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SUPPRESS NOT:
EXAMINING THE RELATIONSHIP BETWEEN PROSPECTION AND EMOTIONAL
SUPPRESSION IN A DEPRESSED POPULATION

By

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Abstract

The aim of the present study was to elucidate the relationship between two transdiagnostic mechanisms of psychopathology: prospection (i.e., one's ability to imagine the future), and emotional suppression, a maladaptive emotion regulation (ER) strategy. Specifically, we proposed that when individuals engage in emotional suppression, it interferes with prospection, which might then contribute to the development of depressive symptoms.

To assess the relationship between emotional suppression and prospection in individuals with depression we used an online experimental paradigm with an MTurk sample of 128 participants (64 depressed; 64 non-depressed) randomly assigned to one of two conditions: the depressed suppression induction condition (D-SIC) ($N=32$); the non-depressed suppression induction condition (ND-SIC) ($N=32$); the depressed view control condition (D-VCC) ($N=32$); the non-depressed view control condition (ND-VCC) ($N=32$).

Results did not support our hypothesis that suppression would lead to worse prospection in individuals with depression. However, our findings did replicate and further support the extant literature that individuals with depressive symptoms generate less episodically specific prospections; therefore, episodic specificity is a fruitful target for both treatment and research examining underlying mechanisms that contribute to symptoms of depression and other forms of psychopathology.

Keywords: prospection, episodic specificity, emotional suppression, depression

Contents

Suppress Not: Examining the Relationship between Prospection and Emotional Suppression in a Depressed Population

Since its beginning, the primary goal of psychology has been to understand the human experience, with the hope of treating and easing human distress and suffering; however, how the field reflects upon, describes, and treats the extremes of these afflictions has varied across history. Over the past century, "the predominant means of conceptualizing mental health struggles has been to categorize them within formal taxonomic systems, organized according to hypothetical distinctions between different sets of signs and symptoms, and compiled into comprehensive compendia of psychiatric diagnoses" (Dalgleish et al., 2020b p. 180) (i.e., within the *Diagnostic and Statistical Manual of Mental Disorders*) (*DSM*; now in its 5th edition) and the International Classification of Diseases (ICD; now in its 11th edition).

Based on criteria set forth by the DSM-5, nearly one in five adults in the United States lives with a mental illness (51.5 million in 2019) (National Institute of Mental Health, n.d.), and nearly half of all Americans will experience a mental illness in their lifetime (Kessler et al., 2003). Additionally, comorbidity rates have been reported as high as 30% in primary care settings (Roca et al., 2009; Ranak et al., 2015), meaning patients in these settings meet criteria for one or more mental health conditions. In fact, uncomplicated clinical presentations are the exception, not the rule (Kessler et al., 2005).

Research suggests that these high rates of comorbidity, are to an extent, an artifact arising from the structure of the categorical system rather than separable disorders (van Loo & Romeijin, 2015). Given the pervasiveness of mental illness, comorbid diagnosis, and a variety of other challenges resulting from the categorical approach (for a review, see Dalgleish et al., 2020a), there has become a growing consensus in the field of psychology that the research and

clinical utility of such a unidimensional paradigm is limited. Therefore, an emergent area of interest is the "transdiagnostic" approach, which conceptualizes mental health difficulties from a dimensional perspective, that is, the assertion that there are critical psychological and biological processes responsible for maintaining symptoms and these are shared across psychological disorders (Harvey et al., 2004).

While the conceptual understanding of mental illness from a diagnostic standpoint has remained largely categorical, there has been a shift in research and treatment over the past twenty years to a more transdiagnostic approach. Transdiagnostic approaches to research and treatment are thought to arise from three different orientations: 1) universal application of therapeutic principles across different disorders, 2) an eclectic approach where modules of different treatments are selected based on case presentation, and 3) a "shared mechanisms" approach which assumes that there are common underlying mechanisms that attribute to mental illness and can therefore be targeted in treatment (Suaer-Zavala et al., 2017, p.130; for a review, see Sakiris & Berle, 2019).

Of particular interest to the present study is the shared mechanisms approach. This approach implies that there are common underlying mechanisms involved in well-being and mental illness which should drive the development of research and interventions. Given that depression is one of the most widely diagnosed and debilitating mental health conditions it has been a primary are of research interest (World Health Organization, 2021) and will be the focus of the current study.

Cognitive and behavioral research studies have been used to examine the underlying mechanisms that lead to the development, maintenance, and treatment of depressive symptoms with findings revealing two important contributory factors: prospection (i.e., one's ability to

imagine the future), and suppression a maladaptive emotion regulation (ER) strategy (MacLeod & Conway, 2005; Rasmussen et al., 2006a; Seligman et al., 2006; Gross, 1998; Aldao & Nolen-Hoeksema, 2010). Prospection is a form of mental time travel (MTT) defined as the capacity for future-oriented cognition including the ability to mentally simulate future events (Gilbert & Wilson, 2007; Szpunar et al., 2013; Bulley & Irish, 2018; Suddendorf & Corballis, 2007).

Emotion regulation is "the process through which individuals modulate their emotions to respond to environmental demands appropriately." (Messina, Sambin, Beschoner, & Viviani, 2016, p. 573). Emotional suppression is considered a maladaptive ER strategy that involves the active inhibition of ongoing emotion-expressive behavior (Gross & Levenson, 1993). Both factors, prospection, and emotional suppression, have been implicated in the development and maintenance of depression and continue to receive increased empirical attention and support as to their transdiagnostic role in psychopathology (Dalgleish et al., 2020d; Cludius et al., 2020; Romano et al., 2020).

While there is a robust amount of research looking at prospection and suppression individually as mechanisms and their relationships with depression there is a paucity of research examining the interaction of these mechanisms and their relationship to the development, maintenance, and treatment of depression. This gap is significant because understanding the underlying cognitive and emotional mechanisms that contribute to depression can potentially help in the development of preventive and treatment strategies. The present study aims to address this gap in the literature.

Depression

In 2021, The National Institute of Mental Health (NIMH) estimated the prevalence of depression at 17.3 million adults or 7.1%% of all adults in the United States. Depression affects

people of all ages, races, and ethnicities and is more common among women than men. Despite the existence of several effective treatments for depression, the American Psychiatric Association (2000) notes that depression is highly recurrent even with the most effective treatments, with at least 50% of those who recover from a first episode of depression have one or more additional episodes in their lifetime. Those rates increase to 80% if a person has experienced more than one episode of depression. Thus, there remains considerable room for growth and development of the treatments that are commonly applied in working with individuals with depression.

The importance of understanding the underlying mechanisms of depression is multi-faceted. Depression is commonly diagnosed as co-occurring with other disorders, such as anxiety, substance use, eating disorders, personality disorders, post-traumatic stress disorder, and attention-deficit hyperactivity disorder (ADHD) among others (Kessler et al., 2005; Hasin et al., 2005; Crow et al., 2009; Skodol et al., 2005; Biederman et al., 2006). From a clinical standpoint co-occurrence of disorders often leads to the question as to what symptoms/diagnosis should be targeted first, and can make case conceptualization more complicated, and the selection of evidence bast treatments (EBTs) more challenging. From the research perspective, the co-occurrence of disorders leads to questions about potential shared mechanisms that contribute to the presentation of symptoms across various disorders and the possibility of identifying and targeting these mechanisms to increase the efficiency and efficacy of treatments.

From a pragmatic view, the importance of better understanding depression is glaring given the high prevalence rates of depression across the lifespan. Further, depression can lead to debilitating symptoms with an estimated 4.7% of all disability-adjust life years (DALYs) attributed to depressive disorders (Gore et al., 2011). Additionally, individuals with depression are at higher risk for suicidal ideation, attempts, and suicide completion with approximately 47%

of those with major depressive disorder (MDD) reporting suicidal ideation (SI; for a review see Cuijpers et al., 2014). The same study found that the risk of suicide completion is highest among those with major depressive disorder who have experienced SI.

Theories and Models of Depression

Most psychological orientations propose models of depression (e.g., a behavioral model of depression, psychodynamic, social, physiological). For the purpose of this study, we will focus on the cognitive model of depression that proposes that symptoms of depression are caused and maintained by three key components: (1) negative self-schema, that is, negative beliefs and expectations about oneself, such as beliefs that that one is unworthy; (2) the negative triad, that is individuals with symptoms of depression tend to see themselves, the world, and their future negatively; (3) cognitive distortion (i.e., errors in thinking), such as overgeneralizing, catastrophizing, and all-or none-thinking, which often lead to a negative interpretation of the events thoughts, beliefs, and interpretations of events (Beck, 1987). Two underlying mechanisms that have been incorporated into this model and identified as contributing to the development and maintenance of depressive symptoms are prospection and emotion regulation (e.g., emotional suppression: Seligman et al., 2016; MacLeod et al., 2005; Gross & John, 2003; Gross & Levenson, 2004; Moyer & Landis, 2014).

Mental Time Travel: Memory and Prospection

Mental time travel (MTT) (Suddendorf & Corballis, 1997) is the term used for human's ability to project themselves into the past to relive personal experiences (i.e., episodic memory) or into the future (i.e., prospection). It has been argued that the relationship between episodic memory and prospection is inextricable and that ultimately the purpose of mental time travel into the past is that it allows access to the future which is evolutionarily advantageous (Dudai &

Carruthers 2005a; Suddendorf & Busby 2003b; 2005; Suddendorf & Corballis 1997; Tulving 2005).

Prospection allows us to simulate mentally or "pre-experience" future events, giving humans the ability to plan for, influence, and potentially shape future outcomes (Suddendorf & Corballis, 2007). In support of the argument that memory and prospection are linked, studies show that they share the same cognitive processes, such as self-referential processing and imagery, are associated with the same forms of psychopathology, and rely on similar neural networks (D'Argembeau & van der Linden, 2004, 2006b; Spreng & Levine, 2006; Szpunar & McDermott, 2007; Zheng, Luo, & Yu, 2014; Boelen et al., 2013).

Studies examining underlying cognitive processes of memory and prospection show that self-referential processing, specifically, imagining future events related to the self-and/or personal goals, leads to better memory of those future events following a delay (Jeunehomme & D'Argembeau, 2021). Additionally, studies show that phenomenological properties of memories and future simulations (such as vividness, sensory details, and emotional intensity) are enhanced by self-reference (e.g., de Vito et al., 2012; Grysman et al., 2013; Thomsen & Pillemer, 2017; Viard et al., 2012). Further, studies consistently demonstrate that another important cognitive process, imagery, plays a role in both memory and prospection.

Studies examining imagery show that participants with higher imagery capacities generate more detailed representations of past and future events, with deficits in one's ability to generate detailed memories, predictably affecting one's ability to generate detailed future events (D'Argembeau & Van der Linden 2006a; Holmes & Matthews, 2010). Similar deficits in memory and prospection (i.e., reduced episodic specificity) are considered risk factors for the development of psychopathology (e.g., depression and PTSD; for a review see Boelen et al.,

2013; Gamble et al., 2019). Taken together these findings elucidate the cognitive, psychological, and behavioral link between memory and prospection.

Additional support of the connection between memory and prospection has been evidenced by functional brain imaging studies showing that remembering and prospecting are associated with the same neural regions, often referred to as the default mode network, which includes the hippocampus, Para hippocampal cortex, lateral and medial parietal cortex, lateral temporal cortex, and medial prefrontal cortex (Okuda et al., 2003; Hassabis et al., 2007; Thakral et al., 2017; Thakral et al., 2020).

Findings show that individuals who have damage to key areas of the default mode network, present with deficits in both memory and prospection. For instance, in a seminal study, Hassabis et al. (2007) found that amnestic patients with primary damage to their hippocampus were markedly impaired in their ability to construct novel future events as compared to controls. Specifically, amnestic patients produced prospections that were less episodically specific, and they rated their subjective experiences as less phenomenologically rich. These findings from cognitive and neuroimaging studies demonstrating the relationship between memory and prospection have led to the development of the *constructive episodic simulation hypothesis* (Schacter & Addis, 2007).

A cognitive theory, *the constructive episodic simulation hypothesis* proposes that episodic memory supports the construction of prospections by providing access to episodic details that can be reconstructed into novel future scenarios. For example, if you are trying to decide whether to attend a professional baseball game in Seattle next month you can draw on details of similar sporting events that you attended in the past to simulate the future experience, which will help you decide whether to go. Studies suggest that we engage in this cognitive process of prospection

from moment to moment (Gilbert & Wilson, 2007). Further, prospection has been identified as playing a functional role in a variety of everyday activities that contribute to well-being, such as goal-directed behavior and decision-making, problem-solving, behavioral engagement, flexible planning, and emotion regulation (for a review; see Schacter et al., 2017; Suddendorf et al., 2018; Jing & Schacter, 2016; McFarland et al., 2017; Bulley & Irish, 2018).

For instance, Knauper et al. (2011) found that the combination of prospection and implementation intentions led to increased fruit consumption in healthy participants. Other studies have found that prospection leads to increases in physical activity, health behaviors, and voting (for a meta-analysis see Conroy & Hagger, 2018; Renner et al., 2019; Chan & Cameron, 2012; Libby et al., 2007). Likewise, research indicates that when prospections are more episodically specific, they are rated as more emotional, meaningful, personally important, and seemingly plausible. The greater the plausibility, the increased likelihood of behavioral engagement in the prospective behavior (Lehner & D'Argembeau, 2016; Renner et al., 2017; D'Argembeau & Mathy, 2011; Chan & Cameron, 2010; Miles et al., 2010; Driskell et al., 1994). Together, these findings suggest that prospection is an underlying mechanism that is important to healthy functioning while deficits in prospection (i.e., reduced episodic specificity) are linked to symptomology observed across disorders.

Episodic Specificity

Episodic specificity (ES) is a key feature of memory and prospection. In prospection, ES is defined by the types of details retrieved in memory which are then reconstructed into novel future scenarios (i.e., prospections; Schacter & Addis, 2007). These details are categorized as episodic or semantic details. Episodic details are those that are autobiographical or personal in nature and refer to specific elements, such as time, place, people, emotions, and sensory

information whereas semantic details are factual statements, or other details not specific to the

event (Schacter & Addis, 2007).

A comprehensive body of research shows that decreased episodic specificity (ES) is

implicated in various forms of psychopathology (Williams & Scott, 1988; Sumner et al., 2016).

Therefore, an emergent interest in ES has developed. Studies over the past 10 years have begun

examining the relationship between prospection, ES, well-being, and psychopathology with

similar findings to memory research; that less episodically specific prospection is prevalent

across disorders (Morina et al., 2011; MaCleod et al. 1997; Holmes et al., 2008a; Beck et al.,

2006). Therefore, ES is now seen as an important feature of prospection and has gained

significant attention in the literature because of its relationship to well-being and its

transdiagnostic role in psychopathology.

Episodic specificity (ES) has been studied extensively by assessing the number of episodic

and semantic details using the adapted autobiographical interview which is a coding protocol

(AI; Levine et al., 2002; Addis, Wong, & Schacter, 2008). Specifically, higher ES scores on the

AI, reflect the episodic richness and specificity of mental simulations, whereas prospections with

higher scores of semantic details are conceptualized as over-general (i.e., lacking episodic

specificity). Importantly, ES can be predicted by age with older adults (65 and over) exhibiting

difficulties generating episodically specific prospections (Williams et al., 1996; Abram et al.,

2014; Gallo et al., 2011). Additionally, phenomenological ratings can be influenced by event

properties, such as the familiarity of the prospective event, valence, visual perspective, temporal

distance, and personal importance to name a few (for a review see D'Argembeau & Van der

Linden, 2012b). Therefore, in experimental paradigms, it is important to measure and control for

these factors.

Overall, studies show that prospections that are episodically specific are related to positive future expectations, planning, goals, emotion regulation, and problem-solving, whereas the generation of less episodically specific prospections has been observed transdiagnostically in different types of psychopathologies (Altgassen et al., 2015; D'argembeau & Mathy, 2011; Kleim et al., 2014; Taylor & Schnieder, 1989; Williams et al., 1996; Gamble et al., 2019; Kleim et al., 2014; Morina et al., 2011; Stöber, 2000)

Episodic Specificity and Psychopathology. Research has demonstrated that individuals with depression generate less episodically specific prospections (Morina et al., 2011), which is believed to contribute to the generation of fewer positive perspective experiences (on average) than healthy individuals (MaCleod et al. 1997; Holmes et al., 2008b; Kring & Caponigro, 2010). Seligman and Ropke (2016) proposed that "faulty prospection" (i.e., less episodically specific prospection) underlies the development of depression, which, in turn, further exacerbates difficulty with generating prospections.

Ropke and Seligman discuss three problems in prospection: (1) poor generation of possible futures; (2) negative evaluation of possible futures; (3) negative beliefs about the future. In support of this theory, research has demonstrated that individuals with depression generate less detailed prospections, generate fewer positive prospective experiences (on average) than healthy individuals, and rate poor outcomes to life problems as more likely to occur than hopeful or positive outcomes (MaCleod et al. 1997; Holmes et al., 2008b; Morina et al., 2011; Beck et al., 2006).

These deficits in prospection are believed to contribute to lower anticipatory pleasure and less motivation to seek out experiences that could lead to reward (Engel et al., 2013; Sherdell et al., 2012). Reduced engagement in rewarding activities has been identified as one of the primary

contributors to the development and maintenance of symptoms present in emotional disorders,

such as depression (Engel et al., 2013; Sherdell et al., 2012). Further, a systematic review by

Hallford et al. (2018) found that individuals experiencing depression, bipolar disorder, suicidal

ideation, and schizophrenia generate significantly less episodically specific prospections than

healthy individuals (Williams et al., 1996). Likewise, a study conducted by Brown et al. (2014)

produced similar findings regarding episodic specificity and post-traumatic stress disorder

(PTSD). These findings further demonstrate the idea that prospection is a mechanism critical to

healthy functioning and well-being, whereas faulty prospection is implicated in the development

of symptoms transdiagnostically.

Given these findings, there is a small but growing body of research looking at the

transdiagnostic benefits of interventions, known as episodic specificity training (EST), that target

episodic specificity (ES) (Hallford et al., 2020a). Cognitive and behavioral studies have found

positive effects of EST, with results showing improved ES, anticipatory pleasure, affect, ratings

of well-being, coping, and problem-solving performance (Madore & Schacter, 2014, 2016; Jing

et al., 2016; McFarland et al., 2017; Hallford et al., 2020b). Neuroimaging studies have

supported these findings by demonstrating that EST results in more activity in several core

neural regions during the construction of imagined events as compared to participants who do

not engage in the training.

Of particular interest to this study are findings that EST can improve emotion regulation

(ER) (i.e., "the process through which individuals modulate their emotions to respond to

environmental demands appropriately"; Messina et al., 2016, p. 573). ER is considered a

transdiagnostic mechanism of psychopathology (Jing et al., 2020). These findings are

particularly important to the present study because we will be examining the ways in which

certain ER strategies, such as emotional suppression affect prospection. Emotional suppression is defined as the attempt to hide, inhibit, or reduce ongoing *emotion-expressive* behavior and has been shown to affect mental time travel broadly (i.e., memory and prospection; Richards & Gross, 1999, 2000, 2004, 2006; D'Argembeau & Van der Linden, 2006a; Gross & Levenson, 1993).

Emotion Regulation

The study of emotion regulation (ER) has been growing in popularity since the 1990s and continues to be an emergent area of research in the field of psychology. Researchers are finding that humans constantly engage in ER consciously and unconsciously to regulate their own (i.e., intrinsic regulation), and other people's emotions (i.e., extrinsic regulation) across a variety of contexts (e.g., long-term vs. temporary social contexts) ((Braunstein et al., 2017; Nozaki & Mikolajczak, 2020; McCrae et al., 2011; Goldenberg et al., 2016; Proat et al., 2020). ER not only affects our daily lives but is also implicated in different forms of psychopathology, physiological processes, and cognitive functioning, such as one's ability to remember and imagine future events (for a review see Aldao et al., 2010; Jumentier et al., 2018; D'Argembeau & Van der Linden, 2006b).

Before diving into the process of emotion regulation (ER) it is critical to define and conceptualize what is being regulated (i.e., emotion). In a review by Thompson and Gross (2007) they define three core features of emotions: (1) emotions arise when one attends to a situation and sees it as relevant to one's values and or goals because when a situation is relevant to our goals and values it becomes meaningful; (2) emotions are multifaceted and involve changes in subjective experience, behavior, nervous system physiology, and emotions; and (3) sometimes emotions interrupt what we are doing and come into our awareness. Additionally, emotions are

often response tendencies that are malleable, and can be modulated (i.e., regulated) in several ways; hence, we can engage in what has become known as emotion regulation (ER).

The contemporary view of emotions in the field of psychology is that they are adaptive and play a role in a variety of daily activities, such as motivation, decision-making, planning, learning, communication, and complex social interactions to name a few (Lazarus, 1991; Toby & Cosmides, 1990; Oatley & Johnson-Laird, 1987; Cahill et al., 1994). Our growing understanding of the importance of emotions in human functioning (for a review see Gross, 1999) has led researchers to wonder how, why, and when emotions become problematic. What researchers have come to understand is that emotions themselves are not problematic in any given situation, but rather how we manage and respond to them, a process that has become known as emotion regulation (ER) can be a point of conflict and where problems often arise.

Emotional Suppression

Research has found that certain emotion regulation (ER) strategies, such as emotional suppression are less effective at regulating emotions than other strategies. Emotional suppression involves the active inhibition of ongoing emotion-expressive behavior (Gross & Levenson, 1993). It is considered a response-focused-or-modulation ER strategy, meaning it happens after an emotion has been generated (i.e., in response to the emotion). Emotional suppression is considered an effortful and cognitively demanding form of ER due to its reliance on self-monitoring and inhibitory control (Lynch et al., 2001; Richards & Gross, 1999; Joorman & Gotlib, 2009).

Emotional Suppression and Psychopathology. Emotional suppression has been shown to be effective at helping people appear to keep their "cool" (Richards & Gross, 1999, p. 1033); however, a breadth of research demonstrates that emotional suppression does not result in the

internal experience of reduced negative affect (i.e., downregulation; Gross & Levenson, 1993; Richards & Gross, 1999; Goldin et al., 2008). In fact, studies have linked emotional suppression to a variety of negative, emotional, psychological, physiological, cognitive, and social outcomes (for a review see Aladao et al., 2010; Gross & Levenson, 1997; Cutuli, 2014; Beblo et al., 2012; Mauss & Gross, 2004; Gross, 2002).

Researchers theorize that this is due to emotional suppression increasing accessibility to what is being suppressed rather than decreasing accessibility. Others suggest that emotional suppression prevents emotional processing which has been linked to positive physical and psychological outcomes (for a review see Frattaroli, 2006; Niederhoffer & Pennebaker, 2002). Additionally, theorists propose that suppression prevents habituation to emotional stimuli, thus chronic suppressers become hypersensitive to negative/depressive thoughts and symptoms (Wenger & Zanakos, 1994; Wenzlaff & Wegner, 2000). Studies have consistently shown correlations between the use of emotional suppression and depressive symptoms, with depressed individuals engaging in more suppression than non-depressed individuals (Beevers et al., 1999). Not only have studies shown that there is a correlation between emotional suppression and depression, but a meta-analysis of 53 studies conducted by Alado et al. (2010) also found that emotional suppression was associated with higher levels of depressive symptoms than other more adaptive emotion regulation strategies.

Given these findings, emotional suppression is now being conceptualized and studied as a transdiagnostic mechanism that contributes to the development of symptoms across emotional disorders. Therefore, treatments for emotional disorders, such as depression, anxiety, borderline personality disorder (BPD), and post-traumatic stress disorder (PTSD) often target emotion regulation (ER) (Berking et al., 2008; Linehan, 1993; Hayes et al., 1999; Barlow et al., 2004).

These findings are important to this study because emotional suppression has been implicated in the same psychological disorders as faulty prospection. Additionally, emotional suppression has been shown to affect cognitive functions, such as mental time travel (MTT). Specifically, there is a well-defined relationship between emotional suppression and memory, which as we have already discussed in depth, is inextricably linked to prospection.

Mental Time Travel and Emotional Suppression

In a seminal paper examining the relationship between memory and emotional suppression, Richards and Gross (1999) used a slide-viewing paradigm in which participants were assigned to an emotional suppression or non-suppression view control condition. Participants were instructed to view emotionally evocative material paired with autobiographical information about the people in the slides. Following the presentation of the slides, the participant's memory for the viewed information was tested using a cued recall and recognition task. Results revealed that emotional suppression led to poorer memory performance on both cued and recognition tests compared to the control group.

In a second study, Richards and Gross (1999) used the same paradigm to test the relationship between suppression, physiological arousal, and memory performance. Increased sympathetic nervous system activation was observed in the suppression group and poorer memory performance was replicated. Additionally, in a series of studies Richards and Gross (2006) found that suppression leads to worse memory performance not only when instructed, but also when used spontaneously. Moreover, participants who used suppression did as poorly on memory tasks as participants who engaged in self-distraction (i.e., intentionally avoided the material altogether). These findings have been replicated in a variety of other studies using experimental paradigms in which participants are instructed to engage in suppression or behave

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naturally while viewing emotion-eliciting material with similar findings that the use of emotional suppression results in poorer performance for recalling details of the material.

In addition to cognitive and behavioral studies, imaging studies further support findings that suppression affects MTT. Specifically, Binder et al. (2012) used a between-subjects design to study the effects that emotional suppression has on the encoding and recall of emotionally evocative images. They found that participants who were instructed to use suppression remembered fewer negative and neutral pictures than the control group, rated negatively valenced pictures as more arousing, and showed reduced activity in the right hippocampus. Additionally, no differences in amygdala activity were observed. Researchers concluded that despite participants' attempts at downregulating their responses to emotionally evocative images by using suppression, it was no more effective at decreasing reactivity in a key neural structure, the amygdala than participants asked to not alter their natural emotional reactions.

Several explanations for the effect of suppression on memory have been proposed. For instance, Richards and Gross (2000) propose that the encoding of information is disturbed while engaging in emotional suppression. This disruption is due to attentional resources being diverted away from ongoing events to continuously monitor and control one's own emotional responses, resulting in the information not being stored in memory. Another possibility is that suppression causes changes at a neuro-structural level, which has been supported by results observed in other neuroimaging studies (e.g., Binder et al., 2012).

Historically, research on mental time travel into the past (remembering) has led to the development of research questions and similar findings about mental time travel into the future (prospection). Further, it has been suggested by leading researchers in the field that there is a bi-directional relationship between emotion regulation and prospection (i.e., imagining future

events might help regulate one's emotions, and emotion regulation strategies might affect the

construction of future events; for a review see Suddendorf & Corballis, 2007). Given these

suggestions and the extant findings that suppression affects memory, it is surprising that there are

a limited number of studies examining the relationship between emotional suppression and

prospection.

Emotional Suppression and Prospection

While there is a paucity of research examining the relationship between emotion regulation

(ER) strategies and prospection broadly, findings from the few existing studies are promising in

that they show a correlation between ER and future thinking (Jing, Madore, & Schacter, 2020;

Jumentier, Barsics, & Van der Linden, 2017). Moreover, the connection between emotional

suppression and episodic specificity (ES) has been established to a lesser degree (D'Argembeau

& Van der Linden, 2006a).

In an influential study, D'Argembeau and Van der Linden (2006a) examined the

relationship between one's capacity for visual imagery, other sensory details, and habitual ER

strategies (e.g., emotional suppression and cognitive reappraisal) when remembering past events

and engaging in prospection. Results revealed that individuals with a higher capacity for visual

imagery experienced more visual and other sensory details both when remembering and

imagining future events (i.e., prospecting). Additionally, individuals who habitually used

emotional suppression experienced fewer sensory, contextual, and emotional details when

imagining both past and future events, while the use of reappraisal had no effect on either kind of

event.

D'Argembeau and Van der Linden (2006a) proposed three different explanations for the

observed effects of emotional suppression on prospection: (1) the habitual use of suppression

interferes with encoding during memory formation which has downstream effects on prospection generation (i.e., leads to less detailed representations of future events); (2) engaging in mental time travel causes people to experience emotions, therefore, they engage in emotional regulation; the use of emotional suppression is more cognitively demanding than adaptive forms of ER and interferes with imagining future events; 3) habitual use of suppression leads to an over general cognitive style, in which people try to avoid experiencing strong emotions by suppressing them which leads to less detailed representations of past and future events.

Neuroimaging studies offer further evidence for the relationship between prospection and emotional suppression. Specifically, studies show that the default mode network (DMN) is activated during prospection while emotional suppression is associated with decreased activity in the DMN activity (D' Argembeau, 2006; Spreng et al., 2009; Kalisch et al., 2006; Liebermann et al., 2007). Therefore, it has been suggested that emotional suppression leads to disruption in processes associated with DMN activity, such as prospection.

Depression, Emotional Suppression, and Prospection

Prospection and emotional suppression are two underlying mechanisms correlated with a variety of psychological disorders. Specifically, findings show that individuals with symptoms of depression, anxiety, and PTSD have less episodically specific prospections (i.e., faulty prospection) and engage in more emotional suppression than those without symptoms. As discussed in the previous sections research on the relationship between prospection and emotional suppression is limited. Similarly, research looking at the relationship between prospection and emotional suppression in individuals with depression is limited. However, from a theoretical perspective, the link between depression, prospection, and emotional suppression is

plausible and could provide important information about the underlying mechanisms of not only

depression but other forms of psychopathology more broadly.

Specifically, prospection and emotional suppression fit into the cognitive model of

depression as factors that contribute to the development and maintenance of depressive

symptoms in that they contribute to the three key factors described by Beck et al. (1987) (e.g.,

negative self-schema, the negative triad, and cognitive distortions). Further, it is well established

that faulty prospection is correlated with symptoms of depression as is the use of emotional

suppression (MaCleod et al. 1997; Holmes et al., 2008b; Kring & Caponigro, 2010; Seligman &

Roepke, 2016). Additionally, the link between prospection and emotional suppression is an

emergent area of study with evidence that emotional suppression interferes with prospection

(Jing, Madore, & Schacter, 2020; Jumentier, Barsics, & Van der Linden, 2017; D'Argembeau &

Van der Linden, 2006b). Given robust findings that individuals with depressive symptoms

generate less episodically specific prospections (i.e., faulty prospection) and engage in emotional

suppression we believe it is important to address the gap in the literature by examining the

relationship between prospection and emotional suppression in a depressed population for

several reasons.

1. While there is a well-established relationship between faulty prospection and

depression, the underlying etiology of faulty prospection is not well understood. This

leaves an important question unanswered, does faulty prospection lead to the

development of depressive symptoms or does depression lead to faulty prospection?

Given the theory that emotional suppression possibly interferes with prospection our

study aims to use an experimental design to examine if emotional suppression leads to

less episodically specific prospections in a depressed population. Thus, contributing

important information about the etiology of faulty prospection and the directionality of

the relationship between prospection and depression.

2. Broadly by better understanding the etiology of transdiagnostic mechanisms

underlying psychopathology, such as prospection and emotional suppression we can

become more precise in our diagnosis of disorders and develop more efficient and

efficacious treatments.

The Present Investigation

The present study investigated whether an emotion suppression induction led to

decreased episodic specificity in participants with symptoms of depression. We used a two-by-

two factorial design to examine the effect of depressive symptoms and emotional suppression on

episodic specificity. Depression status was one independent variable, with nondepressed and

depressed participants being assigned to separate groups. The condition was the second

independent variable, with depressed and nondepressed participants randomly assigned to either

the suppression induction (SIC) or the view control condition (VCC).

The dependent variable in this study was episodic specificity (ES) of imagined future

events (i.e., prospections) measured using a standardized procedure, the autobiographical

interview (AI; Levine, et al., 2002; Addis, et al., 2008; Miloyan & McFarlane, 2019). The AI was

designed to assess participants' ability to generate specific details about imagined future events,

producing an overall episodic specificity score. Episodic specificity was operationalized as the

number of episodic details generated by participants in response to each event cue (e.g., clock,

bird, restaurant).

Further, this study aimed to investigate changes in positive and negative affect after engaging in the experimental emotion regulation paradigm, using the positive and negative affect schedule (PANAS; Watson et al., 1988).

Prospection-Episodic Specificity Hypotheses

H1. We predicted that participants in the depressed group who were instructed to engage in emotional suppression would generate significantly less episodically specific prospections based on the episodic specificity score, compared to all other groups.

Affect Hypotheses

H2. We predicted that participants in the depressed group who were instructed to engage in emotional suppression would have lower positive affect (as measured by the PANAS) after the emotion regulation paradigm, compared to all other groups.

H3. We predicted that participants in the depressed group who were instructed to engage in emotional suppression would have higher negative affect (as measured by the PANAS) after the emotion regulation paradigm, compared to all other participants.

Methods

Experimental Design Using an Online Crowdsource

Through the crowdsourcing platform, Mechanical Turk (MTurk) we recruited a sample of depressed and non-depressed participants ("workers"). MTurk has been shown to be efficient and reliable and provides access to a diverse sample of participants when compared to traditional college samples (Buhrmester et al., 2011). For instance, studies have shown that MTurk workers are more ethnically and socio-economically diverse, thus making it a promising tool for extending the generalizability of behavioral research to broader populations (Casler et al., 2013). Furthermore, the data collected on MTurk has been found to be of high quality, with no

significant differences observed in performance between in-person computer participants and MTurk participants on common experimental paradigms and cognitive psychology tasks (Horton et al., 2011; Kornell et al., 2009; Kornell, 2014).

Despite its advantages, the use of MTurk also has some limitations. For instance, there can be a high number of fraudulent workers; however, high-quality data can be obtained by carefully screening workers (Ophir, 2019; Contractor & Weiss, 2019). Recent large-scale studies have demonstrated that MTurk workers have higher rates of psychopathology compared to the general population, particularly for clinical symptoms of depression (Arditte et al., 2016), which has been partially attributed to lifestyle factors (Ophir, 2019). While this presents challenges for generalizability, it also offers an opportunity to conduct clinical research with populations that are typically difficult to access through traditional means.

Participants

Using G*Power3 (Faul et al., 2007), an apriori analysis was conducted to determine the necessary sample size for observing main effects and interactions in a mixed-design analysis of variance (ANOVA). To achieve a power of .80 with a medium effect size (f = .25), a sample size of 128 participants was required. This effect size is consistent with the extant literature examining the episodic specificity of prospections in depressed populations (D'Argembeau et al., 2012 a,b; Sumner et al., 2010; Raes et al., 2005).

A total of 403 participants provided consent and attempted the screener, with 31.7% completing the full study (N=128; Non-depressed N=64; Depressed N=64). One-hundred and twenty-eight adults (18-64 years old; 37.2% female, 61.2% male, .8% non-binary/third gender) recruited from Mechanical Turk (mTurk) participated in the study in exchange for monetary

compensation ($6). Data was collected between October 2022-February 2023. On average participants took 86 minutes to complete the study (*SD*=32.40 mins).

The University of Montana Institutional Review Board (#81-22) approved all procedures, and all participants provided informed consent prior to participating

Participant Selection

This study was advertised on MTurk as an opportunity to participate in emotional research. To maintain unbiased participation depression was not identified as a population of interest (Suhr & Gunstad, 2005). Participants were compensated $.50 upon completion of the screener and $5.50 upon completion of the entire study, which is comparable to similar studies (Kornell et al., 2014).

Following informed consent, participants were evaluated for eligibility using a screener that included demographic questions, attention check, health questions, and the patient health questionnaire 8-item (PHQ-8). Exclusion criteria and reasons for participant retention or exclusion are described below.

Study Participants: Depressed and Non-Depressed Group

Participants (*N*=128) were selected for the depressed and non-depressed groups based on the Patient Health Questionnaire 8-item (PHQ-8). The first 64 participants with scores indicating moderate to severe symptoms of depression (PHQ-8 $\geq$10) and the first 64 participants with scores indicating mild to no symptoms of depression (PHQ-8 <10) were included in the study.

Attention/Quality Assurance

To ensure high-quality data and completion rates, only participants with IP addresses from the United States were included (Ophir, 2019). Following informed consent, participants answered 2 easy multiple-choice questions designed to identify internet bots or random

responding (e.g., "I am a human being") (Clifford et al., 2019) (Appendix A). Those who answered incorrectly were immediately excluded from the study (*N*=13). To further ensure high-quality data two rare health questions (Bells Palsy, Prader Willi Syndrome) were included to detect participants who answered all health questions in the positive direction (i.e., "yes") (Appendix A-3). None of the participants endorsed both rare health questions, suggesting participants were attentive to item content.

Exclusion Criteria

Participants who did not provide consent for participating in the study (*N* =6) or sharing their health information (*N* =8) were excluded from the study. Additionally, individuals were excluded from the study if they were 65 years or older (*N*=69), non-native English speakers (*N*=0), reported a pre-existing mental health condition other than depression (*N* =147), had a history of a neurodevelopmental disorder (*N* =19), or history of a moderate to severe traumatic head injury (*N*=27). Research has shown that these factors impact prospective abilities (Addis et al., 2008; Wood et al., 2013; Greucci et al., 2013; Kwan et al., 2013).

Materials

Each participant completed the following measures in order: a demographics questionnaire including attention/reliability checks, general health questionnaire, the patient health questionnaire 8-item (PHQ-8; Kroenke, 2001), the positive and negative affect schedule (PANAS; Watson et al., 1988), 120 images from the open affective standardized image set (OASIS; Kurdi et al., 2016), valence and arousal scales adapted from emotion regulation studies (Kuppens et al., 2008; Gross & Levenson, 1995), and a cued paradigm prospection task (Levine, 2002).

The Patient Health Questionnaire (PHQ-8)

The patient health questionnaire 8-Item (PHQ-8; Kroenke et al., 2001) is a self-report questionnaire used to assess depression symptoms and consists of eight items. Each item is rated on a 0–3-point scale, with higher scores indicating more severe symptoms. A total score of less than ten reflects minimal to no symptoms of depression whereas a score equal to or greater than ten suggests moderate levels of depression symptom severity (Shin et al., 2019). Due to safety concerns in online research, the current study excluded item nine assessing for suicidality. The PHQ-8 has demonstrated excellent internal consistency (α=.89) as well as good construct and discriminant validity (Shin et al., 2019). Previous studies have successfully used the PHQ-8 with MTurk samples (e.g., Cui et al., 2019; Ophir et al., 2019) (Appendix A-4).

Positive and Negative Affect Schedule (PANAS)

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) is a self-report measure that assesses positive and negative affect (i.e., emotions). The PANAS is comprised of two 10-item scales, one for positive affect (PA) and one for negative affect (NA). The measure consists of 10 positive adjectives (e.g., inspired, alert, excited) and 10 negative adjectives (e.g., afraid, upset, nervous) that are rated on a 5-point Likert scale from 1 (*not at all)* to 5 (*extremely).* Reliability and Validity reported by Watson (1988) was moderately good; for the PA scale, Cronbach's alpha ranges from α=0.86-0.90; for the NA scale, α=0.84-0.87.

High positive affect reflects a state of high energy, full concentration, and pleasurable engagement, whereas low PA is marked by sadness and lethargy. Negative affect (NA) is a general dimension of subjective distress that is correlated with a variety of negative states, including anger, contempt, disgust, guilt, fear, and nervousness. Low NA is a state of calmness and serenity (Watson et al., 1980) (Appendix B).

Emotion Regulation Paradigm

      Open Access Standardized Image Set (OASIS). The OASIS is an open-access stimulus set of 900 images that were developed via mTurk and has been used in emotion regulation paradigms to induce affective states in participants (Kurdi et al., 2017; Danier-Best & Lee, 2019; Cochran & Woehrle, 2020). Images have been rated for valence (i.e., emotional quality) and arousal (i.e., emotional intensity) by raters in previous studies (Kurdi et al., 2016) with excellent interrater reliability for both dimensions: valence (R= .984, SD = 0.002, range: .974 - .989) and arousal (R= .929, SD = 0.015, range: R = .833 - .958) (Kurdi et al., 2016). Based on previous research by Kurdi et al. (2016) we selected 120 images from the OASIS and sorted images into three neutrally valenced lists and three negatively valenced lists (6 lists total: 3 neutral lists with 20 images each; 3 negative lists with 20 images each). To ensure that our three neutral lists were not significantly different from one another regarding valence and arousal, we calculated the mean valence and arousal scores of the selected stimuli using data from the previous research, we then compared the mean valence and arousal scores (Kurdi et al., 2016, 2017). This process was repeated for the negatively valenced lists. This data is included in the results section, Table 7 and Table 8.

Prospection Task

      Word-Cue Paradigm. For prospection generation of future events, a word-cue paradigm was adopted (Schacter et al., 2008; D'Argembeau & Linden, 2012b; Szpunar & Schacter, 2013). We selected 3 neutral words (e.g., bird, clock, restaurant) from the affective norms for emotional words database, a widely used resource for studying emotions and affective processing (Bradley & Lang, 1990). The selected cue words (e.g., bird, clock, restaurant) were used in

previous studies and did not differ significantly on measures of valence (p=0.21), arousal (p=0.26), frequency (p=0.43), or imaginability (p=0.53) (Kurczek et al., 2015) (Appendix D).

Design and Procedures

First, the group of 128 participants were divided into two groups, referred to as the "depressed group" (N=64) consisting of individuals with moderate to severe symptoms of depression (PHQ-8 ≥10) and the "nondepressed group" (N=64) consisting of individuals with minimal to no symptoms of depression (PHQ-8 <10). Using the random assignment feature in Qualtrics, participants in each group were randomly assigned to one of two conditions: the depressed suppression induction condition (D-SIC) (N=32); the non-depressed suppression induction condition (ND-SIC) (N=32); the depressed view control condition (D-VCC) (N=32); the non-depressed view control condition (ND-VCC) (N=32). For a visual representation of the design and procedures see Figure 1. Next to assess positive and negative affect participants completed the Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988) (Appendix B).

After taking the PANAS participants engaged in our emotion regulation paradigm: all participants were informed that they would be shown 120 images for seven seconds each. Prior to viewing the images, participants in the suppression induction condition (SIC) were instructed, "Suppress your inner emotions. Meaning, do not express how you truly feel" whereas participants in the view control condition (VCC) were instructed, "Allow yourself to feel your inner emotions and show your feelings externally when you see an emotional picture (e.g., as a facial expression)." Immediately after each picture participants were asked to rate the valence, meaning how positive or negative the image was, and the "arousal" (or intensity) meaning the level of activation they felt while viewing the image. To see if participants responded to images
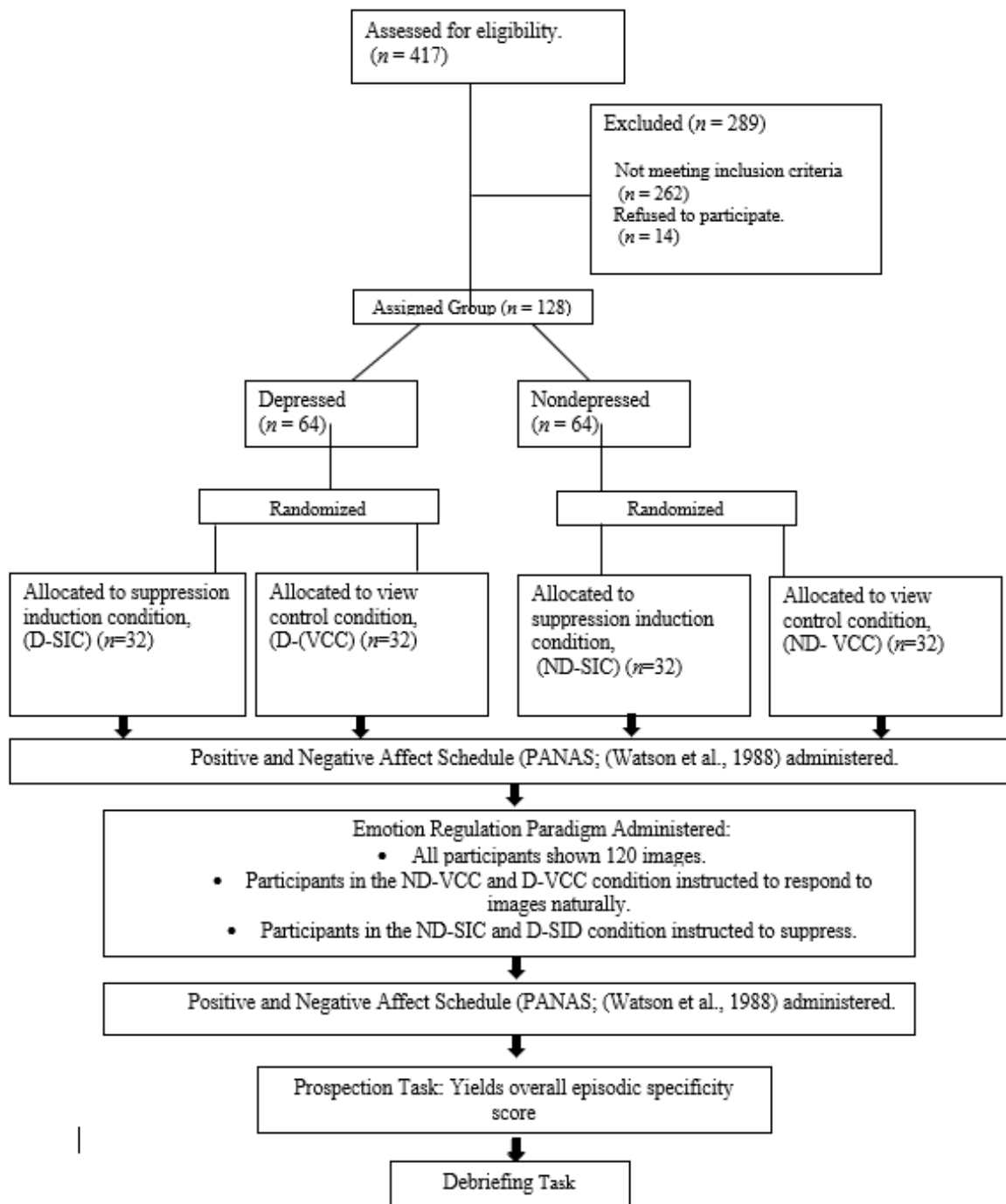
as expected and consistent with other studies using the OASIS (Kurdi et al., 2016) participants rated the valence of each image on a 7-point Likert scale for valence (1 indicating "very negative" and 7 indicating "very positive") and we the arousal of each image using a 7-point Likert scale (1 indicating "very low" and 7 indicating "very high") (Kurdi, Lozano, & Banaji; Ochsner, Bunge, Gross, & Gabrieli, 2002; Nook, Schleider, & Somerville, 2017). For instructions see appendix C.

To assess positive and negative affect after the emotion regulation paradigm participants completed the Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988) (Appendix B).

Next participants were provided instructions for the prospection task (word-cue task), "you will write about different specific events that could happen in the near future (i.e., within the next week)." Participants were presented with cue words (e.g., clock) one at a time and given 3 minutes to write about their imagined future events (Addis et al., 2008). To assess the episodic specificity of prospections two raters who were blind to the study coded participants' prospections (*N*=384) for episodic specificity. Specifically, for each prospection the number of episodic details was tallied, and the totals were averaged across the three events generating an overall episodic specificity score (ES) for each participant. To assess the consistency of ratings, interrater reliability was checked (see results) (Appendix D)

At the end of the study participants were shown 40 positively valenced images selected from the OASIS to reduce the potentially negative effects of viewing negatively valenced images at the end of the study (Waugh & Fredrickson, 2006; Joorman et al., 2007). Additionally, a debriefing statement was provided with resources for individuals experiencing high levels of discomfort or distress (Appendix E).

Figure 1. *Research Design and Procedures.*

Assessed for eligibility.
($n = 417$)

Excluded ($n = 289$)

Not meeting inclusion criteria
($n = 262$)
Refused to participate.
($n = 14$)

Assigned Group ($n = 128$)

Depressed
($n = 64$)

Nondepressed
($n = 64$)

Randomized

Randomized

Allocated to suppression induction condition, (D-SIC) (n=32)

Allocated to view control condition, (D-(VCC) (n=32)

Allocated to suppression induction condition, (ND-SIC) (n=32)

Allocated to view control condition, (ND- VCC) (n=32)

Positive and Negative Affect Schedule (PANAS; (Watson et al., 1988) administered.

Emotion Regulation Paradigm Administered:
- All participants shown 120 images.
- Participants in the ND-VCC and D-VCC condition instructed to respond to images naturally.
- Participants in the ND-SIC and D-SID condition instructed to suppress.

Positive and Negative Affect Schedule (PANAS; (Watson et al., 1988) administered.

Prospection Task: Yields overall episodic specificity score

Debriefing Task

Results

Prospection: Episodic Specificity

H1. We conducted a 2 (depressed and non-depressed) x 2 (suppression induction
condition (SIC) and view control condition (VCC)) analysis of variance (ANOVA) to assess
whether participants in the depressed group, when instructed to engage in emotional suppression,
would generate significantly less episodically specific prospections based on the episodic
specificity score, compared to all other groups.

We examined if there were effects of group and/or condition on episodic specificity
scores. A significant effect of group on episodic specificity was observed, $F(1, 127) = 22.51$, $p =$
<.001, partial $\eta^2 = .15$ (a large effect size). That is, depressed participants (M=2.05, SD= 3.00)
generated significantly less episodically specific prospections based on their episodic specificity
scores than non-depressed participants (M=6.14, SD= 6.20). There was not a significant effect of
condition on episodic specificity, $F(1, 127) = 0.03$, $p = .86$, partial $\eta^2 = .0002$. Descriptive
statistics are presented in Table 1.

There was not a significant interaction between group (depressed vs non-depressed) and
condition (SIC vs VCC) on episodic specificity of prospections, $F(1, 127) = 0.05$ $p = .83$, partial
$\eta^2 = .0003$. In other words, the depressed participants in the suppression induction condition did
not generate significantly less episodically specific prospections than participants in the other
groups. Descriptive statistics are presented in Table 1.

Table 1. Episodic Specificity of Prospection by Group and Condition

	VCC *N*=32	SIC *N*=32	Marginal means by group		
	Mean (SD)	Mean (SD)	Mean (SD)	F	η^2
Non-Depressed	5.97 (6.05)	6.31 (6.38)	6.14 (6.20)	22.51***	.15
Depressed	2.06 (2.29)	2.03 (3.54)	2.0 (3.00)		

Scores. Where a score approaching 1 reflects less episodically specific prospection and a score approaching 10 reflects more episodically specific prospection. Where an asterisk (*) signifies statistical significance (*** $p = <.001$).

Changes in Positive Affect

H2. We conducted a 2 (depressed and non-depressed) x 2 (suppression induction condition (SIC) and view control condition (VCC)) x 2 (pre- and post-ERP) mixed analysis of variance (ANOVA) to assess whether participants in the depressed group who were instructed to engage in emotional suppression would have lower positive affect (as measured by the PANAS) after the emotion regulation paradigm (ERP), compared to all other participants.

We assessed the effects of time (pre- and post-ERP) on positive affect scores. Results revealed a significant effect of time on positive affect, $F(1, 124) = 6.77$, $p = .01$, partial $\eta^2 = .052$, with a medium effect size. These results indicate that positive affect scores on the PANAS for all participants decreased after the emotion regulation paradigm. Descriptive statistics are included in Table 2.

Table 2. Mean (SD) Positive Affect Scores, Pre-to-post Emotion Regulation Paradigm (ERP)

Measures	Pre-ERP N=128 Mean (SD)	Post-ERP N=128 Mean (SD)	F	η^2
Positive Affect Scores	*M*=38.43 (6.47)	*M*=37.02 (6.70)	6.77**	.052

Where an asterisk (*) signifies statistical significance (** *p* = <.01).
Scores. Where a higher score reflects higher positive affect, and a lower score reflects lower positive affect

Results also showed a significant effect of group on positive affect, $F(1, 124) = 7.98$, $p = .006$, partial $\eta^2 = .06$. Results for condition were not significant, $F(1, 124) = 0.11$, $p = .75$, partial $\eta^2 = .001$. Descriptive statistics are presented in Table 3.

Table 3. Mean (SD) Positive Affect Scores by Group, Pre-to-post Emotion Regulation Paradigm (ERP)

Measures	Non-Depressed N=64 Mean (SD)	Depressed N=64 Mean (SD)	t	d
Pre-ER Paradigm	40.3 (6.4)	36.56 (6.04)	3.40***	.6
Post-ER Paradigm	38.06 (7.9)	35.97 (5.90)	1.71*	.3

Where an asterisk (*) signifies statistical significance (*** p = <.001), (*p = <.05)
Scores. Where a higher score reflects higher positive affect and a lower score reflects lower positive affect

There was not a significant interaction between group (depressed vs non-depressed), condition (SIC vs VCC), and time (pre-and post-ERP) on positive affect, $F(1, 124) = 0.17$, $p = .68$, partial $\eta^2 = .001$. Participants in the depressed group who were instructed to engage in emotional suppression did not have lower positive affect (as measured by the PANAS) after the emotion regulation paradigm, compared to all other participants. Additionally, there was not a significant interaction between time (pre- to post-ERP) and condition (SIC vs VCC) on positive affect, $F(1, 124) = 0.002$, $p = .97$, partial $\eta^2 = .00001$ nor was there a significant interaction between time (pre- to post-ERP) and group (depressed vs non-depressed) on positive affect, $F(1, 124) = 2.27$, $p = .13$, partial $\eta^2 = .018$. Descriptive statistics are presented in Table 4.

*Table 4. Mean (SD) Positive Affect by Time (pre- and post-ERP), Group (Depressed vs
Nondepressed), and Condition (SIC vs VCC)*

		Pre-ER Paradigm Mean (SD)	Post-ER Paradigm Mean (SD)
Non-Depressed	VCC *N*=32	39.43 (6.32)	37.00 (8.26)
	SIC *N*=32	41.15 (6.44)	39.12 (7.41)
Depressed	VCC *N*=32	37.06 (5.88)	36.71 (5.70)
	SIC *N*=32	36.06 (6.25)	35.21 (6.06)

Scores. Where a higher score reflects higher positive affect, and a lower score reflects lower
positive affect.

Changes in Negative Affect

H3. We conducted a 2 (depressed and non-depressed) x 2 (suppression induction

condition (SIC) x 2 (pre- and post-ERP) mixed analysis of variance (ANOVA) to assess our

hypothesis that participants in the depressed group who were instructed to engage in emotional

suppression would have higher negative affect (as measured by the PANAS) after the emotion

regulation paradigm (ERP), compared to all other participants.

There was not a significant interaction between group (depressed vs non-depressed),

condition (SIC vs VCC), and time (pre-and post-ERP) on negative affect, $F(1, 124) = 0.01$, $p =$

.933, partial η^2 = .00005. That is participants in the depressed group who were instructed to

engage in emotional suppression did not have higher negative affect (as measured by the

PANAS) after the emotion regulation paradigm, compared to all other participants. Additionally, there was not a significant interaction between time (pre- to post-ERP) and condition (SIC vs VCC) on negative affect, $F(1, 124) = 1.39$, $p = .240$, partial $\eta^2 = .011$. Descriptive statistics are presented in Table 5.

Table 5. Mean (SD) Negative Affect by Time (pre- and post-ERP), Group (Depressed vs Nondepressed), and Condition (SIC vs VCC)

		Pre-ER Paradigm Mean (SD)	Post-ER Paradigm Mean (SD)
Non-Depressed	VCC *N=32*	23.78 (11.09)	25.71 (11.62)
	SIC *N=32*	22.40 (11.70)	25.75 (9.62)
Depressed	VCC *N=32*	31.34 (7.58)	31.34 (7.58)
	SIC *N=32*	31.31 (8.21)	32.50 (6.37)

Scores. Where a higher score reflects higher negative affect, and a lower score reflects lower negative affect.

An interaction effect trended toward significance between time (pre- to post-ERP) and

group (depressed vs non-depressed) on negative affect, $F(1, 124) = 3.34$, $p = .070$, partial $\eta^2 =$

.03, with a small to medium effect size. Next, post hoc paired-sample t-tests were conducted to

examine the interaction effect of time and group on negative affect by comparing mean scores of

negative affect for both groups before and after the emotion regulation paradigm. For the non-

depressed group, negative affect was higher after the emotion regulation paradigm (M=25.70,

SD= 10.58), $t(63) = - 3.39$, $p = <.001$, $d = .41$, compared to before (M=23.09, SD= 11.34). For

the depressed group, there were no significant changes between pre-emotion regulation paradigm

scores, (M=31.31, SD= 7.84) and post-emotion regulation paradigm scores, (M=31.92, SD=

7.39), $t(63) = -7.96$, $p = .215$, $d = .09$. Overall, these results indicate that negative affect scores

on the PANAS for nondepressed participants increased after the emotion regulation paradigm.

An interaction effect of group and time trended toward significance with participants in the

nondepressed group's negative affect scores being higher after the emotion regulation paradigm,

with a small to medium effect size. Descriptive statistics are presented in Table 6.

*Table 6. Mean (SD) Negative Affect score by Time (pre- and post-ERP) and Group (Depressed
vs Nondepressed)*

	Pre-ER Paradigm	Post-ER Paradigm		
	Mean (SD)	Mean (SD)	*t*	*d*
Non-Depressed N=64	23.09 (11.34)	25.7 (10.58)	- 3.39*	.41
Depressed N=64	31.31 (7.84)	31.92 (7.39)	-7.96	.09

Where an asterisk (*) signifies statistical significance (*p* = <.05)
Scores. Where a higher score reflects higher negative affect, and a lower score reflects lower
negative affect.

Other Analyses

Inter-rater Reliability

To assess the episodic specificity of prospections, participants wrote about three

imagined future events. These events were then coded by two independent raters. To establish

inter-rater reliability of the coding procedure, raters coded pilot data from 10 participants (30

prospections total). To minimize bias, raters were blind to the study conditions (i.e., raters were

not provided with any information about the experimental or control groups, and they were not

aware of the hypotheses of the study). We used Cohen's kappa to assess the agreement between

the two raters (Cohen, 1960). The results showed a high level of inter-rater reliability with a

Cohen's kappa of .84, which indicates a large effect size and a strong level of agreement between

the raters, suggesting that the coding procedure was reliable and consistent.

Valence and Arousal Ratings of OASIS Images Based on Previous Research

To ensure that the valence and arousal scores between our neutral lists were not

significantly different from one another we matched them based on valence and arousal scores

from previous studies (Kurdi et al., 2016). We did not find significant between-group differences

for valence, $F_{(1,59)} = .061$, $p=.941$ or arousal, $F_{(1,59)} = 1.405$, $p=.254$ meaning that our stimuli

were not significantly different regarding arousal and valence ratings. Descriptive statistics for

the valence and arousal of neutral pictures are presented in Table 8.

Table 7. Neutral Pictures Mean (SD) Valence and Arousal Ratings

Measures	List A $N=20$ Mean (SD)	List B $N=20$ Mean (SD)	List C $N=20$ Mean (SD)
Valence Rating	4.37 (.03)	4.37 (1.03)	4.37 (1.12)
Arousal Rating	3.20 (1.58)	2.93 (1.53)	3.41 (1.64)

Scores. Where a score approaching 1 reflects negative valence and a score approaching 7 reflects positive valence. For arousal ratings a score approaching 1 reflects less arousal felt by a participant while viewing the picture and a score approaching 7 reflects more arousal.

Negative lists were also matched for valence and arousal and did not show significant

between-group differences for valence $F(1,59)= .046, p=.955$ or arousal F $F(1,59)=.123,$

$p=.855$ meaning that our stimuli were equivalent regarding arousal and valence ratings.

Descriptive statistics for the valence and arousal of the negative pictures are presented in Table

8.

Table 8. Negative Mean (SD) Valence and Arousal Ratings

	List A N=20	List B N=20	List C N=20
Measures	Mean (SD)	Mean (SD)	Mean (SD)
Valence Rating	2.33 (1.11)	2.33 (1.21)	2.32 (1.14)
Arousal Rating	3.99 (1.84)	3.93 (1.84)	4.02 (1.87)

Scores. Where a score approaching 1 reflects negative valence and a score approaching 7 reflects positive valence. For arousal ratings a score approaching 1 reflects less arousal felt by a participant while viewing the picture and a score approaching 7 reflects more arousal.

Discussion

The aim of the present study was to elucidate the relationship between two transdiagnostic mechanisms of psychopathology: prospection (i.e., one's ability to imagine the future), and emotional suppression, a maladaptive emotion regulation (ER) strategy (MacLeod & Conway, 2005; Rasmussen et al., 2006ab; Seligman et al., 2006; Gross, 1998; Aldao & Nolen-Hoeksema, 2010). An unanswered question that our study hoped to address is whether faulty prospection leads to symptoms of depression or whether depression leads to faulty prospection. We aimed to answer this question by proposing that emotional suppression, a known underlying mechanism of depression interferes with the process of prospection in individuals with depression. Our hope was that this finding would provide clarity about the directionality of the relationship between prospection and depression. Specifically, we proposed that when individuals engage in emotional suppression it interferes with prospection, which might then contribute to the development of depressive symptoms. Findings such as these could help

develop more targeted treatments for depression and other disorders as both emotional

suppression and faulty prospection are implicated in disorders transdiagnostically.

For important reasons, depression has been a target for transdiagnostic research

examining underlying mechanisms of psychopathology. According to the World Health

Organization (WHO), depression is the most diagnosed disorder worldwide with high rates of

comorbid mental health diagnosis (e.g., studies have reported that up to 70% of individuals

diagnosed with depression also meet criteria for at least one other disorder; Zimmerman et al.,

2005). Additionally, depression is among the most debilitating disorders and has the potential of

resulting in suicide if left untreated; therefore, effective treatments are a primary target for

researchers and clinicians alike. Understanding the underlying mechanisms of depression is an

approach that can and has led to the development of more precise treatments and interventions

(Farichone et al., 2017; Cuijpers et al., 2016; Hallford et al., 2020b; Grunschel et al., 2016).

Therefore, from a research, clinical, and public health perspective, better understanding the

mechanisms underlying the development and maintenance of depression is critical.

Given the importance of depression in transdiagnostic research and to narrow the scope

of this study, we focused on the relationship between prospection and emotional suppression in a

depressed population. Below is an overview of our findings as well as a discussion of their

significance and key takeaways based on this study.

Our findings did not support our hypothesis that suppression would lead to worse

prospection in individuals with depression. However, these findings are important as they

suggest that faulty prospection and emotional suppression may be independent mechanisms

underlying symptoms of disorders transdiagnostically. Therefore, it may be important to target

them independently in treatments. Overall, our findings did replicate and further support the

extant literature that individuals with depressive symptoms generate less episodically specific prospections; therefore, episodic specificity is a fruitful target for both treatment and research examining underlying mechanisms that contribute to symptoms of depression and other forms of psychopathology (Williams et al., 2007; D'Argembeau & Van der Linden, 2012a; MacLeod et al, 2005; Robinson & Allow, 2003).

There are many explanations for our findings that depressed participants generated less episodically specific prospections than non-depressed participants and a variety of important clinical and research implications. Specifically, Seligman and Ropke's (2016) discussion of the "faulty prospection hypothesis" proposed a relationship between prospection and depression in that individuals with symptoms of depression are unable to imagine positive, episodically specific prospections, which interferes with motivation and goal pursuit. In turn, individuals with depression stop engaging in activities, which leads to low mood via interference with the reward circuitry in the brain and then further perpetuates the cycle of depression through inactivity (Joorman, 2006; MacLeod, 1996). In further support of this theory, imaging studies have shown differences in activity of key brain regions between individuals with depression compared to those without while generating prospection (e.g., hippocampus, ventromedial prefrontal cortex, and dorsolateral prefrontal cortex), suggesting that depression might interfere with one's ability to prospect at a neurological level (Hamilton et al., 2011; Addis et al., 2007; D'Argembeau et al., 2012a).

Our findings are important as they add further evidence in support of the theory that "faulty prospection" is implicated in depression suggesting that prospection and episodic specificity could be important targets for intervention (Seligman, 1990; Seligman et al., 2006 MaCleod et al. 1997; Holmes et al., 2008a; Morina et al., 2011; Beck et al., 2006). In fact, episodic specificity

training (EST) has become an area of increased interest among researchers and clinicians with

promising findings that EST leads to increased positive affect and decreases in symptoms of

depression (Hallford et al., 2020b; Grunschel et al., 2016). In further support of the

transdiagnostic nature and utility of targeting prospection/episodic specificity, EST has been

shown to benefit individuals with symptoms of other disorders, such as PTSD and generalized

anxiety disorder (Beck et al., 2017; Neshat-Doost et al., 2013).

There are several possible explanations for our findings that emotional suppression did not

lead to less episodically specific prospections in depressed or nondepressed participants: (1) the

emotional suppression induction was less effective than we had hoped, meaning participants did

not engage in emotional suppression following the induction; (2) individual differences in the

automatic selection and use of more adaptive emotion regulation strategies; (3) emotional

suppression and prospection are two distinct, independent mechanisms that are unrelated to one

another.

Regarding the effectiveness of our emotional suppression induction, it could be that our

studies novel online experimental paradigm made our induction less effective. While online

research has a variety of benefits, such as low cost and a large, diverse participant pool, it also

poses a variety of challenges (Casler et al., 2013; Buhrmester et al., 2011). For instance, studies

have shown that participants may be less engaged and more distracted while completing online

vs in-person studies, and while we tried to control for attention via our quality assurance

measures, we cannot rule this out as a possibility (Kim et al., 2019). Given the average amount

of time to complete our study (86minutes) it is possible that participants were distracted at

different points throughout the study, which could have led to disruptions in emotional

suppression. Additionally, participants may have misunderstood the suppression induction

instructions. Although we offered assistance in the experiment, we did not receive any requests via email, which could mean that the instructions were well understood by all participants, or it could be that reaching out via email was a barrier to asking for help. This would likely have been less of an issue in an in-person format.

Another possibility is that our participants did not engage in emotional suppression. When emotional suppression paradigms are completed in-person, researchers watch participants' faces to ensure that they are engaging in suppression, this is not possible with the online format. Another way to measure emotional suppression is via physiological measurements (e.g., heart rate), which again is more challenging to do through an online format, limiting our study.

Another consideration regarding the effectiveness of our emotional suppression induction is that of a floor effect. Specifically, participants in the depressed group had an average of two episodic details per prospection. It could be that our emotional suppression induction was not powerful enough to lead to reduced episodic specificity beyond depression alone. That is exposure to images from the OASIS caused enough distress/interfered with the generation of episodic details; therefore, the effects of our suppression induction were not captured. This could have been accounted for by adding a third group of participants who were not exposed to the OASIS images. Another possibility is that the administration of the positive and negative affect scale (PANAS) after viewing the images from the OASIS could have interfered with the effects of the emotional suppression induction.

Another explanation for our lack of findings is individual differences in the automatic selection and use of a more adaptive emotion regulation (ER) strategy (Tamir, 2016; Koval et al., 2015; Sheppes & Gross, 2011). While emotional suppression is implicated in depression and found to be commonly used by people with depressive symptoms, it is possible that our

participants automatically used other more adaptive ER strategies, such as cognitive reappraisal, to regulate their emotional experience during the emotional regulation paradigm. Cognitive reappraisal is a strategy in which people regulate their emotions by changing the way they think about different stimuli/situations (Gross, 1988; Gross & Thompson, 2007). For example, if one sees a negative image of a car accident, they may think to themselves, "help is coming, and everyone is okay." Cognitive reappraisal has been associated with greater ability to generate episodically specific prospections and has been shown to activate similar brain regions, such as the default mode network (DMN) (Buhle et al., 2014; D'Argembeau et al., 2010; McCrae et al., 2012). Therefore, the effects of our suppression induction may have been offset by our participants' use of more adaptive ER strategies, which had downstream effects on their ability to generate detailed prospections.

An important possibility for our study's lack of findings between emotional suppression and prospection is that emotional suppression does not affect one's ability to generate episodically specific prospections (i.e. these two transdiagnostic mechanisms are distinct and independent from one another). Therefore, it may be important to target them independently regarding research and treatments. To date there are only a few studies examining the relationship between prospection and emotional suppression; thus, our study aimed to address this gap in the literature by using a novel, online experimental paradigm to examine this relationship in a depressed population (D'Argembeau & Van der Linden, 2006a). Although our study did not produce the expected results, we believe that our hypothesis that emotional suppression interferes with prospection was based on strong practical and theoretical considerations. Given the transdiagnostic nature of faulty prospection and emotional suppression, we believe that is still valuable research. Due to the limitations of the online format discussed

above, we think that future in-person studies examining the relationship between prospection and emotional suppression are warranted.

Changes in Affect

We also hypothesized that emotional suppression would lead to less positive affect and greater negative affect for depressed participants. Yet, this hypothesis was not supported by the data. These findings were unexpected because emotion regulation literature shows that emotional suppression often leads to decreased positive affect and increased negative affect in addition to increased physiological activation (Gross, 1998; Gross & Levenson, 1993; Gross & Levenson, 1997).

Explanations for these findings mirror the discussion regarding a lack of relationship between emotional suppression and prospection in depressed participants, as explored above. Namely, it is possible that the emotional suppression induction was less effective than we had hoped, meaning participants did not engage in emotional suppression following the induction (due to various reasons, such as the online format, engagement, or distractibility). Additionally, it could that there were individual differences in the automatic selection and use of more adaptive emotion regulation strategies, which interfered with suppression.

Another possibility for our unsupported hypothesis is that emotional suppression did not influence participants' affect. While some studies have found that emotional suppression leads to decreased positive affect and increased negative affect, others have been unable to replicate these findings (Gross & John, 1998; Richards & Gross, 2000). Differences in these findings may be due to individual differences in the use of emotion regulation strategies (as discussed previously). Additionally, studies have found that in certain contexts, emotional suppression can be beneficial and while our emotion regulation paradigm does not necessarily fall into the

category of contexts where we would consider emotional suppression to be adaptive, we cannot

rule it out as a possibility (Bonanno & Keltner, 1997; Troy & Mauss, 2011).

While findings from our study did not support our hypotheses that emotional suppression

would lead to less positive affect and greater negative affect for depressed participants, we did

find that depressed participants had significantly lower positive affect and significantly higher

negative affect than non-depressed participants prior to the emotion regulation paradigm. These

findings are important as they support the premise of our study (i.e., that some participants

affective state was lower than others). Overall, the average scores for our groups based on

depressive symptomology were consistent with research comparing PANAS scores of depressed

and nondepressed individuals (Watson et al., 1988; Carver et al., 2008). Additionally, our

findings supported our hypothesis that the depressed group would have significantly lower

positive affect and significantly higher negative affect after the emotion regulation paradigm than

the nondepressed group.

An interesting finding of this study regarding between group differences and affect was

that viewing the images from the OASIS resulted in decreased positive affect for all participants;

however, only nondepressed participants experienced an increase in negative affect after viewing

the images. A probable explanation is that depressed participants experienced an emotional

dulling that made them less susceptible to experience increased negative emotions in response to

the images used in the emotion regulation paradigm (Judd et al., 1994; Rottenberg et al., 2005).

Limitations of Our Study and Future Directions

The limitations of our study must be acknowledged and addressed with suggestions for

future studies. As previously discussed, the online format of the study is a potential limitation. In

addition to issues with the effectiveness of the emotional suppression induction, distractibility,

and limitations in measurement (e.g., heart rate), the online format also has other limitations, such as sampling bias, data quality, and motivation of participants (Gosling et al., 2004). We believe that future studies should be conducted in person to assess the effectiveness of the emotional suppression induction, allow for additional physiological measurements, and control for other factors, such as distractibility.

Another limitation of our study was not having a true control group, which could limit the internal validity of the study. Given that all participants affect was modulated by viewing the images selected from the OASIS, it is possible that other factors contributed to our findings. Future studies might consider adding a group that engages in a filler task rather than viewing the images from the OASIS.

Additionally, our study did not assess for individual differences in the use of emotion regulation (ER) strategies. Given that emotion regulation is a process that people engage in habitually and often unconsciously, it is important to assess individual differences in strategy use. Future studies should include measurements of ER strategies, such as the emotion regulation questionnaire (ERQ; Gross & John, 2003), which assess the use of emotional suppression and cognitive reappraisal.

Finally, future studies might consider being more targeted with their sample. Specifically, our participants were divided into depressed and non-depressed groups based on a cut score of greater than 10 as measured by the PHQ-8. While this approach made since given the pilot nature of our study, future studies could divide groups by symptom severity (e.g., mild, moderate, severe) or they might consider using measures with greater clinical utility to assess symptoms of depression, such as the beck depression inventory (BDI-II; Beck et al., 1996).

Conclusions

While this study had several limitations it replicated findings that individuals with
depression have faulty prospection. While our hypothesis that emotional suppression would lead
to less episodically specific prospections in individuals with depression was unsupported this
study is still important. To our knowledge it is the first study using an experimental design to
explore the relationship between prospection, emotional suppression, and depression. This study
identified several areas of improvement for future research and while it is a preliminary
investigation, it offers promising avenues for future research on this topic.

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Appendix A

Screener Items: The following items were presented in the screener to qualify for the study. Items are presented in the order that they were shown to participants.

A1: Verification Items

1.) I am a human being.

     Maybe   Yes   No   Cannot say for sure   Definitely not   I don't know   Tigers

1.) I have flown over the Atlantic 30 times this year.

     Yes   No

A2: Demographic Questions

1. What is your age in years?

   0-17 years old

   18-64 years old

   65 + years old

2. How would you describe your gender?

   Male

   Female

   Non-binary/third gender

   Transgender male

   Transgender female

   Prefer not to say

   Other

3. Is English your first language?

Yes   No

A3: Health Screening Questions

Have you been diagnosed with the following conditions? If you are not sure please answer "no."

1. Anxiety, PTSD, obsessive compulsive disorder (OCD), schizophrenia, any personality

   disorder or a substance use disorder?

2. Have you experienced a head injury resulting in loss of consciousness for 30 minutes or

   more?

3. Have you been diagnosed with attention deficit disorder (ADD) or attention deficit

   hyperactivity disorder (ADHD)

4. Prader Willi Syndrome

5. Bells Palsy

6. Anemia/blood disease

7. High cholesterol

8. Heart attack/heart disease

9. Diabetes

10. Asthma

11. Thyroid Disease

12. Arthritis

13. Obesity

14. Migraines

15. Bells Palsy

16. Cystic Fibrosis

A4: Patient Health Questionnaire 8-Item (PHQ-8)

Over the last 2 weeks how often have you been bothered by any of the following problems?

0=not at all

1=several days

2=more than half the days

3=nearly every day

1. Little interest or pleasure in doing things

2. Feeling down, depressed, or hopeless

3. Trouble falling or staying asleep, or sleeping too much

4. Feeling tired or having little energy

5. Poor appetite or overeating

6. Feeling bad about yourself—or that you are a failure or have let yourself or your family
   down

7. Trouble concentrating on things, such as reading the newspaper or watching television

8. Moving or speaking so slowly that other people could have noticed? Or so fidgety or
   restless that you have been moving a lot more than usual?

Appendix B

Positive and Negative Affect Schedule (PANAS)

Indicate the extent you have felt this way over the past week (participants rated each item on
from 1 "not at all" to 5 "extremely")

1. Interested

2. Distressed

3. Excited

4. Upset

5. Strong

6. Guilty

7. Scared

8. Hostile

9. Enthusiastic

10. Proud

11. Irritable

12. Alert

13. Ashamed

14. Inspired

15. Nervous

16. Determined

17. Attentive

18. Jittery

19. Active

20. Afraid

Appendix C

C1: View Control Condition (VCC) Instructions

1. Now you will be shown 120 images with the word "view" above each.

    The images will disappear after **7 seconds**. Please look at each image for the entire time it

    is on the screen.

    Some images may be very touching, and some may be distressing.

    Please, allow yourself to feel your inner emotions and show your feelings externally

    when you see an emotional picture (e.g., as a facial expression). Do not try to alter your

    natural emotional reaction to these images.

2. After viewing each image, you will be asked to rate the "valence" of the image, meaning

    how positive or negative the image was and the "arousal" (or intensity) meaning the level

    of activation you felt while viewing the image: very low arousal=calm, very high

    arousal=excited.

C2: Suppression Induction Condition (SIC) Instructions

1. Now you will be shown 120 images with the word "suppress" above each.

    The images will disappear after **7 seconds**. Please look at each image for the entire time it

    is on the screen.

    Some images may be very touching, and some may be distressing.

    Read the instructions below:

    Suppression.

    Please try to **suppress your inner emotions. Meaning, do not express how you truly**

    feel.

    While viewing the images **stay as calm as possible.** Imagine you have an inner shield,

which easily reflects your emotions. You should **try not to show any emotions**

externally.

Your facial expression should be absolutely calm during picture viewing (poker

face).

For the success of this study, it is essential that you really follow the instructions by

trying to suppress your emotions during picture viewing. Please do not be surprised that it

will be more difficult to suppress your emotions for some of the pictures.

2. **Rate your valence and arousal.**

After viewing each image you will be asked to rate the "**valence**" of the image, meaning

how positive or negative the image is and the "**arousal**" (or intensity) meaning the level

of activation you felt while viewing the image: very low arousal=calm, very high

arousal=excited.

Appendix D

Prospection instructions.

Next, you will write about **different** specific events that could happen in the near future (i.e.,

within the next week).

You will be shown three different cue words, one at a time. You will use each word as

inspiration to imagine a future event. The event **does not** have to be related to the cue word but

could simply be inspired by it.

You will write about each imagined event in as much detail as possible for **3 minutes.**

- Imagined events should be things that will happen or could realistically happen.

- They must be events you could be personally involved in.

- The events must occur in a particular place that is familiar to you and within the space of

 a day.

- Please imagine as many details as you can about these possible future events, such as who will be there, what might happen, how you would feel, and what you might think.

Here is an example:

Cue word: Pleasure

On Friday I will go hiking which is an activity that brings me great pleasure. I will prepare my pack with tasty food and lots of water, extra layers of clothes, a camera, and my journal. I plan to hike in the upper Rattlesnake. I imagine seeing lots of wildflowers, deer, and amazing views. I hope that it is sunny out, because I hate being cold, and it has been raining a lot this Spring.

Appendix E

DEBRIEFING STATEMENT

Thank you for participating in this study. Throughout the course of this experiment, you may have had questions regarding the nature or purpose of this study. If you still have these questions, the experimenter will be glad to answer them for you at this time. The purpose of this study was to investigate different emotion regulation strategies and their respective relationship with how well you are able to imagine future events.

Your answers to these questions, as well as your performance on the computer measures, will be kept completely confidential.

Although some amount of discomfort is normal, if you experienced a significant amount of discomfort during the course of the experiment, you can reach out to the research Chelsey Maxson, MA via email at Chelsey.maxson@umontana.edu or the faculty supervisor Dr. Stuart hall at stuart.hall@umontana.edu and they can address your concerns. If you need to speak to someone immediately you may contact

National Alliance on Mental Illness (NAMI)

The NAMI HelpLine can be reached Monday through Friday, 10 a.m. – 10 p.m., ET.

1-800-950-NAMI (6264)

 info@nami.org

OR reach out to the crisis line by texting 741741

SAMSHA

SAMHSA's National Helpline, 1-800-662-HELP (4357) (also known as the Treatment Referral

Routing Service)

 or TTY: 1-800-487-4889 is a confidential, free, 24-hour-a-day, 365-day-a-year, information

service.

Also visit the online treatment locator, or send your zip code via text

message: 435748 (HELP4U) to find help near you.

I**MPORTANT:**

We request that you not discuss the details of this experiment with anyone who may be a

future participant in the study. Thank you for your cooperation.