. Data were amplified using Biopac's GSR100C amplifier using a gain of 10 Hz and a low-pass filter of 10 Hz. EDA measures have been used extensively in physiological research and have demonstrated both construct and concurrent validity (Roy et al., 2012) as well as acceptable test-retest reliability ($r = .72$; Waters et al., 1987). All event-related responses were defined as a 0.2 μ S increase in skin conductance.

Manipulation Check

After the conversation task, participants completed a 5-item questionnaire (see pre-registration:https://osf.io/3xbc4/?view_only=07a105f9310b413ea3fe24a5a715114f), which assessed the degree to which they believed they engaged in the ER strategy assigned during the

conversation task (see Table 4 for responses across conditions). If participants in the experimental conditions reported not consistently engaging in the strategy assigned (i.e., a score of 0 = “Not at all”, 1 = “Rarely”, or 2 = “Somewhat”), their data were considered for exclusion. If the proportion of positive or neutral expressions (depending on the condition) coded in the videos for each participant was less than 0.5, their data were excluded from the study.

Procedure

Please see Figure 1 for a procedural diagram. The experiment took place in the INSPIRE laboratory, a well-equipped shared psychophysiology facility at the University of Ottawa (<https://socialsciences.uottawa.ca/inspire/>). Participants were informed that the aim of the study was to better understand the relationship between emotions and likeability during a behavioural task. After the consent process, participants completed the emotional experience questionnaire, a sociodemographic measure, and baseline self-report questionnaires (DASS, SPIN, ERQ, DERS, and the first emotion experience questionnaire). The experimenter placed two EDA electrodes onto the participant’s hand, and participants completed a 3-minute rest (baseline) period. Participants were then given instructions on the conversation task: *“I would like you to take part in a conversation with another participant who is waiting in the other experiment room. Your task is to try to acquaint yourself with this person, similar to what you may do when meeting someone for the first time. The conversation will last for at least 10 minutes, and you will be recorded using a video camera. During the conversation, a judge, who will be watching you two from the other room,*

Table 4*Frequencies and Percentages for Questions (#) in the Manipulation Check Questionnaire*

	Expressive Suppression					Expressive Dissonance					Control				
	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)
#1	1 (1.9)	2 (3.8)	23 (43.4)	27 (50.9)	0	0	17 (36.2)	25 (53.2)	5 (10.6)	0	0	13 (27.7)	18 (38.3)	15 (31.9)	1 (2.1)
#2	1 (1.9)	18 (34.0)	26 (49.1)	8 (15.1)	0	0	0	7 (14.9)	36 (76.6)	4 (8.5)	1 (2.1)	3 (6.4)	17 (36.2)	22 (46.8)	4 (8.5)
#3	11 (20.8)	11 (20.8)	17 (36.2)	14 (26.4)	0	5 (10.6)	6 (12.8)	21 (44.7)	11 (23.4)	4 (8.5)	3 (6.4)	10 (21.3)	13 (27.7)	16 (34.0)	5 (10.6)
#4	9 (17.0)	11 (20.8)	19 (35.8)	10 (18.9)	4 (7.5)	6 (12.8)	7 (14.9)	15 (31.9)	15 (31.9)	4 (8.5)	5 (10.6)	14 (29.8)	13 (27.7)	7 (14.9)	8 (17.0)

Note: Responses: 0 = Not at all, 1 = Rarely, 2 = Somewhat, 3 = Very Often, 4= Always; Items:
 #1 = "...maintained a neutral expression?", #2 "...maintained a smile?", #3 = "...changed the interpretation of the conversation to make it less distressing?", #4 = "...find the conversation anxiety-provoking?"

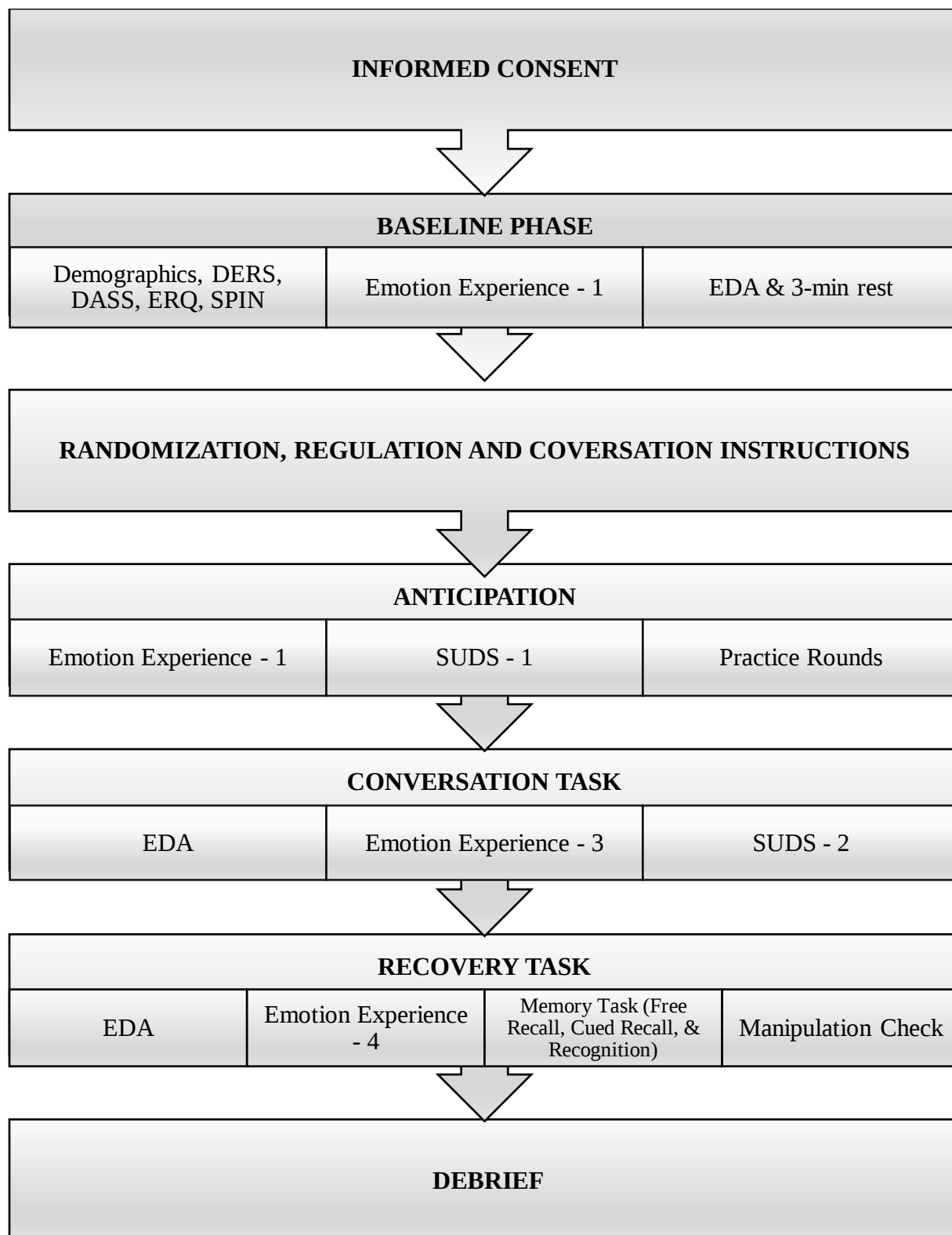


Figure 1: Visual Diagram of Procedure

through cameras (point at the computer cameras) will be evaluating you on the following criteria: clarity, interest, content, poise, style, and management of emotions. The conversation will be video recorded so that a group of researchers can also rate your conversation on the criteria mentioned at a later date. Based on the condition, participants were given the following instructions: Expressive Suppression condition ($n = 54$): *"This task may produce a range of negative feelings, like anxiety. People tend to deal with these feelings in different ways. For the purposes of this study, it's extremely important that you deal with these feelings by not showing any of your emotions during the conversation. That is, please maintain a straight face so that I or the other participant will not be able to see that you are feeling anything at all. Remember, do not show your emotions at any time during this task."*; the Expressive Dissonance condition ($n = 54$): *"This task may produce a range of negative feelings, like anxiety. People tend to deal with these feelings in different ways. For the purposes of this study, it's extremely important that you deal with these feelings by showing happiness during the conversation. That is, please maintain a natural smile with teeth so that I and the other participant will be able to see that you are feeling happy. Remember, smile as often as you can during this task"*; the Control condition ($n = 54$): *"This task may produce a range of negative feelings, like anxiety. People tend to deal with these feelings in different ways. For the purposes of this study, it's extremely important that you deal with these feelings by showing your feelings in any manner that you wish during the conversation. That is, please behave in such a way that I and the other participant might or might not be able to see what you are feeling. Remember, show your emotions if you wish at any time during this task."*

Participants then completed the second emotional experience scale and the anticipatory SUDS measure. After, participants completed up to three practice rounds responding to a

question from the experimenter (e.g., “What is your favourite season and why?”) to ensure that they understood the regulation instructions and could put them into practice.

After the practice round(s), the experimenter brought the confederate into the room. The confederate also had electrodes on their palm, to provide evidence that they were “another participant”. The experimenter explained that the task was about to begin, and that they could stop the task at any time by holding up a “Stop” sign, or participate up to 10 minutes. Then, the experimenter started the psychophysiological measures and turned the camera on. Once the pair said “stop” or when 10 minutes were up, the experimenter returned and escorted the confederate out of the room. Participants completed the third emotion experience questionnaire and the peak anxiety SUDS, prior to completing a 3-minute rest (recovery) period. Participants completed the last emotional experience questionnaire, and then the three memory tasks (one at a time). Finally, participants completed the manipulation check questionnaire to assess reported adherence to their condition instructions. During debriefing, participants completed an additional consent form to include their data, after learning about the deception. All participants consented to include their data.

Data Preparation

Power. We used G*Power 3 (Faul et al., 2009) to estimate the sample size necessary to observe significant effects, should they exist. Our most complicated planned analysis was a mixed ANOVA model. The total estimated sample size for a repeated measures, within-between interaction was 135 ($n = 45$ for each condition), using the following input parameters: effect size of $\eta^2 = 0.09$ (medium effect; based on medium effect size observed in Hofmann et al., 2009), probability of error set at .05, power value of 0.80 (both values suggested in Tabachnick & Fidell, 2007), number of groups was 3, number of measurements was 4, correlation among

repeated measures was 0.69 (as found in Bahl & Ouimet, 2021; revision requested, for repeated measures while engaging in emotion regulation strategies), and non-sphericity correction was kept at 1. To account for participant data that may be excluded (e.g., not following regulation instructions or unable to record electrodermal activity data), we aimed to recruit 144 participants, or 10% more than the sample size provided by G*Power. Our final sample size was 162, as we tested all participants who signed up for the study.

Electrodermal activity. We computed EDA in 30-second intervals during the conversation task and 10-second intervals during the baseline and recovery tasks. We took the mean of each interval and then calculated the average of all intervals.

Manipulation check and missing data. Thirty-three participants (Suppression condition: 26; Dissonance condition; 7) reported not adequately engaging in the strategy assigned during the conversation task. We excluded data from two participants in the suppression and five participants in the dissonance condition as their proportions of neutral and positive expressions, respectively, were under 0.5.

During debriefing, we asked each participant whether they had any suspicions about the conversation partner. We excluded data from two participants who reported knowing that their conversation partner was a confederate and another six participants who withdrew from the experiment after learning about the conversation task. The final sample size was 147.

Analysis Plan

To examine the impact of ER strategies on psychophysiology, memory accuracy, affect, and interpersonal qualities, during a conversation task, we used an experimental mixed-measures design, with Condition (Expressive Suppression, Expressive Dissonance, and Control) as the between-subjects factor and Time (Baseline, Conversation task, and Recovery), as the within-

subjects factor. We used Least Square Difference (LSD) for pairwise planned comparisons across all analyses.

To measure the impact of condition on sympathetic nervous system arousal (EDA), we conducted a 3 (condition) x 3 (time: baseline, conversation task, recovery task) repeated-measures ANOVA. To measure the impact of condition on positive and negative emotion (EE subscales, respectively), we conducted two 3 (condition) X 4 (time: before baseline, anticipation, conversation task, recovery task) repeated measures ANOVAs. We conducted a second set of exploratory analyses to measure the effect of condition on psychophysiological arousal and affect, controlling for social anxiety and depression symptoms. To measure the impact of condition on self-reported anxiety (SUDS), we conducted a 3 (condition) X 2 time (anticipation and peak anxiety) repeated measures ANOVA.

To measure the impact of condition on memory, we conducted five one-way ANOVAs with 1) hits (free recall task), 2) misses (free recall task) 3) standardized information (free recall task), 4) cued recall and 5) recognition memory as the dependent variables, respectively.

We conducted eight one-way ANOVAs to examine the differences in proportions of positive and neutral facial expressions, unresponsiveness, and differences in interpersonal qualities between conditions.

Results

Descriptive Statistics and Baseline Differences.

Participants across conditions did not differ on any baseline measures (see Table 2).

Intrapersonal Consequences.

Due to violation of sphericity assumption, we used the Huynh-Felt correction (EDA: $\chi^2(2) = 10.89, p = .004$; EE positive subscale: $\chi^2(5) = 57.49, p = .000$; EE negative subscale: $\chi^2(5)$

= 45.29, $p = .000$). There was no condition by time interaction for EDA ($F_{3.8,263.50} = .79$, $p = .53$, $\eta^2 = .01$), EE positive subscale ($F_{4.81,344.34} = 1.05$, $p = .39$, $\eta^2 = .01$), or EE negative subscale ($F_{5.08,197.27} = .65$, $p = .67$, $\eta^2 = .009$). There were no main effects of condition ($F_{2,138} = .12$, $p = .89$, $\eta^2 = .002$) on EDA, positive affect ($F_{2,143} = .24$, $p = .78$, $\eta^2 = .003$), or negative affect ($F_{2,143} = .88$, $p = .42$, $\eta^2 = .012$). There was a significant effect of time ($F_{1.9,263.50} = 3.40$, $p = .038$, $\eta^2 = .02$) on EDA, EE positive subscale ($F_{2.41,344.34} = 74.32$, $p < .001$, $\eta^2 = .34$), and EE negative subscale ($F_{2.54,362.94} = 38.96$, $p < .001$, $\eta^2 = .21$). See Table 5 for descriptive data of outcome variables. Participants across conditions showed higher EDA, greater negative mood, and lower positive mood during the conversation task compared to at baseline. See Table 6 for pairwise comparisons between all repeated measures. There were no main effects of condition ($F_{2,144} = .10$, $p = .90$, $\eta^2 = .001$) or time ($F_{1,144} = 1.24$, $p = .268$, $\eta^2 = .009$), nor was there a significant condition by time interaction

Table 5*Descriptive Data for Outcome Variables*

	Expressive Suppression					Expressive Dissonance					Control				
	EDA	EEPOS	EENEG	SUDS 1	SUDS 2	EDA	EEPOS	EENEG	SUDS 1	SUDS 2	EDA	EEPOS	EENEG	SUDS 1	SUDS 2
	<i>Mean (SD)</i>														
Baseline	.41 (.31)	35.2 (16.8)	13.7 (9.8)			.43 (.63)	35.1 (16.6)	15.2 (10.9)			.43 (.36)	33.6 (14.7)	17.6 (14.4)		
Anticipation		27.6 (16.8)	17.1 (11.9)				28.2 (18.6)	18.5 (10.3)				27.7 (16.5)	18.0 (11.7)		
Conversation	.53 (.32)	21.0 (15.3)	17.7 (10.8)	38.3 (21.7)	42.5 (22.1)	.52 (.32)	25.0 (16.9)	19.5 (12.1)	38.9 (16.1)	38.4 (20.7)	.52 (.35)	22.4 (16.1)	19.1 (12.5)	38.6 (22.3)	40.3 (23.5)
Recovery	.52 (.42)	23.4 (16.9)	9.2 (7.6)			.43 (.34)	24.3 (16.8)	10.4 (9.3)			.55 (.49)	20.9 (14.9)	12.4 (12.0)		

Note: EDA = Electrodermal Activity, EEPOS = emotional experience positive subscale; EENEG = emotional experience, negative subscale, SUDS 1 = anticipatory anxiety, SUDS 2 = peak anxiety

Table 6*Pairwise Comparisons Between Repeated Measures*

	EDA				EEPOS				EENEG			
	<i>Mdiff</i>	<i>SE</i>	<i>p</i>	<i>g</i>	<i>Mdiff</i>	<i>SE</i>	<i>p</i>	<i>g</i>	<i>Mdiff</i>	<i>SE</i>	<i>p</i>	<i>g</i>
Baseline – Anticipation					6.47	.68	<.001	.41	-2.34	.76	.002	.21
Baseline – Conversation	-.09	.04	.02	.22	11.79	1.10	<.001	.74	-3.32	1.07	.002	.29
Baseline– Recovery	-.07	.04	.09	.16	11.64	.89	<.001	.72	4.94	.83	<.001	.46
Anticipation – Conversation					5.05	1.02	<.001	.30	-.98	.78	.21	.09
Anticipation – Recovery					4.90	.89	<.001	.28	7.28	.74	<.001	.71
Conversation– Recovery	.03	.03	.42	.04	-.14	.81	.858	.02	8.26	.79	<.001	.79

Note: EDA = Electrodermal Activity, EEPOS = emotional experience positive subscale; EENEG = emotional experience, negative subscale.

($F_{2,144} = .78, p = .46, \eta^2 = .01$), on the anticipatory and peak SUDS. Controlling for DASS-DEP or SPIN scores had no impact on any findings (see Table 7).

For the memory task, there were no significant differences between conditions on the number of hits ($F_{2,139} = 1.44, p = .24, \eta^2 = .02$), misses ($F_{2,139} = .80, p = .45, \eta^2 = .02$) recall of standardized information ($F_{2,140} = .03, p = .97, \eta^2 = .003$), cued recall ($F_{2,144} = .44, p = .64, \eta^2 = .006$), or recognition ($F_{2,144} = .59, p = .94, \eta^2 = .008$).

Interpersonal Consequences

There were significant differences between conditions on the proportion of positive expressions ($F_{2,140} = 37.27, p < .001, \eta^2 = .35$) and neutral expressions ($F_{2,140} = 41.32, p < .001, \eta^2 = .37$), across conditions, during the conversation task. Participants in the expressive suppression condition displayed significantly more neutral facial expressions than those in the control ($Mdifference = .21, p < .001, g = 1.09$) and dissonance ($Mdifference = .35, p < .001, g = 1.76$) conditions. Participants in the expressive dissonance condition showed significantly more positive facial expressions than those in the control ($Mdifference = .16, p < .001, g = .72$) and suppression conditions ($Mdifference = .34, p < .001, g = 1.76$). Participants in the control condition exhibited significantly more positive expressions ($Mdifference = .19, p < .001, g = 1.04$) and significantly fewer neutral expressions ($Mdifference = -.21, p < .001, g = 1.13$) than the expressive suppression condition. There were no differences between conditions on seconds of unresponsiveness ($F_{2,140} = .54, p = .58, \eta^2 = .008$). Participants engaging in dissonance were rated as significantly more friendly, likeable, warm, and easy to get along with, than those in the suppression and control conditions, and participants in the suppression condition were rated as significantly less friendly, likeable, warm, approachable, and easy to get along with than those in the dissonance and control conditions (see Table 8).

Table 7*Main Analyses with DASS-DEP and SPIN as Covariates*

Predictor	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>	η^2
EDA	.56	1.93	.29	3.06	.05	.02
EDA*SPIN	.19	1.93	.10	1.06	.34	.008
EDA*Condition	.27	3.86	.07	.73	.57	.01
Error	24.94	262.14	.09			
EDA	.53	1.90	.28	2.92	.06	.02
EDA*DASSDEP	.09	1.90	.05	.51	.59	.004
EDA*Condition	.33	3.81	.09	.91	.45	.01
Error	24.37	256.87	.09			
EEPOS	2401.63	2.39	1002.79	13.49	.000	.09
EEPOS*SPIN	403.79	2.39	168.60	2.27	.09	.02
EEPOS*Condition	444.63	4.79	92.83	1.25	.29	.02
Error	25111.17	337.69	74.36			
EEPOS	6971.89	2.45	2843.41	38.66	.000	.22
EEPOS*DASSDEP	189.03	2.45	77.09	1.05	.36	.007
EEPOS*Condition	380.56	4.90	77.60	1.05	.38	.02
Error	25245.08	343.27	73.54			
EENEG	555.91	2.53	219.47	3.76	.02	.03
EENEG *SPIN	906.95	2.53	358.06	6.15	.001	.04
EENEG*Condition	267.15	5.07	52.74	.91	.48	.01
Error	20796.97	357.15	58.23			
EENEG	2486.10	2.55	973.52	16.16	.000	.10
EENEG*DASSDEP	132.88	2.55	52.03	.86	.44	.006
EENEG*Condition	209.67	5.11	41.05	.68	.64	.01
Error	21542.67	357.52	60.26			

Note: DASS-DEP = Depression Anxiety Stress Scale, Depression Subscale, SPIN = Social Phobia Inventory, EDA = Electrodermal Activity, EEPOS1 = emotional experience positive subscale; EENEG = emotional experience, negative subscale

Table 8*Pairwise Comparisons Between Conditions on Interpersonal Qualities*

Interpersonal Qualities	Dissonance - Suppression				Dissonance - Control				Control - Suppression			
	<i>Mdiff</i>	<i>SE</i>	<i>p</i>	<i>g</i>	<i>Mdiff</i>	<i>SE</i>	<i>p</i>	<i>g</i>	<i>Mdiff</i>	<i>SE</i>	<i>p</i>	<i>g</i>
Friendly	1.47	.17	.000	1.80	.54	.18	.002	.64	.92	.17	.000	1.05
Likeable	.97	.18	.000	1.09	.57	.19	.003	.61	.40	.18	.03	.44
Warmth	1.44	.22	.000	1.39	.52	.22	.02	.45	.92	.22	.000	.90
Approachable	1.11	.22	.03	1.03	.48	.22	.03	.45	.64	.22	.004	.60
Easy to get along with	.71	.22	.001	.67	.26	.22	.24	.24	.45	.22	.04	.42

Discussion

We examined whether using expressive dissonance is more adaptive than expressive suppression on intrapersonal (i.e., psychophysiology, memory accuracy, self-reported affect – positive and negative mood and anxiety) *and* interpersonal (i.e., interpersonal qualities) variables, among women engaging in a conversation task with an unacquainted male confederate. Although the conversation task was distressing for all participants (as indicated by EDA and self-report questionnaires), there was no advantage of one strategy over another or over control for intrapersonal outcomes. There were, however, important differences on interpersonal outcomes. People who used expressive dissonance (i.e., smiling) were rated more positively, and people who used expressive suppression were rated more negatively, on multiple interpersonal qualities, relative to those in the control condition.

Our findings suggest that although intentionally showing outward positive emotional expression, even when one is feeling anxious, may not lead to positive internal outcomes, it may lead to temporary positive social outcomes. Moreover, the positive and negative interpersonal consequences using expressive dissonance and expressive suppression, respectively, are likely attributable to impressions by *others* rather than to (in)effective intrapersonal ER. Our findings contribute to the relationship development literature, which suggests that positive emotion expression communicates affiliation, leading one to be perceived as approachable and friendly (Harker & Kelner, 2001).

According to Zaki and Williams' (2013) model, interpersonal ER involves an 1) extrinsic interpersonal factor that regulates the perceiver and/or 2) intrinsic interpersonal goal to manage one's emotions. Expressive suppression or dissonance did not help regulate one's emotions, given our observed lack of effect on intrapersonal factors. It is possible that smiling or neutral

expressions actually impacted the emotions felt by the observer (i.e., the videocoders), thereby impacting their judgements of the participant. Because we used a confederate to increase internal validity and allow for experimental control for the memory task, we are unable to explore effects on the conversation partner. Future research focused on conversation partners' satisfaction and beliefs around relationship formation may be particularly fruitful.

Additionally, video coders may have rated participants more favourably when expressing positive emotion due to the participant's situation-congruent affect. A getting acquainted/friendship-forming task is generally a "positive" social situation. Although the task was distressing for the regulator (as demonstrated by increased EDA and negative affect and reduced positive affect), expressing positive emotions in a situation that is *considered* positive by the observer (who again, was unaware of the study goals or manipulation) may lead to positive social judgement. Perhaps expressing emotions considered *incongruent* to the situation (i.e., showing a neutral expression during a getting acquainted task) leads to negative ratings on social variables. This suggestion is consistent with research findings that participants who displayed affect incongruent with the stimuli (e.g., positive affect in response to negative images) or neutral affect (i.e., no response to the stimuli), were judged more negatively than those displaying congruent affect (Szczurek et al., 2012). Additionally, women may be judged particularly harshly for displaying incongruent affect. Brown et al. (2015) found that women were rated significantly more negatively than men when showing incongruent affect towards images.

Because we recruited women only, we are unsure whether gender differences and gender norms may impact the results. According to Hess and Hareli (2005), gendered display rules outline socially appropriate displays of facial expression, which lead to gender differences

between the “appropriate” expressions that men and women can express. Their findings suggest that women and men both believe that women are more expressive than men and that men smile more than women (Hess & Hareli, 2015). Nonsmiling women are judged as experiencing more negative affect than nonsmiling men and perceived more unfavorably than smiling women (Deutsch et al., 1987). It is therefore unclear whether our findings reflect a particular bias towards unsmiling women (e.g., as unfriendly) or a universal impact of smiling during an interpersonal interaction. It is crucial therefore to expand on our work to include men to examine whether response-focused ER strategies carry the same interpersonal consequences for men as for women.

Our lack of between condition intrapersonal differences align with findings from our previous study (Bahl & Ouimet, 2021; revision requested), but is in contrast to a large body of literature suggesting that expressive suppression is always maladaptive. Previously, we found that participants used multiple ER strategies during the conversation task, regardless of condition (Bahl & Ouimet, 2021; revision requested). In our current study, 63% of participants in the expressive suppression condition, 77% of the expressive dissonance condition, and 73% of the control condition reported using cognitive reappraisal to make the conversation task less distressing. We wonder if the lack of intrapersonal differences is attributable to the coactivation of multiple ER strategies, thereby reducing the effect of the manipulation. This possibility is consistent with Gross and Thompson (2007), who suggest that people may use multiple strategies simultaneously. However, we further suggest that specific ER strategy use may impair interpersonal (i.e., relationship building) more so than intrapersonal functioning (i.e., affecting oneself). It appears that even if people use additional strategies (i.e., cognitive reappraisal, a

relatively healthy ER strategy) to manage distress and anxiety in social situations, the specific expressive strategy presented holds interpersonal consequences.

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CHAPTER 5

GENERAL DISCUSSION

Emotion dysregulation is regarded as a transdiagnostic vulnerability factor in the development of psychopathology (e.g., mood and anxiety disorders, borderline personality disorder, eating disorders) (see Aldao et al., 2010). As difficulties with emotion regulation span across clinical disorders, I've become intrigued in researching ways to understand adaptive emotion regulation. While conducting my literature review on emotion regulation, particularly emotion regulation *strategies*, I found that researchers classified emotion regulation strategies into maladaptive and adaptive strategies, based on the impacts of these strategies on intrapersonal (affecting oneself) and interpersonal (affecting the regulator, receiver, and the relationship) factors. Response-focused emotion regulation strategies (or strategies used when facial expressions are elicited and need to be modified), specifically expressive suppression, is considered in the literature to be a maladaptive emotion regulation strategy (see Webb et al., 2002). It is generally found to increase sympathetic nervous system arousal, decrease memory accuracy for information given while suppressing, increase anxiety, and decrease positive mood (see review by Webb et al., 2012). Cognitive change (strategies to change the meaning of an emotion-eliciting situation to decrease its emotional relevance), specifically cognitive reappraisal, is an antecedent-focused emotion regulation strategy that is considered adaptive and is incorporated in cognitive-behavioural therapy as a skill to address unhelpful thoughts.

Because expressive suppression is commonly used in everyday life, and used habitually by people with major depressive and social anxiety disorder (see Aldao et al., 2010), it is important to explore whether all response-focused strategies are considered maladaptive. In my literature review, I came across expressive dissonance, a response-focused emotion regulation

strategy characterized by showing the opposite of how one feels (Robinson & Demaree, 2007). I found two studies exploring the impacts of expressive dissonance. These studies found that expressive dissonance and expressive suppression demonstrated similar characteristics; that is, increased sympathetic nervous system arousal and decreased memory accuracy, when compared to a control condition (see Robinson & Demaree, 2007 and Pelt et al., 2018). With only two studies exploring the impacts of expressive dissonance, and neither study comparing expressive dissonance to an expressive suppression condition, I believed that it was premature to suggest that expressive dissonance and expressive suppression had similar impacts.

In addition, as theorized by the facial feedback hypothesis, muscles in the face will communicate the associated emotion to the brain (see Strack et al., 1988), such that generating a facial expression mirroring a smile leads to positive emotional outcomes. Thus, I wondered if engaging in expressive dissonance, relative to expressive suppression, would result in more adaptive outcomes. Over the span of two studies, my goal was to contribute to the literature on expressive dissonance, to provide suggestions for a healthier emotion regulation strategy to use when an emotion is underway. In addition, I also wanted to integrate the facial feedback hypothesis in the context of emotion regulation – two related and similar lines of research that were seldom explored. As such, I developed two studies, wherein I compared the impacts of expressive dissonance and expressive suppression, two response-focused emotion regulation strategies, on intrapersonal (i.e., sympathetic nervous system activity, memory accuracy, self-reported anxiety and positive and negative emotions; Study 1 & Study 2) and interpersonal (i.e., indicators of positive interpersonal qualities including likeability, friendliness, approachability, easy to get along with; Study 2) qualities, to a control condition.

In this general discussion, I will briefly review the findings of my two experimental studies, and highlight how they may contribute to the existing literature on response-focused emotion regulation strategies. I will also discuss the methodological considerations when experimentally testing emotion regulation strategies. I will speak about the clinical implications of this research and provide recommendations for future research to continue to advance this literature.

Findings

To examine the intrapersonal impacts of expressive suppression and expressive dissonance, 144 undergraduate women were asked to watch a series of negative (low valence and high arousal) emotion eliciting IAPS images, while engaging in the emotion regulation strategy assigned. Electrodermal activity and self-report questionnaires of positive and negative emotions and anxiety were recorded throughout the task. After the task, two memory tasks (recognition and free recall) were administered. Although the images were found to be distressing between the baseline and picture task across conditions, as indicated by increased EDA and negative emotion and decreased positive emotion on the SAM, I still did not find differences between conditions on outcome variables. I did find, however, that participants reported engaging in multiple emotion regulation strategies, particularly cognitive reappraisal, on the manipulation check questionnaire. I was left wondering if the lack of findings was due to the possibility that participants used multiple emotion regulation strategies to help regulate distress. These findings further raised the question of the accuracy of the conclusions from experimental paradigms that focus on “pure” or strategy specific emotion regulation strategies.

Another possibility for the lack of findings may be a non-ecologically valid anxiety task (i.e., viewing images). As such, my goal in designing Study 2 was to create a more ecologically

valid task, and to include our manipulation check from Study 1. In Study 2, 164 undergraduate women were asked to engage in an unstructured conversation task with a male confederate (who was presented to participants as a co-participant), while engaging in the emotion regulation strategy assigned. Electrodermal activity, self-reported anticipatory and peak anxiety, and positive and negative emotions were monitored throughout the study. Free recall, cued recall, and recognition memory tasks were administered. I recruited video coders, who were unaware of the hypotheses and experimental conditions, to judge participants on social interaction variables. Similar to Study 1, I did not find any differences across conditions on intrapersonal factors, but we did find, that participants using expressive dissonance were judged more positively and participants using expressive suppression were judged more negatively on social interaction variables, relative to control. I found that although the conversation task was distressing for participants across conditions (as indicated by EDA and self-report questionnaires), there was no emotional advantage of using expressive dissonance over expressive suppression. However, an advantage emerged for people using expressive dissonance in terms of promoting a positive impression of interpersonal qualities.

Methodological Considerations and Implications

Across both studies, the findings hold important implications for the ways in which researchers study emotion regulation strategies in experimental designs.

Baseline Considerations

In Study 1, I addressed a common limitation inherent to between-participant research designs. Relative to within-participant designs, a between-participant design may not account for individual differences in response to the presented stimulus. This consideration is especially important when recruited participants are unselected, given that the variance in individual

differences may be larger in that population. As such, I included a baseline task that measured people's pre-manipulation responses (i.e., EDA, self-reported anxiety, positive and negative emotions) to 10 negative IAPS images – rather than simply a baseline rest period (i.e., without images). By implementing a baseline task of images similar but not identical to the images viewed in the picture task, I controlled for individual differences in EDA and self-reported affect towards the images. This methodological implementation isolated the impact of the emotion regulation strategy on our multiple outcome variables. It is possible that the effects of emotion regulation strategies were inflated in past research, potentially capturing an elevated response due to the novelty or impact of the stimuli (Webb et al., 2012). Alternatively, it is possible that presenting participants with images during baseline may lead to practice effects, thus blunting an existing effect. I think that interpretation of our findings is unlikely, given that participants reported elevated anxiety and reduced positive mood after the picture task, relative to the baseline task. With the between-within participants design, participants served as their own control condition. I therefore recommend that future studies implementing a picture or video task include a baseline task similar to the task that will be completed using the manipulation, to control for individual differences in outcome variables.

Multi-Stepped Manipulation Check

Our manipulation check process differed from other studies in two ways. First, I excluded participants' data on an *individual*, rather than a *group* basis. Some researchers (e.g., Demaree et al., 2006; Robinson & Demaree, 2009) had volunteers unaware of the hypothesis rate facial expressions (by watching participant videos) and analyze whether there were differences *between conditions*. The differences between conditions in facial expressivity, therefore indicated successful adherence to regulation instructions. Rohrmann et al., 2009 looked at

differences between conditions in response to relevant items (e.g., “I felt emotions but tried to hide them”), which was a manipulation check for the different emotion regulation instructions. In both our studies, I wanted to know whether the manipulation was successful for each individual, to help determine which participants to exclude from our analyses. I used a multiple step process, identifying participants from our manipulation check questionnaire who indicated that they did not engage in the emotion regulation strategy assigned, then examining those participants’ video recording during the picture task, and lastly, implementing a novel technique by comparing mean *f*-EMG to the group means of the regulation condition assigned. By implementing a multi-step manipulation process, I was able to more accurately narrow down participants who did not engage in the emotion regulation strategy assigned at an individual level, allowing us to increase the likelihood that only those participants who followed the regulation instructions were included in our final analyses.

Second, I included *both* objective and subjective measures in our manipulation check process. Our subjective variable was the manipulation check questionnaire (identifying participants who indicated that they did not engage in the emotion regulation strategy assigned), whereas our objective variables were those selected participants’ video recordings during the picture task, and the comparison of each selected individual’s mean *f*-EMG to the group mean of the regulation condition assigned.

Using *f*-EMG to exclude participants in emotion regulation research has not been conducted before to our knowledge. I decided to include *f*-EMG as our objective manipulation check method because it has been shown to reflect brief changes in emotional states (Jackson et al., 2000). For example, the facial muscle corrugator supercilia (i.e., the muscle used to furrow eyebrows) shows more activity in response to unpleasant stimuli and less activity in response to

pleasant stimuli (e.g., Bradley & Lang, 1994; Lang et al., 1993). The zygomaticus major (i.e., the “smile” muscle) shows more activity in response to pleasant stimuli (e.g., Bradley & Lang, 1994; Lang et al., 1993). As such, successful suppression of negative affect would result in decreased corrugator activity, and successful expressive dissonance would result increased zygomaticus activity.

We strongly recommend including EMG as a method to determine group and individual differences in adherence to emotion regulation instructions. EMG is an objective measure, as it does not place demand characteristics on participants and tracks very small and short-term changes in emotional state (Jackson et al., 2002). Also, implementing a multi-step manipulation check enabled me to include more participants than I would have if I used only the questionnaire. For instance, some participants across both studies indicated that they did not engage in the strategy assigned but then on video, it appeared that they followed instructions as required. It is possible that the participants’ perception of their ability to regulate their facial expression did not align with their actual performance.

I also encourage researchers to further explore other methods for implementing emotion regulation manipulation checks through psychophysiological equipment and/or isolating facial movements. For instance, Jackson et al. (2002) found that startle eyeblink responses (as measured by *f*-EMG) was also sensitive to emotion regulation experimental manipulation, as participants who engaged in expressive suppression displayed smaller startle eyeblinks, and those who used expressive exaggeration showed larger startle eyeblinks.

Implications for Emotion Regulation Research

Observations from the Manipulation Check Questionnaire

Our manipulation check questionnaire also provided important information, not previously discussed in past experimental studies, which may offer crucial insights and recommendations for how researchers study emotion regulation in the future. For example, in Study 1, over half of participants in the suppression condition (i.e., 31% indicating *very often* or *always* and 35.4% indicating *somewhat*), and dissonance condition (44% responding to *very often* or *always* and 21% responding to *somewhat*) reported also using the cognitive strategy of changing the meaning associated with the images to make them less distressing (i.e., cognitive reappraisal). Approximately 46% of people in the control group also reported using cognitive reappraisal either somewhat or very often. In Study 2, 63% of participants in the expressive suppression condition 77% of the expressive dissonance condition, and 72% in the control condition reported using cognitive reappraisal. These findings align with Gross and Thompson (2007), who mention that emotion regulation can occur at multiple points in the emotion generation process and thus, people may employ both antecedent- and response-focused strategies simultaneously. Furthermore, Demaree et al. (2006) experimentally examined whether participants engaged in multiple emotion regulation strategies during a negative emotion-eliciting task. They found that half their sample, who were asked suppress their expressions, also reported using cognitive strategies. Similarly, Bebko et al. 2011 found that relative to participants asked to cognitively reappraise during an emotion-eliciting task, participants in the suppression condition also used attentional deployment (i.e., distraction, or an antecedent-emotion regulation strategy) strategies (as measured through eye-tracker device). Participants were asked in the manipulation check questionnaire how often they looked away from the images. Participants in the suppression, dissonance, and control conditions (29.1%, 29.2%,

36.2%, respectively) reported that they used distraction (either somewhat, very often or always) while watching the images.

The lack of significant intrapersonal differences across conditions may make sense, considering the adaptive nature of cognitive reappraisal. When used to down-regulate negative emotions, cognitive reappraisal decreases levels of negative emotion experience (Feinberg et al., 2012; Gross, 1998; Kross & Ayduk, 2011; Lieberman et al., 2011; Ray et al., 2010; Szasz et al., 2011, Wolgast et al., 2011), has no impact on or even decreases sympathetic nervous system responses—at least in low to moderate intensity situations (Gross, 1998; Kim & Hamann, 2012; Sheppes & Meiran, 2007; Wolgast et al., 2011), has no impact on subsequent memory or actually improves it (Kim & Hamann, 2012; Richards & Gross, 2000), and can actually enhance performance on exams (Jamieson et al., 2013). Given that over a third of participants in all three conditions across both studies endorsed using cognitive reappraisal cognitive to some degree, it is possible that our findings do not reflect the impacts of specific-strategy use, but rather a combination of strategies, wherein an unmanipulated strategy diluted the potential effects of expression-related strategies.

Furthermore, in the expressive dissonance condition, over half of participants in Study 1 and Study 2 reported engaging in expressive suppression, throughout the picture and conversation tasks, respectively. This finding may help us to understand the trajectory of engaging in expressive dissonance. Perhaps engaging in expressive dissonance involves implementing a response-focused emotion regulation *process*: first suppressing one's "real" emotions and then exaggerating the required/assigned emotions. Expressive dissonance may thus be a combination of response-focused emotion regulation strategies. Pelt et. al (2018) made a similar suggestion regarding the presence of multiple response-focused emotion regulation

strategies when people engaged in expressive dissonance. They found that relative to the control condition, participants engaging in dissonance reported increased negative mood when watching a negative video or a positive video. The authors suggested that the increased negative mood in the dissonance condition may be due to having to *suppress* the felt emotion (i.e., suppress sadness while watching a negative video and happiness when viewing a positive film). Perhaps the difference between our findings and those of Pelt et al. (2018) is that our participants were asked to display the opposite facial *expression*, whereas Pelt et al. (2018) asked participants to show the opposite *emotion*.

The instructions given to the control condition in our study and in previous work may have ironically promoted the use of emotion regulation strategies (Wegner et al., 1993). Indeed, the majority of participants in the control conditions across both studies indicated on the manipulation check questionnaire that they used at least one emotion regulation strategy (i.e., suppression, dissonance, and/or reappraisal). *Spontaneous emotion regulation* is the term used to describe the emotion regulation strategies that one uses, without given any instructions on how to regulate emotions. To maintain equivalence in the instructions between the different conditions (and hopefully to ensure that any differences were caused only by the expressive instruction), I instructed people in the control condition across both studies to “show or not show” their emotions as they saw fit. Egloff et al. (2006) explored spontaneous emotion regulation during an emotional-eliciting speech task by asking participants to complete the Emotion Regulation Questionnaire after the task. Most participants reported engaging in either reappraisal or expressive suppression and some participants reported using a hybrid of both strategies during the speech. The authors suggested that during stressful emotion-eliciting tasks, most participants are able to regulate their emotions using suppression or reappraisal.

It is possible that using a no-instruction control might have reduced the likelihood that participants in the control condition used expressive suppression or dissonance. This hypothesis is supported by a meta-analysis, wherein Webb et al. (2012) outlined the types of control instructions given to participants across studies on emotion regulation strategies: 1) no instructions on how to regulate; 2) instructions not to regulate in a specific manner (e.g., “do not reappraise any thoughts that may come up while watching the video”); 3) instructions to experience the emotions naturally or 4) a combination of the above instructions. They found that emotion regulation strategies exerted smaller effects when compared to a control condition in which participants were given no instructions or instructions not to regulate in a specific manner, and larger effects when compared to a control conditions in which participants were instructed to experience the emotions naturally. I believe that participants are more likely to use their own habitual emotion regulation strategies when naturally viewing distressing pictures (i.e., without explicit instructions). This point raises the question of how useful a control condition is when experimentally manipulating emotion regulation strategies. Based on the results of Webb et al.’s (2012) meta-analysis, it is important to consider the impacts of control conditions when choosing one, and I recommend choosing a control instruction that asks participants to experience emotions naturally.

In future studies, it may be important to compare differences of emotion regulation instructions (i.e., expression versus emotion) on outcome measures, to better understand whether the impacts of response-focused emotion regulation strategies are due to managing expressions versus emotions.

The question then remains: given that it may be impossible to reliably isolate specific emotion strategy use in experimental paradigms, how can researchers measure the effects of

multiple emotion strategy use for future emotion regulation research? Given the paucity of research on co-active emotion regulation use (Demaree et al., 2006), I am unsure whether multiple emotion regulation strategies occur in sequence or concurrently. Goldin et al. (2008) explored the temporal dynamics of emotion regulation strategies and found that cognitive reappraisal occurred in the first five seconds of 15 second stimulus presentation, whereas expressive suppression appeared 10 seconds after the start of the emotion regulation process. Additional research in temporal dynamics is warranted, including assessing when multiple strategies occur in a stimulus presentation can help us understand whether strategies are occurring simultaneously, sequentially, or whether one emotion regulation strategy remains as the “dominant” strategy. Implementing psychophysiological equipment in combination with exploring the temporal dynamics (i.e., the timing of strategy use) can further assist with measuring multiple emotion regulation strategy use. For example, as mentioned earlier, it is possible, given our manipulation check findings and the findings from Pelt et al. (2018), that participants engaging in expressive dissonance can also engage in expressive suppression. By implementing *f*-EMG and monitoring timing, one can measure the facial muscle activity to explore whether a sequence of combinations of emotion regulation strategies exist. I further recommend using eye-tracking devices to measure attentional deployment, particularly gaze attention or avoidance, and think-aloud protocols or stream of consciousness methods to gauge cognitive reappraisal and rumination (Richards & Gross, 2005). Future research could also focus on the combinations or blends of strategies that are more effective in particular situations. For example, Farb et al., 2014, found that mindfulness involves a blend of regulatory responses, including attentional deployment (increased attention to self), reappraisal, and decreased suppression.

Emotion Regulation Flexibility

People's ability to implement multiple emotion regulation strategies may reflect their level of emotion regulation flexibility – or the ability to choose between a variety of strategies depending on the given situation (Bonanno et al., 2004). Having well-developed emotion regulation flexibility enables people to evaluate the social context and then select which strategies to use, depending on specific goal pursuits (see review by Koole, 2009; Bonanno & Burton, 2013). In more recent frameworks, the focus shifts from categorizing emotion regulation strategies as maladaptive or adaptive to instead understanding flexible versus inflexible use of diverse emotion regulation strategies. Indeed, suppression can be adaptive, as it promotes self-restraint (i.e., stifling a laugh at someone's misfortune), but may lead to long-term emotional, social, cognitive and health costs when used habitually or inflexibly (see Gross & John 2003). Bonanno et al. (2004) found that emotion regulation flexibility predicted decreased distress and increased self-reported adjustment over a 2-year period. The ability to flexibly modulate emotions to align with situational demands (i.e., expressive suppression is sometimes helpful) may reflect well-being more so than the use of any particular expressive regulation strategy (i.e., expressive suppression is *always* bad).

Researchers further suggest that understanding emotion regulation flexibility is important in conceptualizing and understanding the development and maintenance of anxiety and mood disorders (Kashdan & Rottenberg, 2010; Bonanno & Burton, 2014). For example, people with anxiety disorders often use avoidance (i.e., the emotion regulation strategy situation selection), which may meet short-term goals of eliminating anxiety, but holds long term consequences of maintaining anxiety (e.g., Rodebaugh and Shumaker 2012). In summary, the theory underlying emotion regulation flexibility is that the use of a specific emotion regulation strategy is less

important than the specific context in which its used, and the goal that it attempted to achieve (Bonanno & Burton, 2013).

Similar to literature on co-active emotion regulation strategy use, researchers have limited experimental designs at their disposal to work towards understanding expressive flexibility. One proposed method to testing emotion flexibility experimentally is ecological momentary assessment. Researchers can monitor affect at multiple times across different contexts (both in and out of a laboratory setting). Participants can then rate and identify the emotion regulation strategy they used to pursue a specific goal-directed behaviour at each time point (Farmer & Kashdan, 2013). This method allows researchers to capture the initial strategy that someone selects, the time elapsed until they choose another strategy, thus providing data on between-strategy variability. Outcome variables including psychophysiology could also be collected throughout this task.

Research on emotion regulation flexibility, as described above, can also contribute to the literature on interpersonal emotion regulation. In Study 2, I focused only on how strategy-specific emotion regulation strategies impacted the regulator. Because I included a confederate, I was not able to measure the effects of strategies on the conversation partner (i.e., the partner's intrapersonal outcomes). However, from what I understand about interpersonal emotion regulation research (see review by Zaki and Williams ,2013), both intrapersonal and interpersonal emotion regulation may be better understood as lying on a continuum, rather than a set of strategy categories. Given that people can use multiple emotion regulation strategies simultaneously, future research can explore the selection of emotion regulation strategies (i.e., emotion regulation flexibility) during a social interaction, including adjustments of strategies depending on the goal of the interaction. This research can be completed using both objective

(i.e., *f*-EMG, eye-tracking), and subjective (i.e., self-reported affect and use of emotion regulation strategies).

Furthermore, to our knowledge, it appears that to measure specific emotion regulation strategy use, The Emotion Regulation Questionnaire (Gross & John, 2003) is used the most across studies. This questionnaire measures the degree to which an individual uses cognitive reappraisal or expressive suppression. Although these two strategies are used frequently in our everyday occurrences, it is not exhaustive; there are many other known emotion regulation strategies that people commonly use. Therefore, this measure is unable to provide information on emotion regulation strategy use beyond the two strategies mentioned. I strongly recommend further research into the development of an emotion regulation frequency questionnaire, which encompasses multiple strategies. This type of measure can further allow participants to identify the strategy they are using when engaging in research studies examining emotion regulation flexibility.

Interpersonal Emotion Regulation

In Study 2, I found that although expressive dissonance did not impact intrapersonal outcome variables any differently than the other two conditions, it did lead to favourable, positive judgements of interpersonal variables from judges. I have a few suggestions which may explain our findings. First, it is possible that there exists a true effect and that smiling, even when one is distressed, can lead to positive social impacts. If the goal is to build social bonds and likeability, expressive dissonance when feeling anxious/distressed may facilitate this goal. Second, it is possible that participants in the expressive dissonance condition were rated more favourably than those in the expressive suppression condition because smiling during a conversation is *congruent* to the affect of the situation. Perhaps expressing emotions considered

incongruent to the situation (i.e., showing a neutral expression – expressive suppression - during a getting acquainted task) leads to negative ratings on social variables. Additionally, women may be judged particularly harshly for displaying incongruent affect. Brown et al. (2015) found that women were rated significantly more negatively than men when showing incongruent affect towards images. Third, it is possible that one's smiling lead to emotion regulation in the observer (i.e., extrinsic emotion regulation) leading them to rate the participant more favourably. From what I understand about interpersonal emotion regulation, it not only regulates the emotion of the regulator but also the partner in the interaction. As such, it is imperative to expand on Study 2, and assess intrapersonal and interpersonal impacts on the regulator's partner. It is important to capture information on the partner's psychophysiology, use of multiple emotion regulation strategies, self-reported affect, satisfaction of the interaction, perception of the regulator, and the beliefs around relationship formation.

In my discussion of emotion flexibility earlier, and the association between inflexible use of emotion regulation strategies and pathology, I wonder about the longstanding impacts of inflexible expressive dissonance, especially on interpersonal emotion regulation, and subsequently, interpersonal relationships. Studies of the use of longstanding emotional dissonance in workplaces show a positive correlation with exhaustion and depersonalization and negative correlation with personal accomplishment (Wegge et al., 2010). Additionally, expressive suppression is also associated with feelings of inauthenticity, perhaps because hiding outward emotion creates incongruence between an individual's internal emotional state and outward emotional expression (Gross & John, 2003). Across both studies, I explored the impacts of emotion regulation strategies at the state level. Research expanding into the longitudinal impacts of using expressive dissonance (i.e., trait based expressive dissonance) is warranted.

Clinical Implications

It is extremely important to assess the impacts of engaging in response-focused emotion regulation strategies in a clinical sample, to further improve the strategies and skills taught in treatment. A clinical skill taught to tolerate distress in people who present with persistent emotion dysregulation is the half-smile technique (Linehan, 1993). This smile involves a gentle upturning of the corners of the mouth when feeling distressed. Using earlier research regarding the facial feedback hypothesis, a half-smile is a skill taught in treatment, including psychoeducation that the muscles in the face will communicate the associated emotion to the brain (Dewe & Krawitz, 2007). Recently, Chung et al. (2020) examined the effects of a facial feedback manipulation by asking participants to hold chopsticks between their teeth to simulate a smile or a neutral expression during a cognitive-motoric distress task. The researchers found no support for facial feedback effects on distress tolerance or affect among people with elevated borderline personality features. However, Svaldi et al., (2012) found that participants with borderline personality disorder (BPD) who engaged in suppression while watching a sadness-inducing film-clip reported having a lower urge for non-suicidal self-injury and self-punishment than those with BPD who engaged in acceptance.

Given the findings from Chung et al. (2020) and the failed RRR (Wagenmakers et al., 2016), I wonder about the efficacy of implementing the half-smile technique among people seeking help for emotion dysregulation, given the equivocal evidence. According to Svaldi's (2012) findings, it appears that suppression during a negative emotion eliciting situation may be a therapeutic strategy for people with BPD. Notably, however, both studies mentioned lacked ecological validity – specifically in situations of interpersonal relationships. Based on what I found in Study 2, perhaps engaging in the half-smile technique may not have positive

intrapersonal impacts, but instead, be impactful for positive impressions in interpersonal relationships. Interpersonal effectiveness is a core module in dialectical behavioural therapy (an evidence-based treatment to help people with BPD) (Linehan, 1993). The ways in which we communicate with others significantly impacts the quality of our relationships, and specifically for people with emotion regulation difficulties, addressing skills in approaching conversations to help reduce reacting impulsively from intense emotions is key. I strongly encourage more research, expanding Study 2, and exploring the impacts of expressive dissonance with people struggling with emotion dysregulation in interpersonal contexts. It is possible that the “half-smile” technique is a better fit in the interpersonal effectiveness module than in the distress tolerance module.

Our results may also have clinical implications for people experiencing social anxiety and/or depression, who tend to use expressive suppression more than people without it (Werner et al., 2011). Further, they report unhelpful beliefs about emotional expression, including that negative emotions are intolerable and emotional expression may cause social rejection (Jazaieri et al., 2017), leading them to suppress positive and negative emotions. This may cause difficulties in social situations and interpersonal relationships. Because expressive suppression is shown to be a strategy persistently and inflexibly used among people with social anxiety and/or depression (Aldao et al., 2010), I believe that expressive suppression should be targeted directly in therapy. Moscovitch et al. (2012) found participants continued to use expressive suppression after a 12-week course of group cognitive behavioral therapy for social anxiety disorder, suggesting that expressive suppression may not be directly addressed in CBT. As such, I suggest that psychoeducation on the social consequences of suppressing emotions and behavioural experiments related to expressing emotions in social situations to challenge unhelpful beliefs of

emotional expressions may be particularly helpful. These therapeutic components could potentially increase emotion regulation variability and flexibility (i.e., using more strategies than expressive suppression).

The findings from Study 2 have strong clinical implications related to addressing qualities of interpersonal relationships, which may be impacted among people living with social anxiety and/or depression. According to theoretical models underpinning interpersonal therapy (IPT), an evidence-based therapy for depression, improving interpersonal functioning and communication may help improve depressive symptomatology (e.g., Markowitz & Weissman, 2004). It is therefore important to explore and expand on our findings that engaging in expressive dissonance during social interactions may allow one to be perceived positively. If one is feeling low mood, sadness, and/or anxiety, engaging in expressive dissonance during social interactions may help improve their relationships with others, perhaps addressing unhelpful beliefs that are maintaining the affective disturbances. However, this strategy on its own is unlikely to improve mood.

Limitations

I recruited women only across both studies to reduce gender-related variations in the impacts of regulation strategies. As such, I am unsure of the degree to which gender differences and gender norms may impact our findings. In terms of potential differences in intrapersonal impacts between genders, women generally report expressing more emotions than do men (Brebner, 2003). This difference could impact the effectiveness of emotion regulation; expressing more emotions may lead to better control of emotions. This theory is supported by a review from Augustine and Hemenover (2009), wherein the authors suggested that women are more successful at regulating emotions than men. Additionally, in terms of our interpersonal

consequence findings, there are gender differences in socially appropriate display rules—i.e., the “appropriate” expressions that men and women can express. In particular, men and women agreed that women are more expressive than men and that men smile more than women (Hess & Hareli, 2015), and that nonsmiling women are perceived more unfavorably than smiling women (Deutsch et al., 1987). As such, it is essential to examine whether our findings on interpersonal and intrapersonal consequences extend to men as well.

There may also be cultural differences in the impacts of emotion regulation strategies on our outcome variables. For example, for women with European values, greater habitual suppression was accompanied by greater negative emotion while the opposite was true for bicultural (women with both European and Asian values) women (Butler et al., 2007). Habitual suppression was used less often in daily life by women with Western European values than bicultural Asian European values (Butler et al., 2007). I am unsure of the impacts of expressive dissonance or expressive suppression on intrapersonal or interpersonal outcomes across cultures, given the majority of our participants self-identified as White. It is therefore crucial to expand this research and compare findings across culture.

Conclusion

We explored the interpersonal and intrapersonal consequences of engaging in expressive dissonance or expressive suppression (compared to control condition) while viewing negative emotion-eliciting images (Study 1) and during a conversation with an unacquainted confederate partner (Study 2), to better understand the potential helpful effects of smiling when distressed in social situations. Although there were no differences in intrapersonal consequences (changes in sympathetic nervous system, memory accuracy, or self-reported affect) across both studies, we did find that people who engaged in expressive dissonance were rated more favorably, and

people who used expressive suppression were rated more negatively in interpersonal characteristics necessary for a successful conversation. My findings thus suggest that engaging in either strategy may not lead to intrapersonal impacts, relative to regulating with one's choice; however, if the goal is to build social bonds and likeability, expressive dissonance when feeling anxious may facilitate this goal. Additionally, I highlight some methodological considerations that apply broadly to the field. I question the accuracy of examining single or strategy specific emotion regulation strategies, as our results from our manipulation check suggests that participants were engaging in multiple emotion regulation strategies, (i.e., cognitive reappraisal), even when instructed to use the strategy assigned. Indeed, our findings from the manipulation check also support that the control group engaged in at least one emotion regulation strategy. As such, it is possible that lack of intrapersonal findings across conditions and across studies was due to the possibility that participants used multiple emotion regulation strategies to help regulate distress. I suggest that future studies examine the impacts of different control instructions on outcomes, and implement subjective (e.g., self-report) and objective methods (e.g., eye-tracking, think-aloud protocols) to examine the occurrence of multiple strategy use as well as the timing (i.e., in sequence or concurrently) of those strategies.

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APPENDIX A – RECRUITMENT SCRIPTS
Study 1

ISPR RECRUITMENT:

Study Name: How do you feel? Exploring reactions to emotional pictures.

Description: The aim of this study is to better understand the ways that people react to emotional pictures. Participants will first complete a set of questionnaires. Then, they will complete two short computerized tasks, while wearing facial sensors to measure subtle changes in emotional signs and then be asked to complete a behavioural task. For this study, participants must be *very* fluent in English. This study will take about two hours to complete and participants will be compensated with two course credits. Participants will be recruited on a first-come, first- served basis.

Study 2

ISPR RECRUITMENT:

Study Name: Do you like me? Exploring the factors contributing to likeability.

Description: The aim of this study is to better understand the relationships between emotions and likeability. Participants will first complete a set of questionnaires. Then, they will complete a video-recorded behavioural task, while wearing sensors to measure subtle changes in emotional signs. For this study, participants must be very fluent in English. This study will take about 1.5 hours to complete and participants will be compensated with two course credits. Participants will be recruited on a first-come, first-served basis.

APPENDIX B

Research Ethics Board Ethics Approval Certificate Study 1

01/08/2018

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	H-06-17-21
Titre du projet / Project Title	Dealing with Feelings
Type de projet / Project Type	Recherche de professeur / Professor's research project
Statut du projet / Project Status	Renouvelé / Renewed
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	01/08/2018
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	14/09/2019

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Allison OUMET	École de psychologie / School of Psychology	Chercheur Principal / Principal Investigator
Nancy BAH	École de psychologie / School of Psychology	Co-chercheur / Co-investigator
Jude NACHABE	École de psychologie / School of Psychology	Assistant de recherche / Research Assistant

Conditions spéciales ou commentaires / Special conditions or comments

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01/08/2018

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

Le Comité d'éthique de la recherche (CÉR) de l'Université d'Ottawa, opérant conformément à l'*Énoncé de politique des Trois conseils* (2014) et toutes autres lois et tous règlements applicables, a examiné et approuvé la demande d'éthique du projet de recherche ci-nommé.

L'approbation est valide pour la durée indiquée plus haut et est soumise aux conditions énumérées dans la section intitulée "Conditions Spéciales ou Commentaires". Le formulaire « Renouvellement ou Fermeture de Projet » doit être complété quatre semaines avant la date d'échéance indiquée ci-haut afin de demander un renouvellement de cette approbation éthique ou afin de fermer le dossier.

Toutes modifications apportées au projet doivent être approuvées par le CÉR avant leur mise en place, sauf si le participant doit être retiré en raison d'un danger immédiat ou s'il s'agit d'un changement ayant trait à des éléments administratifs ou logistiques du projet. Les chercheurs doivent aviser le CÉR dans les plus brefs délais de tout changement pouvant augmenter le niveau de risque aux participants ou pouvant affecter considérablement le déroulement du projet, rapporter tout événement imprévu ou indésirable et soumettre toute nouvelle information pouvant nuire à la conduite du projet ou à la sécurité des participants.

The University of Ottawa Research Ethics Board, which operates in accordance with the *Tri-Council Policy Statement* (2014) and other applicable laws and regulations, has examined and approved the ethics application for the above-named research project.

Ethics approval is valid for the period indicated above and is subject to the conditions listed in the section entitled "Special Conditions or Comments". The "Renewal/Project Closure" form must be completed four weeks before the above-referenced expiry date to request a renewal of this ethics approval or closure of the file.

Any changes made to the project must be approved by the REB before being implemented, except when necessary to remove participants from immediate endangerment or when the modification(s) only pertain to administrative or logistical components of the project. Investigators must also promptly alert the REB of any changes that increase the risk to participant(s), any changes that considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project or the safety of the participant(s).

Riana MARCOTTE

Responsable d'éthique en recherche / Protocol Officer

Pour/For **Daniel LAGAREC** Président(e) du/ Chair of the **Comité d'éthique de la recherche en sciences sociales et humanités / Social Sciences and Humanities Research Ethics Board**

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Research Ethics Board Ethics Approval Certificate Study 2

03/01/2020

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number

H-09-18-49

Titre du projet / Project Title

Understanding the role of two
different emotion regulation
strategies on conversation
success and anxiety

Type de projet / Project Type

Thèse de doctorat / Doctoral
thesis

Statut du projet / Project Status

Renouvelé / Renewed

Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)

03/01/2020

Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)

14/01/2021

Équipe de recherche / Research Team

Chercheur / Researcher

Affiliation

Role

Nancy BAHL

École de psychologie / School of Psychology

Chercheur Principal / Principal Investigator

Allison OUMET

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03/01/2020

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

Le Comité d'éthique de la recherche (CÉR) de l'Université d'Ottawa, opérant conformément à l'*Énoncé de politique des Trois conseils* (2014) et toutes autres lois et tous règlements applicables, a examiné et approuvé la demande d'éthique du projet de recherche ci-nommé.

L'approbation est valide pour la durée indiquée plus haut et est sujette aux conditions énumérées dans la section intitulée "Conditions Spéciales ou Commentaires". Le formulaire « Renouvellement ou Fermeture de Projet » doit être complété quatre semaines avant la date d'échéance indiquée ci-haut afin de demander un renouvellement de cette approbation éthique ou afin de fermer le dossier.

Toutes modifications apportées au projet doivent être approuvées par le CÉR avant leur mise en place, sauf si le participant doit être retiré en raison d'un danger immédiat ou s'il s'agit d'un changement ayant trait à des éléments administratifs ou logistiques du projet. Les chercheurs doivent aviser le CÉR dans les plus brefs délais de tout changement pouvant augmenter le niveau de risque aux participants ou pouvant affecter considérablement le déroulement du projet, rapporter tout événement imprévu ou indésirable et soumettre toute nouvelle information pouvant nuire à la conduite du projet ou à la sécurité des participants.

The University of Ottawa Research Ethics Board, which operates in accordance with the *Tri-Council Policy Statement* (2014) and other applicable laws and regulations, has examined and approved the ethics application for the above-named research project.

Ethics approval is valid for the period indicated above and is subject to the conditions listed in the section entitled "Special Conditions or Comments". The "Renewal/Project Closure" form must be completed four weeks before the above-referenced expiry date to request a renewal of this ethics approval or closure of the file.

Any changes made to the project must be approved by the REB before being implemented, except when necessary to remove participants from immediate endangerment or when the modification(s) only pertain to administrative or logistical components of the project. Investigators must also promptly alert the REB of any changes that increase the risk to participant(s), any changes that considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project or the safety of the participant(s).

Marc Alain BONENFANT

Coordonnateur de l'éthique / Ethics Coordinator

Pour/For **Daniel LAGAREC** Président(e) du/ Chair of the **Comité d'éthique de la recherche en sciences de la santé et sciences / Health Sciences and Sciences Research Ethics Board**

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APPENDIX C
Consent Form
Study 1

CONSENT FORM FOR RESEARCH PARTICIPATION

The CADRe Lab would like to thank you for participating in our research!

Title: Dealing with Feelings

Invitation to Participate: I am invited to participate in the abovementioned research study conducted by Dr. Allison Ouimet and Ms. Nancy Bahl, University of Ottawa, and funded by a Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant to Dr. Ouimet and a Social Sciences and Humanities Research Council (SSHRC) Doctoral Fellowship to Ms. Bahl.

Purpose of the Study: The main purpose of this study is to investigate affect regulation to better understand the relationships between different patterns of cognition and emotion.

Participation: My participation will consist of providing general information about myself such as age, self-identified gender, and family income. I will also answer online five (5) questionnaires, related to how I think and feel in a variety of situations. This will take up to fifteen (15) minutes. Then, I will be asked to sit while the research assistant cleans six (6) small areas of my face with a mild abrasive lotion containing lemon. Six (6) sensors that measure subtle changes in involuntary electrical activity in the head will be placed on each of these areas. I will be shown the cleaning process on my wrist, and then the researcher will proceed with cleaning the areas on my face if I feel comfortable. This will take up to thirty (30) minutes, after which the researchers will check that the quality of recordings is good. The research assistant will then place two sensors that measure subtle changes in involuntary electrical activity on my non-dominant hand, which will take up to three (3) minutes. I will then be asked to watch a series of slides, and the research assistant will give me instructions on how to watch them. This will take up to (30) minutes. I will also be asked to refrain from large body movements (e.g. change in posture) as much as possible during this part of the testing. Following this task, I will be asked to complete five (5) questionnaires, which will take up to (10) minutes. This study, in its entirety, will take about two (2) hours to complete.

Eligibility: To participate, I am required to have a solid understanding of the English language. I will be excluded from taking part in this study if I currently have a neurologic disorder or had one in the past (e.g. stroke, [cranial] neuropathy like Bell's Palsy). I will also be excluded if I had a major injury or had a recent surgery around their facial area.

Risks: My participation in this study will entail that I volunteer personal information about my thoughts, feelings, and behaviour. Additionally, I will be asked to view a series of slides that have been categorized to be unpleasant and may contain some upsetting content. The content of the pictures may include violent pictures. It is possible that I may experience some emotional discomfort when answering questionnaires related to my thoughts, feelings, and behaviours and/or when I view the slides. If any of the questionnaires or media presented makes me feel too

uncomfortable, I can choose to withdraw from the study without any negative consequences. In addition, upon completion of or withdrawal from this study, I will be provided with a list of self-help and professional resources, should I be interested in receiving more information and/or professional help related to any mental health issues.

I understand that some people find the skin cleansing somewhat uncomfortable. The skin may be slightly reddened after the removal of electrodes, but this will disappear in a few hours. In rare cases, the cleansing of the skin may leave a scab that will be apparent on the skin for a few days. I should warn the researcher if the skin cleansing becomes painful; it may be uncomfortable, but it should not be painful. A demonstration on the arm will be a good indication of how it will feel on my face. I understand that I can withdraw from the study at any time without incurring any penalty.

In addition, the online questionnaires that I will be asked to complete are hosted by Qualtrics, a USA company. All communications to/from the Qualtrics servers are encrypted using TLS (Transport Layer Security). For research at Canadian institutions, Qualtrics stores their data in Ireland. Thus the data is not subjected to the US Patriot Act. The security and privacy policy for the web-survey company can be found at the following link: <http://www.qualtrics.com/security-statement/>. If I prefer to not submit my responses using Qualtrics, then I will not sign this consent form.

Benefits: By participating in this study, I may develop an increased awareness of my own thoughts, feelings, and behaviour. This experience may also contribute to my understanding of psychological research. Additionally, my participation will contribute to an advanced understanding of the relationships between cognition and emotion.

I understand that the researchers will provide no feedback on the psychophysiological measures. The researchers are not trained to offer feedback of a medical nature, and the equipment was designed for research purposes only.

Confidentiality: I understand that the information I will share will remain strictly confidential and the information will be used strictly for research purposes. The only people who will have access to the research data are research personnel of Dr. Allison Ouimet at the University of Ottawa. Anonymity cannot be guaranteed because I will be asked to provide my name when I sign the present form but will remain confidential. My data will be identified by my ISPR identity code only—my name will always be kept separate from my data. Results will be published in pooled (aggregate) format and presented at professional conferences and in academic journals. Data may also be used in undergraduate and graduate student thesis projects.

Conservation of data: The data collected from the questionnaires and measures of physiology, will be kept in a secure manner. Specifically, all electronic data derived from this study will be password-protected. All participant information and data will be stored on password-protected computers and/or password-protected external hard drives and/or locked filing cabinets in Dr. Allison Ouimet's office or laboratory space. Both of these spaces are physically locked at all times. Only members of Dr. Ouimet's research team will have access to the rooms, and only members of the research team working directly on this study will have the password and keys to

relevant documents and/or datasets. Data will be stored in this manner for five (5) years following publication of the findings, after which point it will be deleted or destroyed permanently.

Compensation: In return for my participation in this study, I will be compensated with two (2) course credits through ISPR. If I choose to withdraw from the study at any time, I will still receive this compensation.

Voluntary Participation: I am under no obligation to participate and if I choose to participate, I can withdraw from the study at any time without suffering any negative consequences. If I choose to withdraw, all my data will be deleted.

Acceptance: I, _____, agree to participate in the above research study conducted by Allison Ouimet of the School of Psychology, Social Sciences, University of Ottawa.

If I have any questions regarding my rights as a study participant, I may contact the Protocol Officer for Ethics Research, located at:

University of Ottawa
Tabaret Hall,
550 Cumberland Street, Room 154
Ottawa, ON K1N 6N5
Tel.: (613) 562-5387
E-mail: ethics@uOttawa.ca

There are two copies of the consent form, one of which is mine to keep.

Participant's signature: _____ Date: _____
Researcher's signature: _____ Date: _____

**Consent Form
Study 2**

CONSENT FORM FOR RESEARCH PARTICIPATION

Title: Do You Like Me? Exploring the factors contributing to likeability.

Invitation to Participate: I am invited to participate in the abovementioned doctoral thesis project conducted by Nancy Bahl (Ph.D. student) and Allison J. Ouimet, emotions Ph.D., C.Psych, from the University of Ottawa.

Purpose of the Study: The main purpose of this study is to better understand the relationships between emotions and likeability.

Funding Declaration: This project has been supported by an NSERC Discovery Grant to the Doctoral Supervisor and a SSHRC Doctoral Scholarship to the Principal Investigator.

Participation: My participation will consist of providing general information about myself such as age, self-identified gender, and family income. I will also answer five (5) online questionnaires, related to how I think and feel in a variety of situations. Then, two (2) sensors that measure subtle changes in emotional signs will be placed on my nondominant palm. This will take approximately two (2) minutes, after which the researchers will ensure that the quality of recordings is good. I will be asked to refrain from large body movements (e.g. change in posture) as much as possible during the duration of the testing. I will then be asked to complete a video recorded behavioural task. Before the start of the behavioural task, there will be some initial practice trials with the experimenter. I will be asked to complete questionnaires throughout the study. This study, in its entirety, will take about 1 hour to complete.

Risks: My participation in this study will entail that I volunteer personal information about my thoughts, feelings, and behaviour. It is possible that I may experience some emotional discomfort when answering questionnaires related to my thoughts, feelings, and behaviours. Upon the completion of or withdrawal from this study, I will be provided with a list of self-help and professional resources, should they be interested in receiving more information and/or professional help related to any mental health issues. **I understand that I can withdraw from the study at any time without incurring any penalty.**

Benefits: By participating in this study, I may develop an increased awareness of my own thoughts, feelings, and behaviour. This experience may also contribute to my understanding of psychological research. Additionally, my participation will contribute to an advanced understanding of measures of cognition.

Confidentiality: I understand that the information I will share will remain strictly confidential and the information will be used strictly for research purposes. The only people who will have access to the research data are research personnel of Allison Ouimet at the University of Ottawa. My data will be identified by my ISPR identity code only—my name will always be kept separate from my data. Results will be published in pooled (aggregate) format and presented at

professional conferences and in academic journals. All data collected after I provide consent until (and including) the debriefing process can and may be used for research purposes (i.e., conferences, academic journals), as well as be used in undergraduate and graduate student thesis projects, after obtaining appropriate ethics approval. Moreover, I understand that, in support of Open Science practices, the dataset from this study might be made available to the public with all identifying information removed (including ISPR number and all demographic variables except for gender and age).

Conservation of data: The data collected from the questionnaires, computerized tasks, and video recordings will be kept in a secure manner. Specifically, all electronic data derived from this study will be password-protected. All participant information and data will be stored on password-protected computers and/or password-protected external hard drives and/or locked filing cabinets in Dr. Allison Ouimet's office or laboratory space. Both of these spaces are physically locked at all times. Only members of Dr. Ouimet's research team will have access to the rooms, and only members of the research team working directly on this study will have the password and keys to relevant documents and/or datasets. Due to the nature of Open Science practices (i.e., data available with identifying information removed), the data will be stored in the aforementioned manner indefinitely.

Compensation: In return for my participation in this study, I will be compensated with one (1) course credit through ISPR. **If I choose to withdraw from the study at any time, I will still receive this compensation.**

Voluntary Participation: I am under no obligation to participate and if I choose to participate, I can withdraw from the study at any time without suffering any negative consequences. If I choose to withdraw, all my data will be deleted.

Acceptance: I, _____, agree to participate in the above research study conducted by Nancy Bahl and Dr. Allison J. Ouimet of the School of Psychology, Social Sciences, University of Ottawa.

If I have any questions regarding my rights as a study participant, I may contact the Protocol Officer for Ethics Research, located at:

University of Ottawa
Tabaret Hall,
550 Cumberland Street, Room 154
Ottawa, ON K1N 6N5
Tel.: (613) 562-5387
E-mail: ethics@uOttawa.ca

There are two copies of the consent form, one of which is mine to keep.

Participant's signature: _____

Date: _____

Researcher's signature: _____

Date: _____

APPENDIX D
Baseline Measures Used in Study I & II

Sociodemographic Questionnaire

Please read and answer the following questions as honestly and accurately as possible.

Age: _____

Which of the following describes how you think of yourself?

- Male
- Female
- Transgender: male to female
- Transgender: female to male
- If you have another gender identity, please specify: _____
- I prefer not to answer

What best describes your sexual orientation?

- Heterosexual
- Lesbian
- Gay
- Bisexual
- Bicurious
- Two-spirited
- Asexual
- Unlabeled
- Unsure
- You don't have an option that applies to me. I think of myself as (please specify):

- I prefer not to answer

Which ethnic or racial background(s) describes you most (check all that apply)?:

- White
- Black
- Hispanic/Latinx
- Asian
- South Asian
- Indigenous
- European
- Pacific Islander
- Caribbean
- Middle Eastern
- Other: _____

- I prefer not to answer

Marital Status (select one):

- Married
- Living Together
- Long-term relationship
- Separated
- Divorced
- Widowed
- Single
- I prefer not to answer

Number of children: _____

Household annual income before taxes:

- Less than 20,000\$ CAD
- 20,000-40,000\$ CAD
- 40,000-60,000\$ CAD
- 60,000-80,000\$ CAD
- + 80,000\$ CAD
- I prefer not to answer

What is your university student status?

- Part-time student (less than 12 credits per semester)
- Full-time student (12 credits or more per semester)
- I prefer not to answer

What is your occupational status?

- Part-time employed (25 hours of paid work or less per week)
- Full-time employed (more than 25 hours of paid work per week)
- Not currently employed
- I prefer not to answer

Have you been diagnosed by a professional with a psychological disorder in the past?

- Yes _____
- No
- I prefer not to answer

Have you been treated for a mood or anxiety disorder?

- Yes, in the past (please specify which mood or anxiety disorder): _____
- Yes, currently (please specify which mood or anxiety disorder): _____
- Never
- I prefer not to answer

Were you ever prescribed with medication to treat the disorder(s):

- Yes, in the past: _____
- Yes, currently: _____
- Never
- I prefer not to answer

What is your first language?

- English
- French
- Other: _____
- I prefer not to answer

How fluent do you consider yourself to be in English?

- I am a native speaker or am totally fluent (100%)
- I understand almost everything (>90%)
- I understand a lot (>80%)
- I understand about 70-80%
- I understand about 50-70%
- I understand less than 50%
- I prefer not to answer

APPENDIX E
Study 1 Questionnaires

Memory Tasks

Free Recall Task

Describe all the images you saw in the last task. Please be as detailed as possible.

Manipulation check

0 Not at all	1 Rarely	2 Somewhat	3 Very Often	4 Always
-------------------------------	---------------------------	-----------------------------	-------------------------------	---------------------------

How often did you show an expressionless or neutral expression throughout the task? _____

How often did you show happiness or smiled throughout the task? _____

How often did you try to change the meaning associated with the images to make them less distressing? _____

How often did you look away to avoid the images? _____

Did you do anything else to avoid the images? (Please explain).

How often were you successful at controlling your *emotions*? _____

How often were you successful at controlling your facial *expression*? _____

APPENDIX F
Study 2 Questionnaires

Emotion Experience 1 (Baseline)

Please indicate on a scale of **0 = none** and **10 = a great deal**, the degree that you are feeling each emotion.

Anger: _____
Anxiety: _____
Self-Consciousness: _____
Contempt: _____
Disgust: _____
Fear: _____
Sadness: _____
Tension: _____
Frustration: _____
Embarrassment: _____
Guilt: _____
Shame: _____
Amusement: _____
Happiness: _____
Joy: _____
Love: _____
Interest: _____
Excitement: _____
Pride: _____
Pleasantness: _____

Emotion Experience 2 (Anticipation)

Please indicate on a scale of **0 = none** and **10 = a great deal**, the degree that you are feeling each emotion.

Anger: _____
Anxiety: _____
Self-Consciousness: _____
Contempt: _____
Disgust: _____
Fear: _____
Sadness: _____
Tension: _____
Frustration: _____
Embarrassment: _____
Guilt: _____
Shame: _____
Amusement: _____
Happiness: _____
Joy: _____
Love: _____
Interest: _____
Excitement: _____
Pride: _____
Pleasantness: _____

Emotion Experience 3 (Conversation Task)

Please indicate on a scale of **0 = none** and **10 = a great deal**, the degree that you felt each emotion **during the conversation task**.

Anger: _____
Anxiety: _____
Self-Consciousness: _____
Contempt: _____
Disgust: _____
Fear: _____
Sadness: _____
Tension: _____
Frustration: _____
Embarrassment: _____
Guilt: _____
Shame: _____
Amusement: _____
Happiness: _____
Joy: _____
Love: _____
Interest: _____
Excitement: _____
Pride: _____
Pleasantness: _____

Emotion Experience 4 (Recovery Task)

Please indicate on a scale of **0 = none** and **10 = a great deal**, the degree that you are feeling each emotion.

Anger: _____
Anxiety: _____
Self-Consciousness: _____
Contempt: _____
Disgust: _____
Fear: _____
Sadness: _____
Tension: _____
Frustration: _____
Embarrassment: _____
Guilt: _____
Shame: _____
Amusement: _____
Happiness: _____
Joy: _____
Love: _____
Interest: _____
Excitement: _____
Pride: _____
Pleasantness: _____

Memory Tasks**Free Recall Task**

Please remember all that was said by your conversation partner during the conversation.

Cued Recall Task

What was your conversation partner's name: _____

What academic program was your conversation partner in: _____

What are your conversation partner's career goals: _____

What was the last show your conversation partner watched on Netflix: _____

What month was your conversation partner born in: _____

Recognition Task

What was the last show your conversation partner watched on Netflix?

- The Office
- How I Met Your Mother
- Making A Murderer
- Friends from College

What are your conversation partner's career goals?

- Psychologist
- Paralegal
- Lawyer
- Social Worker

What academic program was your conversation partner in?

- Criminology
- Psychology
- Bio-Medical Sciences
- Political Science

What was your conversation partner name?

- Bryan
- Brandon
- Brad
- Brett

What month was your conversation partner born in?

- April
- July
- February
- August

Manipulation Check

0 Not at all	1 Rarely	2 Somewhat	3 Very Often	4 Always
-------------------------------	---------------------------	-----------------------------	-------------------------------	---------------------------

How often did you show an expressionless or neutral expression throughout the conversation task? _____

How often did you show happiness or smile throughout the conversation task? _____

How often did you try to change your interpretation of the conversation task to make it less distressing? _____

Did you find the conversation task anxiety provoking? _____

Did you do anything to make the conversation task less distressing/anxiety-provoking? Please explain. _____

APPENDIX G

IAPS Image Codes

Baseline task

1080, 1304, 2120, 2141, 2345, 8480, 9373, 9594, 9630, 9909;

Picture task

1120, 1202, 1270, 1300, 1931, 2750, 2900, 3301, 4621, 5971, 6010, 6200, 6213, 6220, 6370, 6540, 6830, 6840, 7380, 9031, 9050, 9140, 9145, 9160, 9445, 9480, 9490, 9590, 9622, 9623.

Recognition task – original images

6540, 1202, 1270, 9050, 6200, 4621, 2900, 9590, 9145, 6830, 9445, 6010, 1931, 5971, 9160.

Recognition task – added images

1321, 1220, 1275, 5920, 9621, 9561, 9920, 3022, 3300, 6211, 9584, 9120, 1050, 8231, 2661

APPENDIX H

Emotion Regulation Instructions Script – Study 1

Suppression: "In a few minutes, you will be asked to view a slideshow with a series of pictures. This task may produce a range of negative feelings, like anxiety. People tend to show or not show these feelings in different ways. For the purposes of this study, please behave in such a way that I will not be able to see that you are feeling anything at all by watching these slides like this (**demonstrate a straight face**). Remember, do not show your emotions every time you see a new image, until the image comes off the screen. Any questions?"

Expressive Dissonance: "In a few minutes, you will be asked to view a slideshow with a series of pictures. This task may produce a range of negative feelings, like anxiety. People tend to show or not show these feelings in different ways. For the purposes of this study, please behave in such a way that I will see that you are feeling happy by watching these slides like this (**demonstrate a happy face with teeth**). Remember, smile – with teeth to show happiness, every time you see a new image, until the image comes off the screen. Any questions?"

Control: "In a few minutes, you will be asked to view a slideshow with a series of pictures. This task may produce a range of negative feelings, like anxiety. People tend to show or not show these feelings in different ways. For the purposes of this study, please behave as you normally would when watching these slides. Again, show or don't show your emotions every time you see a new image, until the image comes off the screen. Any questions?"

APPENDIX I

Conversation Task Script – Study 2

Say: I would like you to take part in a conversation with another participant who is waiting in the other experiment room. Your task is to try to acquaint yourself with this person, similar to what you may do when meeting someone for the first time. The conversation will last for at least 10 minutes, and you will be recorded using a video camera. During the conversation, a judge, who will be watching you two from the other room through cameras (point at the computer cameras) will be evaluating you on the following criteria: clarity, interest, content, poise, style, and management of emotions. The conversation will be video recorded so that a group of researchers can also rate your conversation on the criteria mentioned at a later date.

Depending on their condition, say:

Expressive Suppression group: "This task may produce a range of negative feelings, like anxiety. People tend to deal with these feelings in different ways. For the purposes of this study, it's extremely important that you deal with these feelings by not showing any of your emotions during the conversation. That is, please maintain a straight face so that I or the other participant will not be able to see that you are feeling anything at all. Remember, do not show your emotions at any time during this task."

Expressive Dissonance group: "This task may produce a range of negative feelings, like anxiety. People tend to deal with these feelings in different ways. For the purposes of this study, it's extremely important that you deal with these feelings by showing happiness during the conversation. That is, please maintain a natural smile with teeth so that I and the other participant will be able to see that you are feeling happy. Remember, smile as often as you can during this task."

Control group: "This task may produce a range of negative feelings, like anxiety. People tend to deal with these feelings in different ways. For the purposes of this study, it's extremely important that you deal with these feelings by showing your feelings in any manner that you wish during the conversation. That is, please behave in such a way that I and the other participant might or might not be able to see what you are feeling. Remember, show your emotions if you wish at any time during this task."

Before we start, please complete this questionnaire (*Hand them SUDS 1, and Emotional Experience 2*). SUDS: please indicate on a scale of 0 – totally relaxed and 100 – most anxiety you've ever felt, how anxious you are feeling at this moment.

It can feel a bit unusual to use a new way of managing emotions. Let's just practice for a minute or two to make sure you understand the instructions. Pretend that I am the partner you will be talking to, and engage in the strategy that I told you to do. Ready?

What's your favourite season of the year and why?

If the participant engaged in the strategy assigned, then say "Okay, great! Please remember the instructions on how to deal with your feelings during the conversation. We will begin shortly."

If the participant does not follow the instructions assigned, say "Please remember to smile as often as you can during the conversation, or say "Please remember to not show your emotions at any time during the conversation. Do you have any questions? Let's begin.

What's your favourite kind of music?

Ask the participant these questions and check whether they are following instructions (smiling during the conversation, showing no emotions; or behaving as they wish (control)).

If the participant engaged in the strategy assigned, then say "Okay, great! Please remember the instructions on how to deal with your feelings during the conversation. We will begin shortly."

If the participant does not follow the instructions assigned, say "Okay let's try that again. Please remember to smile as often as you can during the conversation, or say "Please remember to not show your emotions at any time during the conversation.

APPENDIX J
Debrief Form
Study 1

DEBRIEFING FORM FOR RESEARCH PARTICIPATION

The CADRe Lab would like to thank you for participating in our research!

Title: Dealing with Feelings

INVESTIGATORS AND INSTITUTION:

The study you just participated in is being conducted at the University of Ottawa by Allison Ouimet, PhD., C.Psych, in the Cognition and Anxiety Disorders Research Laboratory (CADRe Lab).

STUDY PURPOSE AND IMPLICATIONS:

You were told that the purpose of our study was to investigate the relationships between cognition and emotion. We were also interested in how the emotion regulation strategy that you were assigned while watching the slides affected you 1) physiologically (we measured your sweating as an indicator of sympathetic nervous system activity), 2) cognitively (through the memory task that was given to you at the end of the task) and 3) affectively (by asking about mood and anxiety before and after the picture-viewing task).

Emotion regulation refers to a set of automatic and controlled processes that influence which emotions we have, when we have them, and how we experience and express those emotions. We use strategies everyday to help us regulate our emotions. These strategies help us change our emotions in response to a variety of situations. There are some strategies that research suggests are unhealthy to use. One such maladaptive strategy is called expressive suppression (ES; preventing emotions from appearing on the face). Another emotion regulation strategy is called expressive dissonance (ED), which occurs when people express on their face the opposite emotion than they are actually feeling (e.g., smiling when feeling sad). Our research aims to compare these two emotion regulation strategies, with the focus of exploring which strategy may be more “healthier” strategy (i.e., has better outcomes across measurement methods) than the other.

We hope that this study will be an important first step towards better understanding how emotion regulation strategies impacts physiology, cognition, mood, and anxiety. Ultimately, we hope our findings will work towards developing and refining effective treatments for anxiety disorders.

Because this is any ongoing study, and some information you have learned could bias other people’s responses if they knew it before the beginning of the study, we ask that you do not discuss the full content of the study to anyone. We appreciate your cooperation!

Thank you for your participation. If you are interested in finding out more about this study and its findings, or if you have any concern or questions about the research itself, please contact Allison Ouimet, the Principal Investigator, at allison.ouimet@uottawa.ca.

For further reading:

- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, 30, 217-237.
- Butler, E. A., Egloff, B., Wilhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003). The social consequences of expressive suppression. *Emotion*, 3, 48-67.
- Gross, J. J. (Ed.). (2013). *Handbook of emotion regulation*. Guilford publications.
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85, 348-362.

If you would like to seek psychological services to help manage and treat your anxiety or other problems, below are some psychological clinics in the Ottawa area that you may find helpful:
 Ottawa Institute of Cognitive Behavioural Therapy (613-820-9931)
 Ottawa Centre for Cognitive Therapy (613-729-0801)
 Centre for Psychological Services and Research, University of Ottawa (613-562-5289)

In the course of completing the questionnaires or the interaction task, you may have noticed some emotional discomfort, or become aware of difficulties you are experiencing with anxiety or another type of mental health issue. You can find out more information about anxiety and other mental health problems at the following websites:

<http://www.cpa.ca/psychologyfactsheets/>
<http://www.mooddorderscanada.ca/page/resources>
<http://www.bps.org.uk/psychology-public/psychology-and-public>
<http://www.anxietycanada.ca/english/brochures.php>
<http://www.cmha.ca/mental-health/mental-health-brochures/>

If you would like to receive support or help for psychological problems in the Ottawa area, the following resources may be of use:

Ottawa Distress Centre, 613-238-3311
 Tel-Aide Outaouais, 613-741-6433
 Centre d'Aide 24-7, 819-595-9999
 Ottawa Academy of Psychology, 613-235-2529
 University of Ottawa Student Academic Success Service,
<http://www.sass.uottawa.ca/about/mental-health-wellness.php>

If you are interested in seeking self-help resources, the Association of Behavioral and Cognitive Therapies maintains a searchable database of recommended books for a series of concerns, which can be found online: <http://www.abct.org/SHBooks/>

If you have any questions or concerns related to this study, please contact the researcher:

Allison J. Ouimet, Ph.D., C.Psych.
 University of Ottawa, 136 Jean Jacques Lussier, VNR 4088, Ottawa, ON, K1N 6N5
 Phone: 613-562-5800, x.4806; Fax: 613-562-5169
 Email: Allison.Ouimet@uOttawa.ca

If you have any questions relating to your rights as a research participant, please contact the Protocol Officer for Ethics Research at the University of Ottawa:

Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5

Tel.: (613) 562-5387

E-mail: Ethics@uOttawa.ca

This debriefing form is for you to keep for future reference.

Debrief Forms Study 2

DEBRIEFING FORM FOR RESEARCH PARTICIPATION

The Cognition and Anxiety Disorders Research (CADRe) Lab would like to thank you for participating in our research!

Title: Do you like me? Exploring factors contributing to likeability.

INVESTIGATORS AND INSTITUTION:

The study you just participated in is being conducted at the University of Ottawa by Nancy Bahl, Ph.D. Student, and Allison J. Ouimet, Ph.D., C.Psych, in the Cognition and Anxiety Disorders Research Laboratory (CADRe Lab).

STUDY PURPOSE AND IMPLICATIONS:

You were told that the purpose of our study was to investigate the relationships between emotions and likeability. We were actually not interested in examining likeability – we were interested in exploring how the emotion regulation strategy that you were assigned while engaging in the conversation task affected you 1) physiologically (we measured your sweat responses as an indicator of sympathetic nervous system activity), 2) cognitively (through the memory task that was given to you at the end of the conversation) and 3) affectively (by asking about mood and anxiety before and after the conversation task).

Emotion regulation refers to a set of automatic and controlled processes that influence which emotions we have, when we have them, and how we experience and express those emotions. We use strategies every day to help us regulate our emotions. These strategies help us change our emotions in response to a variety of situations. There are some strategies that research suggests are unhealthy to use. One such maladaptive strategy is called expressive suppression (ES; preventing emotions from appearing on the face). Another emotion regulation strategy is called expressive dissonance (ED), which occurs when people express on their face the opposite emotion than they are actually feeling (e.g., smiling when feeling sad). Our research aims to compare these two emotion regulation strategies, with the focus of exploring which strategy may be more “healthier” strategy (i.e., has better outcomes across measurement methods) than the other.

We also didn’t tell you the exact nature of the behavioural task – that it was a conversation task – to try to prevent feelings of elevated anxiety before the conversation task was introduced. The content of the videotaped speeches will be viewed by research assistants in our lab and used to code for verbal and non-verbal indicators of anxiety, as well as for social indicators (e.g., eye contact, laughter). If you feel uncomfortable with the way that data was obtained, please let us know, and we can remove your data from the study.

Lastly, the person that you engaged in conversation with, is not another participant, but rather a research assistant in our lab. We used a confederate as they were trained on providing predetermined answers to all questions that were asked during the conversation task.

We hope that this study will be an important first step towards better understanding how emotion regulation strategies impact physiology, cognition, mood, anxiety, and social outcomes. Ultimately, we hope our findings will work towards developing and refining effective treatments for anxiety disorders.

Because this is an ongoing study, and some information you have learned could bias other people's responses if they knew it before the beginning of the study, we ask that you do not discuss the full content of the study to anyone. We appreciate your cooperation!

If you are interested in finding out more about this study and its findings or if you have any concerns or questions about the research itself, please contact Nancy Bahl, the Principal Investigator, at (613) 562-5800 x. 7617.

If you would like to seek psychological services to help manage and treat your anxiety or other problems, below are some psychological clinics in the Ottawa area that you may find helpful:

Distress Centre Lines

Ottawa Distress Centre, (613-238-3311)

Tel-Aide Outaouais, (613-741-6433)

Centre d'Aide 24-7, (819-595-9999)

Treatment Resources:

Free

University of Ottawa Student Academic Success Service,

(<http://www.sass.uottawa.ca/about/mental-health-wellness.php>)

613-562-5976

The Walk-In Counselling Clinic, (<https://walkincounselling.com/>)

613-722-2225

Counselling at Catholic Family Services (<https://cfsottawa.ca/programs-and-services/women/>)

613-233-8478

Pinecrest-Queensway Community Health Centre, (www.pqchc.com/mental-health-services/)

613-820-4922

Individual Counselling at Family Services Ottawa

(<http://familyservicesottawa.org/adults/individual-counselling/>)

613-725-3601 (ext. 117)

Low-Cost

University of Ottawa Centre for Psychological Services and Research (CPSR):

Reception (613-562-5289) or cpsr@uOttawa.ca

Private Practice (sliding scale available)

Ottawa Institute of Cognitive Behavioural Therapy, (<https://www.ottawacbt.ca/>): 613-820-9931

Ottawa Centre for Cognitive Therapy, (<https://ocbt.ca/>): 613-729-0801

Centre for Interpersonal Relationships, (<https://www.cfir.ca/>): 1 855 779 2347

For further reading, if interested:

- Butler, E. A., Egloff, B., Wilhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003). The social consequences of expressive suppression. *Emotion*, 3, 48-67. doi:10.1037/1528-3542.3.1.48
- Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, 74, 224-237. doi:10.1037//0022-3514.74.1.224
- Hofmann, S. G., Heering, S., Sawyer, A. T., & Asnaani, A. (2009). How to handle anxiety: The effects of reappraisal, acceptance, and suppression strategies on anxious arousal. *Behaviour Research and Therapy*, 47, 389-394. doi: 10.1016/j.brat.2009.02.010

In the course of completing the questionnaires, computer tasks, or conversation task, you may have noticed some emotional discomfort, or become aware of difficulties you are experiencing with anxiety or another type of mental health issue. You can find out more information about anxiety and other mental health problems at the following websites:

<http://www.cpa.ca/psychologyfactsheets/>

<http://www.moooddisorderscanada.ca/page/resources>

<http://www.bps.org.uk/psychology-public/psychology-and-public>

<http://www.anxietycanada.ca/english/brochures.php>

<http://www.cmha.ca/mental-health/mental-health-brochures/>

If you are interested in seeking self-help resources, the Association of Behavioral and Cognitive Therapies maintains a searchable database of recommended books for a series of concerns, which can be found online: <http://www.abct.org/SHBooks/>

This debriefing form is for you to keep for future reference

POST-DEBRIEFING CONSENT FORM

Title: Do You Like Me? Exploring the factors contributing to likeability.

Deception sometimes occurs in research studies when the researchers attempt to have a participant believe something that was not true. We also didn't tell you the exact nature of the behavioural task – that it was a conversation task – to try to prevent feelings of elevated anxiety before the conversation task. Also we are not evaluating measures of likeability– instead, we are examining the impacts of emotion regulation strategies (expressive suppression, expressive dissonance, or no specific strategy) on psychophysiology, cognition, affect, mood, and social outcomes. The content of the videotaped speeches will be viewed by research assistants in our lab and used to code for verbal and non-verbal indicators of anxiety, as well as social indicators (e.g., eye contact, laughter, fidgeting). Lastly, you did not interact with another participant. Rather, a researcher in our lab was trained to follow a standardized protocol for every participant, in order to complete the memory task.

We ask for your consent to use your data, knowing that deception was used in this study. Remember that all data will be anonymized and published in an aggregate format. However, we understand that you may not wish to have your data used in our analyses and, if you prefer, we will delete your data permanently. You will, of course, still receive full compensation for your participation in this study.

Please select **one** of the following options:

I understand that deception was used in this study and I would like my data **included** in the study analyses.

I understand that deception was used in this study and I would like my data **destroyed (i.e., NOT included in the study analyses)**.

Participant's name: _____

Participant's signature: _____

Date: _____