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Rumination and Positive Autobiographical Memories in Depression: An Examination of the Undermining Effect of Maladaptive Emotion Regulation on Adaptive Emotion Regulation

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RUMINATION AND POSITIVE AUTOBIOGRAPHICAL MEMORIES IN

DEPRESSION: AN EXAMINATION OF THE UNDERMINING EFFECT OF

MALADAPTIVE EMOTION REGULATION ON ADAPTIVE EMOTION

REGULATION

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RUMINATION AND POSITIVE AUTOBIOGRAPHICAL MEMORIES IN DEPRESSION: AN EXAMINATION OF THE UNDERMINING EFFECT OF MALADAPTIVE EMOTION REGULATION ON ADAPTIVE EMOTION REGULATION

PRANAV R. BOLLA

ABSTRACT

Major Depressive Disorder (MDD) is a highly prevalent disorder of a recurrent nature that enacts a high burden across many domains. MDD has been conceptualized as a disorder of emotion regulation deficits in the frequent use of maladaptive ER responses as opposed to adaptive ER responses. While adaptive ER responses have been generally found to be efficacious in reducing distress within laboratory settings, they often fail to predict depression symptoms, do not differentiate those at high- from low-risk for MDD, and do not prognosticate risk for new MDD episodes. Given the preponderance of evidence suggesting a reliance on maladaptive ER among depressed persons and those at risk for the disorder, it is feasible maladaptive response deployment precedes and undermines the effectiveness of adaptive ER responses. The present study sought to test this possibility in a sample of 59 adults who following a negative mood induction either deployed an adaptive ER response (recalling a Positive Autobiographical Memory, PAM) or maladaptive ER (engaging in rumination) that preceded PAM. Contrary to expectation, neither rumination, participants' depression levels, nor their interaction undermines PAM's mood repair effects. An interaction between ER response sequence and depression levels was observed regarding the negative affect endorsed post-PAM. Moderation analysis revealed that those who immediately recalled PAM following mood

induction endorsed higher negative affect compared to those who ruminated prior to

PAM.

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INTRODUCTION

Major Depressive Disorder (MDD) is characterized by low mood and/or

anhedonia (American Psychological Association (APA), 2013). These symptoms are

often accompanied by weight or appetite fluctuations independent of dieting, insomnia or

hypersomnia, changes in psychomotor activity, loss of energy or fatigue, feelings of

worthlessness or inappropriate guilt, diminished ability to think or concentrate, and

recurrent thoughts of one's own death alongside suicidal ideation, planning, or attempts

(APA, 2013). The disorder is found to be globally prevalent, affecting roughly 4.4% of

the global population in 2015 (World Health Organization (WHO), 2017), with a 12-

month prevalence of roughly 3% (Ferrari et al., 2013). Within the United States MDD is

found to be highly prevalent as well, with the lifetime prevalence and 12-month

prevalence of MDD found to be approximately 20.2% and 10.4% respectively (Hasin et

al., 2018).

MDD is found to enact burden upon those affected by the disorder. Globally,

MDD was found to be the most common reported mental disorder associated with days

out of role, as well as the fourth leading cause of role impairment behind pain disorders,

headache/migraines, and cardiovascular disease (Alonso et al., 2011). Globally MDD is

the single largest contributor to non-fatal health loss compared to other mental disorders in terms of 'years lived with disability' (WHO, 2017). Similarly, within the United States, MDD was found to be one of the more debilitating mental disorders, causing moderate to severe interference in work, home, social, and interpersonal relationships (Druss et al., 2008). It is not surprising then that MDD incurs significant economic burden. Greenberg and colleagues (2014) found that between 2005 and 2010 there was overall an increase in economic burden associated with individuals with MDD, from 173.2 billion to 210.5 billion dollars (21.5% increase). Of the 2010 estimates, direct costs of 98.9 billion were primarily attributed to medical services (70.7 billion); outpatient (38.2 billion) and pharmaceutical (28.1 billion) services being the largest contributors of medical service costs. Regarding 2010 workplaces costs (102 billion), reduced work productivity accounted for roughly 3 quarters of costs (78.7 billion) over missed days at work (23.3 billion) (Greenberg et al., 2014).

Given the high burden enacted by the disorder, it becomes concerning when considering the course, chronicity, and outcomes of MDD. The Netherlands Mental Health Survey and Incidence Study determined the median duration of MDD episodes to about 3 months, with roughly 50% of individuals recovering after that period of time and 73% after a year; only 20% did not remit after 2 years (Spijker et al., 2002). Regarding recurrent episodes of MDD, Solomon et al. (1997) determined recurrent episodes had an average length of 20 weeks from a cohort of 258 depressed individuals over a 10-year longitudinal study. Recovery rates of the first 5 recurrent episodes of this sample were found to be 90%, 88%, 90%, 90%, and 90% respectively (Solomon et al., 1997). On a broader scale, Ten Have et al. (2018) found that the cumulative recurrence rate to be

4.3%, 13.4%, and 27.1% at 5, 10, and 20 years respectively among remitted individuals. Keller et al. (1992) determined that longer durations of depressive episodes in addition to the severity of symptoms reflected diminishing likelihood of remission, with the diminishing probability of remission increasing after a 12-month episode; further, individuals who experienced protracted episodes tend to recover but present with symptom levels akin to Persistent Depressive Disorder or subthreshold symptoms (Keller et al., 1992).

When looking at the burden and recurrent nature of MDD, it is also important to examine the prevalence and impact of subthreshold depressive symptoms. Wittayanukorn, Qian, & Hansen, (2013) found that within the United States the prevalence of depressive symptoms in 2010 was found to be 25.66%, an increase from 20.92% in 2005. Subthreshold depressive symptoms are also found to be burdensome as well. Judd, Paulus, Wells, and Rapaport (1996) found that while not to the same degree as those at criteria of MDD, those with significant depressive symptoms compared to non-depressed individuals endorsed higher rates of dysfunction in the form of high social irritability, high household and financial strain, and physical limitations in the form of more days in bed, restricted activity, and limitation in physical and job functioning. The importance of subsyndromal depressive symptoms is further highlighted when considering its course leading to full criteria MDD episodes. Horwath and colleagues (1992) found that those presenting with below threshold depressive symptoms were 4.4 times likely to develop a first onset depressive episode with a 12-month period compared to non-depressed individuals, with more that 50% of first onset MDD episodes predicted by subthreshold depressive symptom. Regarding the recurrence of MDD episodes,

residual subthreshold depressive symptoms were associated with rapid recurrence of the next MDD episode in remitted individuals with depression histories, 3 times more so that non-depressed remitted individuals (Judd et al., 1998).

Given the burden, both economical and functional, and recurrent nature of MDD alongside the impact and consequences of subclinical depressive symptoms alone, a need to identify the mechanisms behind MDD and its symptoms exists.

1.1 Depression and Emotion Regulation

A large body of empirical evidence identifies emotion regulation (ER) as a potential mechanism of depression. Emotion regulation refers to various responses and strategies that are automatic and purposeful, conscious or unconscious, that alter the timing, intensity, chronicity, and morphology of both positive and negative emotional experiences (Parrott, 1993; Thompson, 1994; Gross, 1998a; Rottenberg & Gross, 2003; Mauss, Bunge, & Gross, 2007; Aldao, Nolen-Hoeksema, & Schweizer, 2010). Typically, these responses are deployed in response to negative stimuli as an attempt to ameliorate dysphoria (Gross, 1998b; Rottenberg & Gross, 2003). ER responses consist of behavioral, interpersonal, and cognitive domains and have been identified as a transdiagnostic factor for psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010).

ER is categorized as either adaptive or maladaptive. Adaptive ER responses refer to those that minimize or decrease the intensity and duration of emotional distress brought on by stressful stimuli (Gross, 1998b) or up-regulate and maintain positive emotions (Parrott, 1993). In contrast maladaptive ER refers to ineffective attempts to reduce distress and dysphoria which may lead to some success but paradoxically result in

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sustained and exacerbated negative long-term outcomes (Kovacs, Rottenberg, & George, 2009; Kovacs, Yaroslavsky, & Rottenberg et al., 2016). Teasdale (1988) proposes that individuals who become clinically depressed differ from those experiencing a period of sadness not because of the initial experience of dysphoric mood states, but from the responses to it or rather that engagement in maladaptive ER responses over adaptive responses during depressive episodes often determined the severity of symptoms and the length of the depressive episodes themselves. Additionally, this higher use of maladaptive ER responses has been found to not only be a hallmark of actively depressed individuals but is related to remitted individuals, contributing to relapse (Teasdale, 1988). Therefore, examining the individual differences in ER responses may provide insight into the mechanisms of depression.

1.2 Maladaptive ER

The literature identifies maladaptive ER as a prominent risk factor and predictor of depressive outcomes, so much so MDD can be described as a disorder of maladaptive ER (Campbell-Sills & Barlow, 2007; Ehrin, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010). Numerous empirical findings point to higher use of maladaptive ER responses and strategies being associated with depressive severity. For example, Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross (2010) experimentally demonstrated via sad mood induction that remitted depressed undergraduates differed in spontaneous ER responses; remitted depressed individuals engaged in use of emotional suppression, or active inhibition of emotional processing (Gross, 1998b), more so than never depressed controls. Further, high use of spontaneous emotional suppression was found to lead to

higher levels of negative affect in remitted individuals but not for healthy controls (Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010).

Maladaptive mood repair responses, or ER responses aimed at the reduction of negative affect (Josephson, Singer, & Salovey, 1996), are also found to predict depression course: In a longitudinal study of mood repair responses of healthy controls and both actively depressed and remitted probands with childhood onset depression, probands endorsed higher maladaptive mood repair responses to negative mood states than adaptive responses, with maladaptive responses being endorsed more by actively depressed individuals over and above both group. These maladaptive responses were found to predict depressive outcomes in terms of symptoms and episodes for both remitted and actively depressed probands (Kovacs, Rottenberg, and George, 2009). Given the positive associations between ER and depression outcomes and symptoms, further examination of maladaptive ER is needed in order to understand the mechanisms of depression. Further, the predictive nature of maladaptive responses on depression outcomes was also found in a group adolescent probands (Kovacs, Yaroslavsky, & Rottenberg et al., 2016).

1.3 Adaptive ER

In contrast, adaptive ER responses and strategies in turn have been show as effective means of combating depression, shown to provide protective factors and promote resiliency against dysphoric mood states and stress that are associated with depression (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Troy & Mauss, 2011). As Teasdale (1988) proposed that the difference between never-depressed individuals and depressed individuals lies in their emotional response to life stress, use of adaptive ER

begets positive outcomes. For example, Troy, Wilhelm, Shallcross, & Mauss (2010) demonstrated in a sample of community dwelling adult women that the ability to use adaptive ER in the form of cognitive reappraisal, or reframing an event in order to change one's emotional response to it (Gross, 1998a), evidenced lower endorsement of depressive symptoms compared to those who are unable to among high stress individuals.

Empirically, research points to the efficacy of the cultivation of various adaptive ER strategies such as acceptance within treatment interventions for improved depressive outcomes as it is a core determinate of treatment outcomes of depression (Fehlinger, Stupenhorst, Stenzel, & Rief, 2013). Radkovsky, McArdle, Bockting, & Berking (2014) found that successful adaptive ER skills such as acceptance and modification of psychiatric inpatients were associated with lower depressive symptom severity; more over, increases of the application of adaptive ER strategies during treatment were associated with changes in depressive symptom severity. Berking, Wirtz, Svaldi, & Hofmann (2013) similarly found successful application of various adaptive ER responses negatively predicted depressive symptom severity over a 5 year period. It is not surprising then that many different empirically based treatments for depression such as Cognitive Behavioral Therapy (Beck, 1964), Emotion Focus Therapy (Greenberg & Watson, 2006), and Emotion Regulation Therapy (Mennin & Fresco, 2014) focus not only on the cultivation of adaptive ER responses but the extinction of maladaptive ER tendencies as a goal of treatment.

Despite the wealth of literature on ER, there is still much that needs to be explored when looking at depression. A meta-analysis done by Aldao, Nolen-Hoeksema, & Schweizer, (2010) determined while adaptive ER strategies such as reappraisal are

shown to have a negative association with depression, the relationship between maladaptive ER strategies such as suppression to depression were stronger and more robust comparatively. Further, within the literature there are some inconsistencies on the predictive value of various adaptive ER responses regarding depression. For example, an experimental examination of instructed use of emotional acceptance, an adaptive ER response, and emotional suppression of a clinical group composed of anxious and depressed individuals during a sad mood induction, found that suppression lead to negative outcomes compared to those who were instructed to accept their emotional states (Campbell-Sills, Barlow, Brown, & Hofmann, 2006). However, when using the same study design by Cambell-Silis et al. (2006) in a sample of depressed only individuals Liverant, Brown, Barlow & Roemer (2008) paradoxically found that instructed emotional acceptance evidenced higher negative affect compared to instructed suppression. Given the efficacy of adaptive ER evidenced by the literature, a further examination of adaptive ER is needed to understand where these inconstancies arise.

1.4 Positive Autobiographical Memories: An Adaptive ER Response

One adaptive ER response that has mixed findings related to outcomes in depression is use of positive autobiographical memories (PAM). PAM refers to the recall of positively valanced episodic events (Roediger & Marsh, 2003). Recall of PAM has been found to be efficacious in repairing one's mood state among healthy and to some extent depressed individuals (Josephson et al., 1996), however it is less frequently used in association with depression as they are found to be less likely to engage in thoughts about happy feelings (Kovacs et al., 2009).

One reasoning for this reduced tendency to use PAM as an adaptive ER response among depressed individuals is due to the difficulties in retrieval and processing of mood incongruent information in favor of memories that are congruent with one's mood (Bower, 1981; Blaney, 1986). Indeed, the literature points to the idea that memories recalled often mirror the mood state an individual is currently in, experimentally demonstrated by positive mood induction promoting generation of more happy memories and conversely more negative memories due to negative mood induction (Snyder & White, 1982; Blaney, 1986; Drace, 2013). Bower (1981) proposed this phenomenon within an associative networking theory of memory. Bower (1981) proposes that emotions within memory networks form units composed of valence relevant information; these emotional units become activated by similar emotional information which in turn causes mood congruent thoughts and memories to be readily accessible (Bower, 1981). Given that depression is effectively prolonged sad mood, it is not surprising that access to mood incongruent memories such as PAM is impaired (Lemogne et al., 2005) and when retrieved tends to be less detailed (Werner-Seidler & Moulds, 2011).

Researchers have shown that while healthy individuals are able to ameliorate negative affect with success by instructed recalling of PAM, depressed individuals exhibit mixed results. For example, Joormann & Siemer (2004) found that after negative mood induction, depressed individuals did not benefit from recall of PAM but rather use of distraction whereas non-depressed individuals benefit from both adaptive ER responses. Similar results were replicated among a group of formally depressed individuals and currently depressed individuals compared to non-depressed individuals, with the additional effect of worsening negative affect for among currently depressed

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individuals (Joormann, Siemer, and Gotlib, 2007). These affective outcomes as a result of ineffective use of PAM to repair mood is concerning as in addition to the affective consequences associated with depression, affect alongside mood state is found to play a role in the generation of mood congruent memories, following in line with the associative networking theory (Drace, 2013). Further, these finding regarding the ineffective use of PAM to repair one's mood was not only found within adults but within depressed adolescent probands as well (Kovacs, Yaroslavsky, Rottenberg et al., 2015). However, other research demonstrates depressed individuals being able to successfully use PAM to repair distress. Josephson and colleagues (1996) demonstrated for example that while depression was associated with consecutive generation of sad memories after not only sad mood induction but neutral mood induction; however, a portion of depressed individual recalled positive memories after sad memory recall, with the motivation to repair their mood.

Werner-Seidler and Moulds (2012) also demonstrated depressed individuals successfully repairing their mood via PAM. Actively and remitted probands incurred either a sad or neutral mood induction then were instructed to recall a positive memory from their years in high school via two different processing modes prompts (Watkins, Moberly, and Moulds, 2008): one that focused on more concrete processing asking them to "play the memory scene over in your head like you are replaying a movie of how the event unfolded" and a more abstract prompt to consider the "causes, meanings, and consequences of what happened". Those that were given the concrete prompt were able to successfully engage in PAM recall to repair their moods as apposed to those who received the abstract prompt. Most notably, Werner-Seidler and Moulds (2012)

highlighted that abstract processing of PAM is a similar cognitive process of a maladaptive ER response: rumination.

1.5 Rumination: A Maladaptive ER Response

Rumination is a maladaptive ER response that has been extensively researched and associated with depression. Rumination refers to an individual's perseverative inward focus on their emotional state and the antecedent situations surrounding it (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Like other maladaptive ER responses, rumination is engaged, either passively or actively, as an attempt to ameliorate distress but results in negative information to be cognitively revisited, causing increase and maintenance of the negative mood state (Treynor, Gonzalaz, & Nolen-Hoeksema, 2003; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Joormann & Stanton, 2016). With respect to depression, rumination is a response style involving focusing on one's depressive symptoms in addition to the implications of their depression, both the cause and consequences of their depressive state (Nolen-Hoeksema, 1991). Indeed, while rumination has been robustly identified as a transdiagnostic factor of psychopathology, rumination has been extensively linked to depression and considered to be a hallmark of the disorder (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Joormann & Stanton, 2016). Rumination can be further operationalized in two forms: reflection and brooding (Treynor, Gonzalaz, & Nolen-Hoeksema, 2003). While reflection refers more so to adaptive revisiting of distressing content as a means to facilitate problem solving, brooding follows maladaptive perseverative revisiting of said content.

Rumination has been linked to the course of depressive mood states and negative affect. For example, Ciesla & Roberts (2007), experimentally demonstrated after a sad

mood induction task, spontaneous rumination was linked to higher negative affect;

further, additional examination showed that rumination predicted sustained and

maintained negative affect over time during a non-task interval after the sad mood

induction task (Ciesla & Roberts, 2007). Nolen-Hoeksema and Morrow (1993)

experimentally examined the effects of an instructed rumination task versus an instructed

distraction task in a sample of health controls and individuals with elevated depressive

symptoms, finding that depressed individuals in the rumination condition endorsed

worsen depressed mood. Rumination has also been implicated as a risk factor for

depressive episodes. Just & Alloy (1997), found that dispositional tendencies to

rumination predicted the likelihood of non-depressed individuals of developing a

depressive episode during an 18-month follow up; further, trait rumination also predicted

the severity of the depressive episode of both those who developed a depressive episode

and those actively at criteria for MDD during said 18-month period. Similar findings

were found by Nolen-Hoeksema, Morrow, and Fredrickson, (1993), evidenced by an

examination of seventy-nine undergraduates who kept records of the occurrence of

negative moods and their responses to those mood state for a period of 30 days; those

who engaged in more ruminative responses had their depressed mood prolonged

independent of their initial severity.

Yoon & Joormann (2010) also explored experimentally sequential effects of ER

strategies such as rumination's potential to undermine adaptive ER responses and vice

versa. Depressed individual completed a sad mood induction and then engaged in

rumination or distraction at two different time points, after which they completed a

problem-solving task. With regards to measured negative affect, those who ruminated

then distracted evidenced better affective recovery compared to those who distracted first then ruminated. However, there remains a dearth of studies examining sequential effects of ER strategies within in the laboratory.

1.6 Rumination and the Attention Disengagement Hypothesis

Koster, De Lissnyder, Derakhshan, & Raedt (2011) point to the impairment of higher order information-processing impacting the tendency for depressed individuals to ruminate referred to as the attention disengagement hypothesis. Koster et al. (2011) proposes that the tendency to ruminate lies in an individual's difficulty to disengage attention from negative thoughts which leads to the perseverative brooding characteristics of depressed individuals. When faced with stressors that cues self-critical thoughts, these elicit high cognitive conflict within the individual which leads the individual to disengage their attention from these mood-congruent thoughts in order to either engage in problem-solving related to the stressor or ER in order to ameliorate this distress in absence of a solution; however should the individual be unable to disengage from mood congruent thoughts, the continual persistent negative thoughts exacerbates this conflict, mounting in higher generation of negative affect which leads to increased depressive outcomes (Koster et al., 2011).

In line with Koster et al., (2011)'s hypothesis, researchers have established associations with ruminative tendencies with factors of attentional control such as working memory and cognitive inhibition. Joormann & Gotlib (2008) demonstrated that deficiencies in removing irrelevant negative emotional information from working memory via a modified Sternberg Task (see Oberauer, 2005) amongst depressed and non-depressed individuals determined that rumination was associated with difficulties in

updating working memory among depressed individuals, with these effects maintained even after depressive symptoms were controlled for. Similar conclusions were drawn when examining depressed and non-depressed individuals' ability to reverse or maintain emotional or neutral words in working memory, finding that depressed participants had more difficulties sorting negatively valanced words, with trait rumination predicting this difficulty (Joormann, Levens, & Gotlib, 2011). Further, while depressive symptoms in general were not related to deficiencies in internal shifting in working memory, De Lissnyder, Koster, & Raedt (2011) found that trait rumination was related to shifting impairments in relation to negative valanced emotional faces in a modified Internal Shifting Task (see Chambers, Lo, & Allen, 2008) within depressed individuals. It is not surprising then that rumination is related to perseverative behaviors and cognitive inflexibility, with dispositional ruminators making more perseverative errors on the Wisconsin Card Sorting Test independent of depressive symptoms than non-ruminators (Davis & Nolen-Hoeksema, 2000). It is worth noting that these impairment in cognitive process were independent of the participant's depressive symptoms, depression itself is associated with cognitive inhibition and working memory impairment (Joormann, Yoon, & Zetsche, 2007; Goheir et al., 2009; Joormann, 2010), further predisposing depressed individuals to rumination.

1.7 Rumination and PAM: Future Considerations for Research

Given the literature regarding deficits in cognitive inhibition and working memory, difficulties in attentional control, and favoring of mood congruent thoughts and memories amongst depressed individuals, it appears that rumination responses may undermine successful recall of PAM in order to ameliorate distress in depressed

individuals. At it's core, ruminative thinking can be viewed as perseverative mood congruent thoughts which includes mood congruent memories. It is not surprising then, depressed individuals who are instructed to ruminate after negative mood induction tend to recall mood congruent memories (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998). Thus a further examination of associations between rumination and PAM with regards to depression is warranted.

However, some considerations must be in mind when experimentally exploring the relationship between PAM and rumination. Werner-Seidler and Moulds (2012) suggested that Joormann et al. (2007)'s findings of depressed individual's mood worsening following attempts to repair mood via PAM lies in those individuals recalling PAM using abstract processing, which is akin to ruminative thinking, versus using more concrete processing modes. Seminal models of rumination propose that a component of rumination lies in comparisons of an individual's mood state and ideal state, with discrepancy between them generating dysphoria (Martin & Tesser, 1996). Following this, if depressed individuals attempt to use PAM to regulate after negative mood induction, this would highlight the difference in mood between an episodic memory in which they were happy versus their current negative mood state (Werner-Seidler and Moulds, 2012). Further, following Koster's et al. (2011) hypothesis of impaired attention disengagement from such cognitive thoughts would cause focus on these negative thoughts, leading to rumination and subsequent worsen mood outcomes. In other words, depressed individuals may engage in PAM but the end result leads them to ruminate on more mood-congruent thoughts related to the memory, worsening their mood instead of repairing it. Abstract processing of memory would facilitate this process as it tends to lead to "why" questions

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where as concrete processing would attenuate this effect as it removes the focus on such comparisons in favor of the sequential elements of a memory (i.e. what happened first, second, third, etc…) (Werner-Seidler and Moulds, 2012). Therefore, future empirical examinations should consider the means by which depressed individuals are instructed to recall PAM.

While Yoon & Joormann (2010) examined sequential effects regarding instructed engagement of rumination in relation to other adaptive ER strategies such as distraction, this is the only study to this date that examine such effects with rumination. Further, sequential effects of different ER responses undermining other responses was not observed. Given the literature on mood congruent memory recall, deficits in working memory and cognitive inhibition, and individual differences as a function of depression, an examination of instructed rumination on PAM would be a prudent means to further the literature between the sequential interaction of maladaptive ER upon adaptive ER, providing a framework by which future research can explore.

1.8 Current Study Aims

The present study aimed to test the sequential effects of maladaptive ER undermining attempts to repair mood via adaptive ER, using rumination and PAM test these sequential effects. First, I examined the effectiveness of using PAM to repair one's mood directly after a negative mood induction and after ruminating about said mood induction. Second, I examined the degree to which depressive symptoms interact with use of both ER strategies. Given that engagement of rumination and PAM makes use of the same cognitive resources, examination of possible sequential effects of rumination may provide insight into why depressed individuals fail to repair their moods via PAM recall.

Further, this study aimed to provide a new framework into examining the regulatory effects of PAM experimentally. This study also aimed to further highlight the negative consequences of rumination, not only its effects upon depression and negative affective outcomes but attempts to cope with said outcomes. Lastly, this study will add to the small literature base examining the undermining sequential effects of maladaptive ER and adaptive ER.

Hypotheses 1. The effect of engaging in recall of a positive autobiographical memory after recall of a stressful memory will be undermined by engaging in an instructed rumination task.

Hypotheses 2. This effect will be more pronounced for individuals with elevated depressive symptoms.

CHAPTER II

METHODS

2.1 Participants

Fifty-eight community dwelling adults from the surrounding Cleveland area were recruited for participation in the study. Seven (N = 7) were excluded from the study based on a manipulation check described in the general analysis. Fifty-one individuals consisted as the final sample for analysis. The age of participants ranged from 19-66 (M = 32.18, SD = 13.13), with 47% of the sample consisting of female participants. Participants were acquired from a larger follow up study, from which measures were acquired. Participants received monetary compensation of $45 for participation in the study.

2.2 Measures

Demographic questionnaire. A nine-item measure that gathers participants' age, sex, race, current year in school, household income level, country of origin, number of year/generations their family has been in the U.S., their relationship status, sexual orientation, the gender of their current/last romantic partners. Only information regarding age and sex were utilized for analysis.

Center of Epidemiological Studies Depression Scale (CES-D). The CES-D is a 20-item self-report scale that is used to assess depression symptoms in community

dwelling adults (Radloff, 1977). The CES-D measures major facets of depression such as depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor disturbance, appetite disturbances, and sleep disturbance via responses such as "My sleep was restless" and "I felt sad" as well as reverse coded items such as "I was happy" and "I felt hopeful about the future" (Radloff, 1977). Items are rated via a 4-point Likert scale indicating how often they experienced said item in the past week, from 0 (*Rarely or None of the Time - Less than 1 day*) to 3 (*Most or All of the Time 5-7 days*) (Radloff, 1977). The CES-D has been shown to be a reliable measure of depression and evidences good internal consistency ($\alpha > .85$) across studies involving adults (Hann, Winter, & Jacobsen, 1999; Radloff, 1977). A similar level of internal consistency was reflected within this sample as well ($\alpha > .93$).

State Positive and Negative Affect Ratings. State Positive and Negative Affect (NA and PA) will be measured via items drawn from the Positive and Negative Affect Schedule (Watson, Clark, & Tellgen, 1988). PA will be measured via items such as joyful and happy while NA will be measured via items such as sad and upset. Participants will use a 10-point Likert scale to respond to prompts such as "How happy do you feel right now?" before both before and after a negative mood induction task and each ER task (see *Procedures*). State NA is composed of the aggregate of all NA items and PA reflects the aggregate of all PA items.

2.3 Procedure

Data used for this study was drawn from a larger project examining internalizing disorders, ER, and psychophysiology of community dwelling adults followed up from a previous study examining the same constructs. This larger project is composed of a

laboratory study and a out of lab portion. Only data from the laboratory study was be used.

After receiving informed consent, participants completed self-report surveys measuring their level of depressive symptoms (CES-D). Afterwards, participants completed the University of California Life Stress Interview (UCLA) (Hammen, 1997) of which only the data from the episodic stress interview will be used in this study. The UCLA probes for episodic stressful events occurring within the past 3 months, having the participant give information about the event and the consequences of the event. While the UCLA only assess for stressful or negative episodic events, similar probes were used to acquire positively valanced event and neutral (i.e. non-valance) events. Short titles were created in order to help prime the participant as to which episodic life event they will be discussing in the following experimental protocol described in procedures. When generating life events, participants were asked to rate how negative, positive, and how vivid the event was on a 1 to 10 Likert scale, with 1 being the least characteristic and 10 being most characteristic. Of the events obtained from UCLA episodic interview, only events that were vivid and determined to be valance-congruent were used in the experimental protocol. Table 1 depicts the means and standard deviations of negative, positive, and vivid ratings for each event types. Participants were then interviewed to establish the presence of depression histories. Thirty-nine individuals (N = 39) evidenced depressive histories and nineteen (N = 19) evidenced no depression history.

Afterwards, participants completed an experimental protocol which that included, among other tasks, a neutral autobiographical memory (NAM) verbal recall task, a stressful autobiographical memory (SAM) verbal recall mood induction task, a PAM

verbal recall task, and instructed rumination dwelling task. Participants will be randomly assigned into two protocol versions: one version involves recounting the PAM after the SAM task (PAM protocol) while the other will have participants complete the dwelling task after the SAM task then the PAM task afterwards (Dwell protocol).

For the dwelling task, participants were instructed to ruminate about the content of the SAM for 140 seconds, with prompts to guide the participant to "*think about what made this event negative*" and "*think about the cause of the event*". These instructions follow prompts that promote more abstract processing as seen from Werner-Seidler & Moulds (2012) experiment, which was found to induce more ruminative thinking.

All memory recall tasks followed the same procedure and prompts. First, participants were instructed to think about "*what led up to the event, what happened during the event, and what the consequences of the event were*" while recalling as many details of the event for 120 seconds in preparation for verbally recounting it afterwards. Participant will then be shown the title made during the UCLA episodic stress interview for the corresponding memory while recalling. Afterwards, participants were instructed to verbally recount the details of the event by telling experimenter "*what happened first, second, third, and so on, like you were watching a movie*". Differences between pre- and post-task NA and PA ratings for NAM, SAM, PAM, and the dwelling task will serve as manipulation checks for the SAM mood induction task and both ER tasks. These instructions follow prompts that promote more concrete processing as seen from Werner-Seidler & Moulds (2012)'s experiment, which promotes more mood-congruent memory recall. Specifically, Werner-Seidler & Moulds (2012) found that concrete processing facilitated successful mood regulation using PAM.

Through random stratification, thirty individuals completed the Dwell protocol of which consisted of eleven controls and nineteen individuals that endorsed depressive histories. For the PAM protocol, twenty-eight individuals completed the protocol of which consisted of eight controls and twenty individuals that endorsed depressive histories.

2.4 General Analysis

Descriptive Statistics and bivariate associations among study variables were examined by SPSS v. 22. SPSS were also be used to examine both hypothesis 1 and 2. Age and sex were controlled for in all analysis as the literature points to individual differences as a function of these variables with respect to autobiographical memory recall (Davis, 1999; Kennedy, Mather, & Carstensen, 2004), depression (Nolen-Hoeksema, 1987; Kessler, Birnbaum, Bromet, Hwang, Sampson, & Shahly, 2010), and rumination (Tamres, Janicki, & Helgeson, 2002; Nolen-Hoeksema & Aldao, 2011).

2.5 Power Analysis

There is no study examining the sequential effects of rumination and PAM, thus the approach to estimating sample size requirements was based on a power = .80 and α = .05. Across both study hypothesis, a proposed sample of $N = 60$ was determined to be enough to detect a small-to-medium effect size (.035). However, due to difficulties in recruitment, a total of N=59 were recruited. Further, seven ($N = 7$) were excluded from analyses based on a manipulation check described in the general analysis. Fifty-one (N=51) individuals consisted as the final sample for analyses.

CHAPTER III

RESULTS

3.1 Manipulation Check

Examination of raw scores revealed seven individuals who did not endorse NA while recalling the stressful memory. These subjects were excluded from analyses because some NA must be present in order examine mood regulation effects of PAM. Of the final sample, twenty-five (N = 25) individuals completed the Dwell protocol, which consisted of nine controls and sixteen depression history individuals. For the PAM protocol, twenty-six (N = 26) individuals completed the protocol, which consisted of eighteen depressive probands and eight controls. As expected, a doubly repeated measures MANOVA revealed a significant effect between tasks ($F[2,48] = 31.53$, $p <$ .001, $\eta_p^2 = .57$), with the magnitude of NA rating increasing in the overall sample while in engaging in SAM from baseline ($F[1,49] = 45.35$, $p < .001$, $\eta_p^2 = .48$). Further the magnitude of PA rating endorsed post-SAM decreased in the overall sample from baseline ($F[1,49] = 46.85$, $p < .001$, $\eta_p^2 = .49$). A non-significant trend was observed in reduction of PA among those within the PAM condition ($F[1,49] = 3.17$, $p = .08$, $\eta_p^2 = .06$). Participants did not significantly differ in terms of NA increase as a function of condition type ($F[1,49] = 1.81$, $p = .18$, $\eta_p^2 = .04$).

3.2 Descriptive Analysis

Pearson correlations were performed to examine correlations between all variables in the models (see table 2). Gender was negatively correlated with NA post-SAM ($r = -.38$, $p < .01$) and PA post-PAM ($r = -.29$, $p < .05$). CES-D scores were found to be positively correlated with NA endorsed post-NAM, SAM, and PAM ($rs = .42 - .66$, $ps < .01$). Regarding affect, NA endorsed post-SAM was positively correlated with NA endorsed post-PAM ($r = .5$, $p < .001$). NAM post-NA was found to be negatively associated with condition ($r = -.32$, $p < .05$). NAM post-NA was positively associated with both post-SAM PA and NA ($rs = .39 - .43$, $ps < .01$), in addition to NA post-PAM ($r = .71$, $p < .001$).

3.3 Hypothesis Testing

3.3.1 Hypothesis 1. In order to test the effect of engaging in recall of PAM after recall of SAM will be undermined by engaging in the dwelling task, a doubly multivariate repeated measures MANOVA with both PA and NA during SAM and PAM served as dependent measures. Task served as the within subject factor and condition (Dwell vs PAM) type served as the between subject factor. Age and sex were included into the model as covariates. Table 3 depicts results. Contrary to hypothesis 1, no differences in the interaction between task and condition type (PAM versus Dwell) were observed regarding NA ($F[2,46] = .061$ $p = .94$, $\eta_p^2 = .003$) nor PA ($F[2,46] = .061$ $p = .94$, $\eta_p^2 = .003$). Analysis did reveal significant differences as a function of task ($F[2,46] = 8.96$ $p = .001$, $\eta_p^2 = .28$), demonstrating significant reduction in NA endorsed going from SAM (M = 20.04, SD=10.98) to PAM (M = 9.69, SD=6.19; $F[1,47] = 9.62$ $p < .01$, $\eta_p^2 = .17$). A similar effect was observed in differences in PA endorsed post-SAM (M =

4.25, SD = 11.78) and PAM (M=11.78, SD=5.09; $F[1,47] = 15.65$ $p < .001$, $\eta_p^2=.25$) indicating recovery. A significant interaction between task and gender ($F[2,46] = 6.4$ $p = .004$, $\eta_p^2=.22$). Specifically, a significant effect was observed regarding NA ($F[1,47] = 12.79$ $p = .001$, $\eta_p^2=.21$) with female participants endorsing less NA post SAM compared to males ($b = -8.2$, $p = .01$); a non-significant trend effect was observed regarding differences in PA ($F[1,47] = 3.81$ $p = .06$, $\eta_p^2 = .08$) amongst female participants, with female individuals endorsing more PA post-PAM compared to males ($b = 3.2$, $p =.05$).

3.3.2 Hypothesis 2. In order to test the effect of engaging in recall of PAM after recall of SAM will be undermined by engaging in the dwelling task as a function of depressive symptoms, a doubly multivariate repeated measures MANOVA with both PA and NA during SAM and PAM served as dependent measures. Task served as the within subject factor and condition (Dwell vs PAM) type served as the between subject factor. Age and sex were included into the model as covariates. Table 4 depicts results. Contrary to hypothesis 2, the interaction between post-task affect and depressive symptoms was not observed ($F[2,44] = .93$ $p = .40$, $\eta_p^2=.04$) nor the 3-way interaction between task, condition type, and depressive symptoms ($F[2,44] = .03$ $p = .97$, $\eta_p^2 < .001$) at the within subject level. However, similar to hypotheses 1 a within subject effect was observed as a function of task ($F[2,44] = 4.472$ $p = .017$, $\eta_p^2=.24$), with reductions in NA endorsed post-SAM (M=20.04, SD=10.98) and PAM (M=9.69, SD=6.189; $F[2,44] = 9.623$ $p = .003$, $\eta_p^2=.17$). A similar effect was found again regarding post PA ratings after SAM (M=4.25, SD=3.599) and PAM (M=11.78, SD=5.085; $F[2,44] = 15.652$ $p < .001$, $\eta_p^2=.25$). The interaction regarding gender observed in hypothesis 1 once again was observed ($F[2,44] = 6.400$ $p = .004$, $\eta_p^2=.22$), regarding NA ($F[1,45] = 13.384$ $p = .001$,

$\eta_p^2 = .23$) and a non-significant trend effect regarding PA ($F[1,45] = 3.377\ p = .073$,

$\eta_p^2 = .07$). Female participants experienced significantly less NA post-SAM compared to

males ($b = -9.74,\ p < .001$) and a non significant trend depicting females endorsing high

NA post-PAM compared to males ($b = .10,\ p = .07$). While the results did not support the

hypothesis, a between subject effect was observed regarding depressive symptoms

($F[2,44] = 15.924\ p < .001,\ \eta_p^2 = .42$). Specifically depressive symptoms were found to be

associated with NA post-PAM ($F[1,45] = 1.138\ p < .001,\ \eta_p^2 = .41$); regression analysis

revealed a non-significant trend predicting increased NA post-PAM ($b = .178,\ p = .053$,

$\eta_p^2 = .08$). No other associations were found regarding depressive symptoms and NA and

PA ratting for the other tasks. Further, a between subject effect was observed regarding a

2-way interaction between depressive symptoms and condition type was also observed

($F[2,44] = 3.237\ p = .049,\ \eta_p^2 < .003$). Similarly this association was found regarding NA

($F[1,45] = 4.790\ p = .034,\ \eta_p^2 = .10$). Regression analysis revealed a moderation effect

regarding post-PAM NA ($b = .178,\ p = .053,\ \eta_p^2 = .11$) (See figure 1). Specifically, those

that ruminated prior to recalling PAM endorsed higher levels of post-NA at lower levels

of depression while those who engaged in PAM immediately after SAM endorsed higher

levels of post-NA comparatively.

Chapter IV

DISCUSSION

The present study tested whether maladaptive ER deployment undermines the effectiveness of an adaptive ER response in order to ameliorate distress. The literature by and large conceptualizes MDD as a disorder of ER deficits in the form of higher utilization of maladaptive ER responses and weaker associations with adaptive ER responses. This is concerning given the strong associations between ER and depression outcomes. A possible explanation for the reduced effectiveness and utilization of adaptive ER may lie in the prior deployment of maladaptive ER responses undermining attempts. A proposed example of this was considered with use of PAM being undermined by rumination given the number of attentional and cognitive processes related to both ER responses. Given the mixed laboratory results related to use of PAM to ameliorate distress amongst depressed individuals, the present study tested whether PAM would be undermined by engagement of rumination.

It was hypothesized that ruminating about a stressful negative life event would undermine the effectiveness of PAM to reduce distress. Contrary to expectation, results did not demonstrate that engaging in rumination prior to recalling PAM undermined the effectiveness to utilize PAM. Both those who recalled PAM immediately after recalling

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their stressful memory and those who ruminated immediately after recalling their stressful memory were able to repair their mood state, both in terms of reduction of NA and augmentation of PA. While contrary to the initial hypothesis, these results follow literary works establishing PAM as an efficacious adaptive ER response to repair one's mood in the face of distress (Parrott, 1990; Rusting & DeHart, 2000). Regardless whether individuals ruminated prior to recalling their positive memories or not, participants were able to successfully engage in PAM reducing their NA. Further, results also demonstrated that participants were able to upregulate their PA by engaging in PAM.

It was also hypothesized that participants' depression levels would influence the effects of ruminating before PAM. Contrary to expectations again, there was no interaction regarding affect post the SAM, whether they ruminated or not prior to recalling PAM, and their level of depression. Participants in both conditions again were able to successfully utilize PAM a means of regulating their mood in terms of down-regulating their NA and up-regulating their PA. Indeed, other researchers have shown that depressed individuals are both motivated and able to utilize PAM to repair their moods in the face of induced dysphoria (Josephson et al., 1996; Werner-Seidler & Moulds, 2012). This successful use of PAM may have been facilitated by the use of concrete prompts to recall their memories that focused more so on the sequential elements of the memory rather than abstract prompts, which facilitates more open-ended processing. Indeed, Werner-Seidler & Moulds (2012) determined that successful use of PAM to ameliorate distress amongst depressed individuals was determined by how these memories are processed. This effect was not only seen just with NA, but with elevation of PA. However, this examination only made use of concrete processing prompts for the

memories and did not compare them to memory prompts instructing more abstract recalling of their memories.

Another important factor that may explain these findings lies in the method by which participants generated their positive memories. Various methods have been utilized to generate positive memories in experimental protocols. For example, Josephson et al. (1996) had individuals write down a happy memory that occurred within the past year. Others had participants generate these memories from their high school years after sad mood induction with time given to do so (Joormann, Siemer, & Gotlib, 2007; Werner-Seidler & Moulds 2012). This work differed considerably from other works by using the episodic interview portion of UCLA to identify specific episodic events within the past three months. Participants specifically recall positive, stressful, and neutral memories that were vivid and valance congruent. To the author's knowledge, no other works examining positive autobiographical memories in the context of ER utilization have taken this approach towards the generation of memories. It may be that the timeframe and salience of the episodic event from whence the memory is generated plays an important role in whether PAM can be utilized as a means of ameliorating dysphoria, however further examination of these factors are needed. Further, instead of simply having participants write down memories, individuals verbally recall their autobiographical memories in a manner that has not done within experimental procedures to the author's knowledge.

Surprisingly, while both groups were able to successfully utilize PAM to reduce NA and increase PA, it does appears that depressive symptoms do affect the degree of NA endorsed after engaging in PAM. Interestingly, it was those who engaged in PAM

immediately after recalling their stressful memory endorsed higher NA compared to those who ruminated and then recalled their positive memory. This finding is somewhat paradoxical, considering rumination's link to high levels of NA not only amongst depressed individuals, but healthy controls (Just & Alloy, 1997). It would seem at the surface that engagement of rumination enhances down-regulation of NA of subsequent recall of positive memories in relation towards depressed individuals. One possibility is that while prompts that facilitated abstract processing were used for the instructed rumination task, it may have facilitated individuals to engage in rumination in the form of reflection rather than brooding. Treynor, Gonzalez, & Nolen-Hoeksema (2003) postulated that reflection may be instigated by NA as a means of problem solving, and the instructed rumination task may have been an opportune time for individuals to repair their mood state after mood induction. Post-hoc paired sample t-tests examining the change in NA and PA going from SAM to the instructed rumination task were executed amongst participants who completed the Dwell protocol. Analyses found that the level of NA post-SAM (M=20.48, SD=10.98) did not significantly differ from NA endorsed after the instructed rumination task (M=19.68, SD=11.47; t[24] = .43, p = .67); similar results were examined when looking at PA post-SAM (M=4.32, SD=3.71) and PA endorsed after the instructed rumination task (M=5.00, SD=3.84; t[24] = -.98, p = .34). Given that both NA and PA was maintained between SAM and the instructed rumination task, ostensibly the instructed rumination task worked as intended. However, reflective rumination is found to induce or maintain NA in the short term with positive benefits seen more so in the long term (Treynor, Gonzalez, & Nolen-Hoeksema, 2003), leaving open the possibility that individuals within the Dwell protocol engaged in reflective

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rumination still. Thus this factor should be considered in future research-exploring sequential effects of rumination on adaptive responses given the possible confound of reflective rumination enhancing subsequent adaptive responses.

4.1 Limitations

The findings of this study should be considered in the context of several limitations. First, while some participants endorsed histories of MDD (N = 34) and elevated depressive symptoms, this study utilized a community sample of participants and results may not generalize to clinical populations. Second, as the current study only used fifty-one participants in analyses, a larger sample size would likely increase the statistical power of the current findings and may allow for further elucidation of the trend effects observed in this study. Third, this study did not control for comorbid disorders. Given that MDD is often found to be comorbid with other disorders associated with ER deficits (e.g., Generalized Anxiety Disorder), it is possible that the results are confounded by comorbid disorders. Fourth, while this study did incorporate use of concrete processing focused prompts in the memories recall tasks and abstract processing focused prompts in the dwelling task, we did not examine if these findings were present if the memories were processed using abstract processing focused prompts. Finally, we did not examine types

4.2 Future Research

The design of this study revealed several limitations that should be addressed in future research. First, utilizing a clinical sample consisting of individuals diagnosed with depression. Second, controlling for comorbid disorders that could account for confounding effects on ER. Third, incorporating both abstract and concrete processing

focus prompts in the generation and recall of autobiographical memories in order to compare individual differences between different memory generations. Finally, accounting for differentiation of rumination engagement in terms of reflection versus brooding.

4.3 Strengths and Clinical Implications

This study is one of few to investigate the presence of sequential effects of maladaptive and adaptive ER responses, specifically with regards to rumination. Additionally, this is the first to examine whether rumination impacts use of positive autobiographical memories. This study is clinically significant because is highlights factors that help facilitate successful utilization of positive autobiographical memories as means to reduce dysphoria and increase positive affect in relation to depressive symptoms. Finally, this study points towards future directions in examining the effectiveness of this emotion regulation response. The observations and postulations of this study overall helps future researchers and clinicians explore factors and means to facilitate recall of positive autobiographical memories as an adaptive means combating dysphoria present in Major Depressive Disorder.

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APPENDIX A: TABLES

Table 1. Means and standard deviations of self-reported ratings of autobiographical memories used in

Variable	NAM	SAM	PAM
Negative	1.72 (1.42)	7.60 (2.36)	1.06 (.32)
Positive	3.06 (2.00)	1.75 (1.41)	9.34 (1.15)
Vivid	8.00 (2.56)	8.14 (2.42)	8.77 (1.84)

experimental protocol

Note: NAM = Neutral Autobiographical Memory; SAM= Stressful Autobiographical Memory; PAM= Positive Autobiographical Memory

Table 2. Descriptive statistics and bi-variate correlations

Measures		M (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10
1.	Age	32.18 (13.13)	-									
2.	Gender	---	-.24	-								
3.	Con	---	.16	-.16	-							
4.	CES-D	17.31 (11.86)	.00	.18	-.21	-						
5.	NANAM	10.35 (7.45)	.07	.10	-.32*	.42**	-					
6.	PANAM	7.57 (4.24)	.21	-.18	.19	-.25	-.04	-				
7.	NASAM	20.04 (10.98)	.25	-.38*	-.04	.43**	.43**	-.04	-			
8.	PASAM	4.25 (3.60)	.06	.00	-.02	-.14	.39**	.61**	-.18	-		
9.	NAPAM	9.69 (6.19)	-.00	.10	-.17	.66**	.71**	-.23	.50**	.01	-	
10.	PAPAM	11.78 (5.09)	.07	-.29*	-.01	-.17	-.13	.58**	.15	.25	-.27	-

Note. Gender= 0 = male, 1= female; Con= Condition; CES-D= Center of Epidemiological Studies Depression Scale; NANAM= negative affect post neutral autobiographical memory recall; PANAM= positive affect post neutral autobiographical memory recall; NASAM= negative affect post stressful autobiographical memory recall; PASAM= positive affect post stressful autobiographical memory recall; NAPAM= negative affect post positive autobiographical memory recall; PAPAM= positive affect autobiographical memory recall

***p ≤ .001, **p ≤ .01, *p ≤ .05

Table 3. Results of doubly multivariate repeated measure MANOVA for hypothesis 1

Predictor	Affect	PA	NA
Between-Subjects			
Gender	$F(2,46)=2.47, p= .10, \eta_p^2=.10$	$F(1,47)=2.04, p= .16, \eta_p^2 = .02$	$F(1,47)=2.32, p= .14, \eta_p^2= .05$
Con	$F(2,46)=.74, p = .48, \eta_p^2=.03$	$F(1,47)=.15, p= .70, \eta_p^2 < .01$	$F(1,47)=1.22, p= .28, \eta_p^2= .03$
Age	$F(2,46)=.66, p = .52, \eta_p^2=.03$	$F(1,47)=.08, p= .78, \eta_p^2 < .01$	$F(1,47)=1.15, p= .29, \eta_p^2= .02$
Within-Subjects			
Task	$F(2,46)=8.96, p <.001, \eta_p^2 = .28$	$F(1,47)=15.65, p < .001, \eta_p^2= .25$	$F(1,47) =9.62, p < .01, \eta_p^2= .17$
Task X Gender	$F(2,46) =6.40, p <.01, \eta_p^2 = .22$	$F(1,47)=3.81, p = .06, \eta_p^2= .08$	$F(1,47) =12.79, p = .001, \eta_p^2= .21$
Task X Con	$F(2,46) =.06, p = .94, \eta_p^2 < .01$	$F(1,47)=.07, p= .79, \eta_p^2< .01$	$F(1,47) =.10, p = .75, \eta_p^2< .01$
Task X Age	$F(2,46) =1.40, p =.26, \eta_p^2 = .06$	$F(1,47)=.04, p =.84, \eta_p^2< .01$	$F(1,47) = 2.10, p = .15, \eta_p^2= .04$

Note. PA= Positive Affect; NA= Negative Affect; Con= Condition

Table 4. Results of doubly multivariate repeated measure MANOVA for hypothesis 2

Predictor	Affect	PA	NA
Between-Subjects			
Gender	$F(2,44)=4.47, p= .02, \eta_p^2=.17$	$F(1,45)=1.82, p= .18, \eta_p^2=.04$	$F(1,45)=7.59, p< .01, \eta_p^2=.14$
Con	$F(2,44)=2.41, p = .10, \eta_p^2=.10$	$F(1,45)=2.00, p= .17, \eta_p^2=.04$	$F(1,45)=2.75, p= .10, \eta_p^2=.06$
Age	$F(2,44)=1.33, p = ..27, \eta_p^2=.06$	$F(1,45)=.002, p= .97, \eta_p^2< .01$	$F(1,45)=2.72, p= .11, \eta_p^2=.06$
CES-D	$F(2,44)=15.92, p < .001, \eta_p^2=.42$	$F(1,45)=1.14, p= .29, \eta_p^2=.03$	$F(1,45)=30.94, p< .001, \eta_p^2=.41$
Con*CES-D	$F(2,44)=3.24, p = .05, \eta_p^2=.13$	$F(1,45)=1.61, p= .21, \eta_p^2=.03$	$F(1,45)=4.79, p= .03, \eta_p^2=.10$
Within-Subjects			
Task	$F(2,44)=6.82, p <.01, \eta_p^2= .24$	$F(1,45)=12.98, p< .001, \eta_p^2=.22$	$F(1,45)=5.81, p= .02, \eta_p^2=.11$
Task*Gender	$F(2,44) =6.60, p <.01, \eta_p^2= .23$	$F(1,45)=3.38, p= .07, \eta_p^2=.07$	$F(1,45)=13.38, p< .001, \eta_p^2=.23$
Task*Con	$F(2,44) =.04, p = .96, \eta_p^2< .01$	$F(1,45)=.03, p= .87, \eta_p^2< .01$	$F(1,45)=.02, p= .89, \eta_p^2= 0$
Task*Age	$F(2,44) =1.22, p =.31, \eta_p^2= .05$	$F(1,45)=.03, p= .86, \eta_p^2< .01$	$F(1,45)=1.83, p= .18, \eta_p^2=.04$
Task*CES-D	$F(2,44) =.93, p =.40, \eta_p^2= .04$	$F(1,45)=.04, p= .84, \eta_p^2< .01$	$F(1,45)=1.33, p= .26, \eta_p^2=.03$
Task*Con*CES-D	$F(2,44) =.03, p =.97, \eta_p^2< .01$	$F(1,45)=0, p= 1, \eta_p^2= 0$	$F(1,45)=.05, p= .82, \eta_p^2< .01$

Note. PA= Positive Affect; NA= Negative Affect; Con= Condition; CES-D= Center of Epidemiological Studies Depression Scale
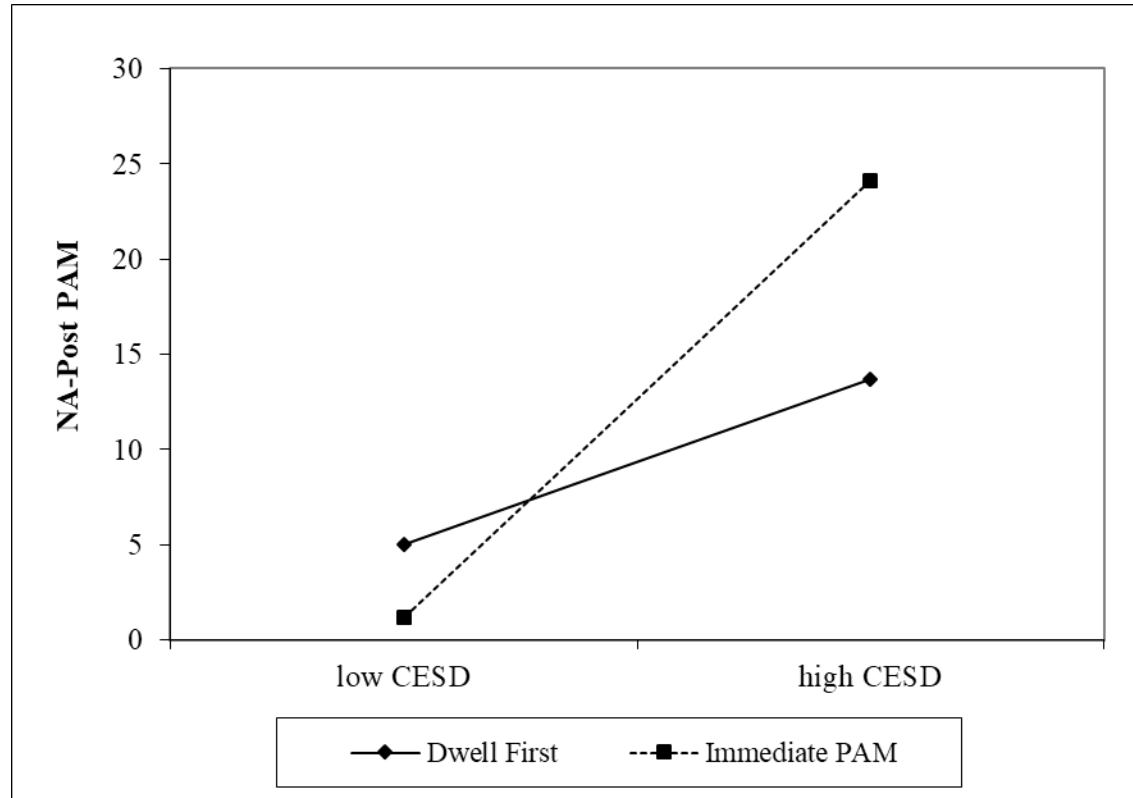
APPENDIX B: FIGURES

Figure 1. Post Positive Autobiographical Memory negative affect across Depressive Symptoms and Condition type
Note. CES-D= Center of Epidemiological Studies Depression Scale; NA=Negative affect; PAM=Positive Autobiographical Memory

APPENDIX C: Demographic Questionnaire

1.Age (in years): _____

2.Sex (circle one): Male Female

3.Year in School (circle one): Freshman Sophomore Junior Senior

4.Ethnicity Please circle your ethnicity(ies)/race(s): African-American/Black (non

Hispanic) Caucasian/White (non Hispanic) Hispanic/Latino(a) Middle Eastern Native

American/American Indian/Eskimo/Aleut Native Hawaiian/Pacific Islander South

Asian/East Indian Southeast Asian

Other (please describe): _____

Multiracial (please describe): _____

5. Country of Origin: _____

If country of origin is the US: Including you, how many generations of your family have

lived in the US?

1

2

3

4 or more

If country of origin was not the U.S., how many years have your resided in the US?

_____

APPENDIX D: Center of Epidemiological Studies Depression Scale

Instructions: Below is a list of the ways you might have felt or behaved. Please tell me

how often you have felt this way during the past week.

1. I was bothered by things that usually don't bother me.
2. I did not feel like eating; my appetite was poor.
3. I felt that I could not shake off the blues even with help from my family or
   friends.
4. I felt I was just as good as other people.*
5. I had trouble keeping my mind on what I was doing.
6. I felt depressed.
7. I felt that everything I did was an effort.
8. I felt hopeful about the future.*
9. I thought my life had been a failure
10. I felt fearful.
11. My sleep was restless.
12. I was happy.*
13. I talked less than usual.
14. I felt lonely.
15. People were unfriendly.
16. I enjoyed life.*
17. I had crying spells.
18. I felt sad.
19. I felt that people dislike me.
20. I could not get "going".

Ratings

   0=Rarely or none of the time (less than 1 day)

   1=Some or a little of the time (1-2 days)

   2=Occasionally or a moderate amount of time (3-4 days)

   3=Most or all of the time (5-7 days)

*reversed scored items