

EXAMINING NOSTALGIA'S IMPACT ON DEPRESSIVE SYMPTOMOLOGY

by

Ashley C. DeMarco, M.A.

Submitted to the graduate degree program in Clinical Psychology and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

---

Chairperson Ruth Ann Atchley, Ph.D.

---

Nancy Hamilton, Ph.D.

---

Andrea Greenhoot, Ph.D.

---

Monica Biernat, Ph.D.

---

Thomas Krieshok, Ph.D.

Date Defended: June 13<sup>th</sup>, 2016

The Dissertation Committee for Ashley C. DeMarco  
certifies that this is the approved version of the following dissertation:

EXAMINING NOSTALGIA'S IMPACT ON DEPRESSIVE SYMPTOMOLOGY

---

Chairperson Ruth Ann Atchley, Ph.D.

Date approved: June 13<sup>th</sup>, 2016

## Abstract

Nostalgic memories are universal experiences that typically contain emotions characterized by a warm, sentimental yearning for the past or tales of redemption leading to triumph (Wildschut, Sedikides, Arndt, & Routledge, 2006). Several studies have documented nostalgic recall's ability to enhance psychological well-being through increasing the sense of a cohesive self-identity across time, promoting social connectedness, and drawing on past experiences to enhance problem solving and to guide future behaviors. The domains of these effects overlap with the socio-cognitive deficits occurring in depression and being able to elicit these effects would be helpful for addressing the corresponding depressive symptoms. However, there is a paucity of research assessing the degree to which mood state impacts the nostalgic recall process.

Mindfulness interventions have been shown to increase richness of memory recall and reduce depressive symptoms through augmenting attention and reducing rumination. This study hypothesized that these changes resulting from a brief mindfulness intervention would increase state levels of nostalgia. A series of three experiments investigated the relationship between level of depressive symptomology and the state level of nostalgia as well as how mindfulness impacts this relationship. Experiments 1 ( $n = 200$ ) and 2 ( $n = 200$ ) examined the effects of level of depressive symptomology on the state level of nostalgia in an online sample recruited through Amazon's Mechanical Turk (MTurk) and in a sample of undergraduate students. Experiment 3 ( $n = 473$ ) examined how a brief mindfulness intervention impacted these effects and how mindfulness and nostalgia effected depressive symptomology over the course of the experiment. The present project provided evidence for the impact of heightened state levels of nostalgia on depressive symptomology and demonstrated that 1) higher depressive symptomology reduces state levels of nostalgia, 2) higher subjectively reported levels of mindfulness improve state

levels of nostalgia, as measured by the State Functions of Nostalgia Scale (Hepper, Ritchie, Sedikides, & Wildschut, 2012), and 3) engaging in nostalgic recall and higher state levels of nostalgia predicted decreases in depressive symptomology.

**Key Words:** Depression, Nostalgia, Mindfulness

## Acknowledgments

Throughout graduate school, I have learned many skills and acquired a great deal of knowledge, but the most important insight I have gained is the value of strong family, friends, and colleagues. I feel extremely fortunate to be surrounded by such an incredible group of people who have been unfaltering in their support and patience and generous with their time and knowledge. I am grateful to my advisor Dr. Ruth Ann Atchely and my committee members Drs. Nancy Hamilton, Andrea Greenhoot, Monica Biernat, and Thomas Krieshok for their mentorship and contributions. I would also like to thank the Department of Psychology at the University of Kansas for funding through the Psychology Strategic Initiative Grant.

A special thanks to: my mom for being a role model of perseverance and determination, and for her tireless love and support; Jack for his countless hours of help; Farines for the many pearls of wisdom along the way, space at the nerve center/satellite office, enduring support, and humor; Paul for his sharing of knowledge, patience, and encouragement; Coach for helping emphasize the importance of work/life balance; and my mentors and supervisors over the years for helping foster my passions and skills.

“The remembrance of things past thus includes the remembrance of paradise that never was, which is paradise because it never was. It is the nature that does not yet exist, the smell in the air that is yet to be, the tomorrow that never comes in which – paradoxically – individual love, hope, and infinite joy can exist.” – Deepika Bahri<sup>1</sup>

---

<sup>1</sup> Bahri, D. (2003). *Native Intelligence: Aesthetics, Politics, and Postcolonial Literature*. Minneapolis: University of Minnesota Press p. 243.

## Table of Contents

Title Page	i
Acceptance Page	ii
Abstract	iii
Acknowledgments	v
Table of Contents	vi
Nostalgic Recall	5
Proneness to Engage in Nostalgia	8
Effects and Triggers	9
Self	9
Social	12
Directive	13
Depression	15
Self-Conceptualization	16
Attentional Bias	18
Cognitive Biases	20
Overgeneralization and autobiographical memory specificity	20
Catastrophizing	21
Problem solving	22
Proposed Interaction between Effects of Nostalgia and Depression	26
Application of Mindfulness	28
Present Study	31
Specific Aims and Hypotheses	32
Aim 1	32
Hypothesis 1a: Main effects	32
Hypothesis 1b: Interaction	32
Figure 1. Depressive symptomology's proposed impact on SFNS score	33
Aim 2	33
Hypothesis 2a: Main effects	33
Hypothesis 2b: Interactions	34
Figure 2. Proposed relationship between mindfulness intervention, depressive symptomology, and SFNS	35
Aim 3	35
Hypothesis 3a: Main effects	36
Hypothesis 3b: Interactions	36
Figure 3. Proposed effects of mindfulness and nostalgia on level of depressive symptomology	39
Method	39
Participants	39
Experiment 1	39
Table 1. Demographics of the Sample	40
Experiment 2	40
Experiment 3	41
Procedure	42
Experiment 1 and 2	42

Table 2. Summary of Design for Experiments	43
Experiment 3	43
Measures	45
Demographic Data	45
Mood and Depression	45
Mindfulness	46
Nostalgia Effects	46
Institutional Review Board (IRB)	47
Analysis Methods	48
Sample Size and Power	48
Experiments 1 and 2	48
Experiment 3	499
Statistical Testing	49
Results	49
Nostalgia Manipulation Check	50
Mindfulness Manipulation Check	51
Figure 4. Interaction between mindfulness condition and recall condition to predict subjective mindfulness scores (TMS scores)	52
Effects of Nostalgic Recall	52
Figure 5. Main effect of recall condition on SFNS scores	53
General Measures of the Constructs Related to Nostalgic Recall's Effects	53
Table 3. Summary of EFA for Measures Related to Psychological Well-being	54
Measures of depressive symptomology	55
Combining of Experiments 1 and 2	55
Table 4. Descriptive Statistics Across Experiments and Conditions	56
Evaluation of Constructs Related to SFNS	57
Table 5. Summary of Regression Results for SCS, SCCS, and NGSE	58
Analyses of Hypotheses	59
Aim 1	59
Structural equation modeling results	59
Experiments 1 and 2	59
Figure 6. Effects of depressive symptomology on nostalgic benefit, accounting for recall condition	60
Experiment 3	61
Figure 7. Relationship between level of depressive symptomology and benefits of nostalgic recall, accounting for recall condition.	62
Regression results:	62
Experiments 1 and 2	62
Table 6. Summary of Regression Result for SFNS for Experiments 1 and 2	63
Experiment 3	63
Table 7. Summary of Regression Results for SFNS for Experiment 3	64
Aim 2	65
Structural Equation Modeling Results	65

Experiment 3	65
Figure 8. Relationship between baseline depressive symptomology, mindfulness, and state level of nostalgia.	66
Figure 9. Relationship between baseline depressive symptomology, mindfulness, and nostalgic benefit, accounting for memory recall and mindfulness manipulations.	67
Figure 10. Relationship between baseline depressive symptomology, mindfulness, and state level of nostalgia, accounting for subjective rating experienced nostalgia, recall condition, and mindfulness condition.	68
Regression Results	68
Table 8. Summary of Regression Results for SFNS for Experiment 3 Incorporating Mindfulness Condition	70
Aim 3	71
Structural Equation Modeling Results	71
Experiment 3	71
Figure 11. Relationships between baseline depressive symptomology, mindfulness, nostalgic benefit, and change in depressive symptomology after mindfulness and memory recall manipulations, accounting for mindfulness and recall conditions	73
Regression Results	73
Experiment 3	73
Table 9. Summary of Regression Results for Change in Depressive Symptomology in Experiment 3	74
Discussion	75
Experiments 1 and 2	755
Experiment 3	79
Method of Delivery	87
Limitations and Future Directions	89
Conclusion	92
References	94
Appendices	122
Appendix A: Positive and Negative Affect Schedule	122
Appendix B: Rumination and Reflection Questionnaire	123
Appendix C: Multidimensional Depression Assessment Scale	124
Appendix D: Memory prompts	125
Appendix E: Nostalgia Manipulation Check	126
Appendix F: Toronto Mindfulness Scale	127
Appendix G: State Functions of Nostaliga Scale	128
Appendix H: New General Self-Efficacy Scale	129
Appendix I: Self-Concept Clarity Scale	130
Appendix J: Social Connectedness Scale	131

## Impact of Mood on State Levels of Nostalgia

People formulate their sense of self and identity from a collection of life stories, which are based on episodic and autobiographical memories. This collection of stories is known as an individual's narrative identity. Narrative identity has been broadly conceptualized as a way for people to link their past, present, and thoughts about their future in order to create meaning, continuity, and aspiration (McAdams & McLean, 2013; Singer, Blagov, Berry, & Oost, 2013). One type of autobiographical memory that contributes to the narrative identity and that is of interest to clinical psychology is nostalgic memory. Nostalgic memories are ubiquitous experiences that elicit a common pattern of emotions across cultures and age groups. They are generally experienced several times per week and are spurred by numerous internal and external sources (e.g., Hepper, Ritchie, Sedikides, & Wildschut, 2012; Sedikides, Wildschut, Routledge, Arndt, et al., 2015). Nostalgic memories are typically thought of as a self-relevant, warm reminiscing and longing for one's past. They tend to revolve around satisfying moments that focus on positive aspects of experiences (Wildschut et al., 2006).

Previous studies have linked the structure and themes presented in nostalgic memories to well-being, coping, and health (Dunlop & Tracy, 2013; McAdams, Reynolds, Lewis, Patten, & Bowman, 2001). These studies have also outlined nostalgic recall's effects and have proposed potential mechanisms for these effects. Engaging in nostalgic recall bolsters self-esteem and optimism; it fosters feelings of social connectedness and meaning making (for a review: Sedikides, Wildschut, Routledge, Arndt, et al., 2015). Negative life events can trigger nostalgic memories. In turn, this recall can help buffer against negative events through promoting a coherent connection between a person's past and his/her present sense of self known as self-continuity (Sedikides, Wildschut, Routledge, & Arndt, 2014). The power of nostalgic memories

seems to come from their ability to help people derive meaning from past events to re-engage individuals in the present (Routledge et al., 2011).

Although the current view of nostalgic recall posits it as a positive experience that individuals can draw on, this view has evolved over time. Initially stigmatized and pathologized, experiences of nostalgia were thought to be indicative of a melancholic psychiatric disorder spurred by homesickness (de Diego & Ots, 2014; McCann, 1941). Historically, this disorder was marked by loneliness, weeping, isolation, sadness, an obsession with returning home, and a feeling of suffering related to the nostalgic memories. Over time, the stigma and pathological label associated with nostalgic experiences faded as research began to demonstrate their utility as part of a normal, adaptive coping response that helps restore equilibrium after life challenges and transitions (Sedikides et al., 2014). While these two views of nostalgic experiences seem diametrically opposed, current findings in different populations yield credence to both conceptualizations. This disparity in findings suggests a need to explore moderating variables. The effects of nostalgic memories have largely been studied in psychologically healthy populations. However, recent work examining the effects of nostalgic recall in habitual worriers demonstrated that this type of recall can increase distress in habitual worriers (Verplanken, 2012). This work implies that mood might, at least, mediate the role of nostalgic memories in coping processes.

Furthermore, in disorders like depression, individuals hold dysfunctional views of themselves related to the past, present, and future. Research has shown that people with depression exhibit aberrant, maladaptive processing of emotional, self-referent memories, typifying rumination (Nolen-Hoeksema, 2000; Watkins & Teasdale, 2001). Depressed individuals also develop overgeneralized autobiographical memories (e.g. memories relating to a

category, reoccurring events, or a long period of time (birthday parties), rather than a particular instance (10<sup>th</sup> birthday party)), potentially minimizing their ability to fully engage in nostalgic recall (Brittlebank, Scott, Williams, & Ferrier, 1993; Hipwell, Sapotichne, Klostermann, Battista, & Keenan, 2011; Park, Goodyer, & Teasdale, 2002). In addition, depressed individuals have a low sense of self-worth and self-esteem (Crocker & Wolfe, 2001; Crocker, 2002; Pyszczynski & Greenberg, 1987). Thus, nostalgic memories may serve a different role in depressed individuals as depressed individuals may find engaging in nostalgic memories to be more difficult. In depressed individuals, these memories may promote less continuity of self-concept and may not engender effective coping in the same way as in healthy individuals. Consequently, making the leap from the past into the present, which is required to reap the benefits of nostalgic recall, may be difficult for individuals with depression and particularly ones who are prone to rumination. These individuals tend to struggle to disengage with the past and focus their attention on the present. Future work is needed to understand how nostalgic memories function in negative mood states.

One possible way to increase the potential effects of recalling nostalgic memories for individuals with depression is through mindfulness based interventions. Mindfulness based interventions, which have garnered much attention in recent years, are efficacious at improving well-being and symptoms of depression (Helen & Teasdale, 2004; Hofmann, Sawyer, Witt, & Oh, 2010; Kuyken et al., 2008; Teasdale et al., 2000; Van Dam, Hobkirk, Sheppard, Aviles-Andrews, & Earleywine, 2014). These interventions strive to focus attention in the present and encourage the development of non-judgmental, accepting views. These views enhance self-regulation and decrease emotional avoidance (Baer, 2009). Mindfulness based interventions have also been shown to promote self-efficacy (Chang et al., 2004) as well as reduce overgeneralized

autobiographical memories in health people and in formerly depressed patients (Heeren, Van Broeck, & Philippot, 2009; Williams, Teasdale, Segal, & Soulsby, 2000). Based on this past research, it stands to reason that mindfulness based interventions may improve an individuals' ability to recall specific nostalgic events and promote self-efficacy and hope. Activating non-judgmental focus with mindfulness based interventions may also serve to help reconcile dissonant views of one's past and present self that may arise in depressed individuals. If a mindfulness intervention can help in this way, it would enable depressed individuals to more fully engage in the recall process. Allowing for a fuller engagement in nostalgic recall, mindfulness should work synergistically with and nostalgic recall to promote increased well-being. Taken together, nostalgic recall and mindfulness may serve as therapeutic compliments in restoring and creating a unified, positive narrative identity that links the past, present, and future.

Given the lack of research on the intersection of nostalgic recall and depression, the aim of this project was to synthesize and expand the literature on how nostalgic experiences relate to depressive symptomology. To lay the groundwork for this project, I will summarize the current literature on triggers and tendencies for engaging in nostalgic recall, the common effects of engaging in nostalgic recall, and the proposed mechanisms behind these effects. I will also review the literature on attentional and cognitive biases in depression. This will allow for a discussion of how depressive symptomology may interact with nostalgic recall to affect nostalgic recall's efficacy at promoting well-being. This background will also lay the framework for exploring how mindfulness based interventions may help restore nostalgic recall's effects in depressed populations. Lastly, this proposal will report three studies that empirically evaluated the relationship between depressive symptomology and the effects of engaging in nostalgic recall as well as mindfulness' effects on this relationship.

## Nostalgic Recall

Much of the research to date on the effects of nostalgic recall has been done with healthy individuals, but there exists a paucity of research on how mood disorders such as depression may influence the effects of nostalgic recall. To understand why mood may moderate the effects of nostalgic recall, this review will first define what is meant by nostalgic recall and then discuss the common factors that elicit it, its effects, and the proposed mechanisms behind these effects. Numerous studies have sought to define the construct of nostalgia and what constitutes a nostalgic memory (e.g., Batcho, 1998; Hertz, 1990; Wildschut et al., 2006) . However, there remains a lack of consensus on this matter. Hepper and colleagues (2012) summarize this debate, noting that nostalgia has been characterized as a psychological resource, a predominately positive, negative, or ambivalent experience, and an emotion. They note that most definitions lack either scientific rigor in their derivation or fail to thoroughly capture the scope of the construct. Asserting that there is not a simple binary determination of whether an experience is nostalgic or not, Hepper and colleagues (2010) argue that experiences vary in degree of epitomizing nostalgic. To support this assertion, they pursued a line of research to determine the features that are most typical of, and most closely related to nostalgic recall. This study asked participants to generate a list of words that were characteristics of nostalgic experiences. These words were then used to derive 35 features of nostalgic experiences. A separate set of 102 participants then used an eight point Likert scale to rate these features on their centrality or relatedness to the construct of nostalgia. The most central features found to represent nostalgia were a *found remembering or reminiscing of personally meaningful, memories of the past typically relating to a social relationship or childhood*. This study also found nostalgia to be regarded as an *emotion with a primarily positive affective tone*, but that encompasses a *longing*

*or for the past.* While negative emotions (e.g. regret, sadness, and loneliness) were also associated with nostalgia, they were only peripherally related. Researchers found that people remember and focus on the central features of an event, which tend to be the more positive ones (Hepper et al., 2012). Building upon past research, Oba and colleagues (2016) conducted an exploratory factor analysis of the factor structure of nostalgia and found two dimensions of nostalgic experiences: emotional and personal significance as well as chronological remoteness. They also found that when recalling nostalgic memories, the brain recruits areas associated with memory and with reward to construct these memories, reinforcing the notion that nostalgic experiences capture a particular type of autobiographical memory that has a predominantly positive or pleasing association.

Nostalgic experiences have also been examined cross-culturally. In a study with 1,704 student participants from 18 countries representing five continents, Hepper et al. (2014) found that the rank order of centrality of these 35 previously derived features of nostalgic experiences had strong positive correlations across countries, implying that there is a universal conceptualization of nostalgic experiences. In addition to having a culturally generalizable definition, nostalgic experiences are common across cultures and age groups, ranging from older children to elderly adults. For instance, in a sample of undergraduate students, 79% of participants reported experiencing nostalgia at least once per week or more and 26% endorsed experiencing it at least once a day (Wildschut et al., 2006). Given the ubiquitous experience of nostalgia and the high prevalence of depression, investigating its triggers and effects across varying degrees of depressive symptomatology has important implications for understanding and treating mood disorders.

As outlined above, the field lacks a consensus on what constitutes a nostalgic memory and how nostalgic memories are unique from autobiographical memories or from reminiscing. This study argues that nostalgic memories are a subtype of autobiographical memories. They tend to elicit high valence/low arousal emotions (Troost, Ethofer, Zentner, & Vuilleumier, 2012) and tend to be personally significant memories. D'Argembeau, Comblain, and Van der Linden (2003) examined the emotional content of positive, negative, and neutral autobiographical events, while Wildschut and colleagues (2006) examined the emotional content of nostalgic memories. D'Argembeau, Comblain, and Van der Linden (2003) found that recall of positive events lead to more positive and less negative feelings than recalling either negative or neutral events. Conversely, negative events elicited more negative emotions than positive or neutral events, and neutral events evoked more positive than negative feelings. Examining nostalgic memory recall, Wildschut and colleagues (2006) found that nostalgic memories tend to be more positive than negative overall, but relatively low arousal (positive affect mean = 2.37 and negative affect mean = 1.37 when rated on a 1-5 Likert scale for intensity). While not a direct comparison, these studies looking at the emotional content of different kinds of memories highlight that in terms of emotional intensity, nostalgic memories may be most similar to neutral autobiographical memories, but more personally salient (Oba et al., 2016).

Reminiscing, while similar to nostalgic recall in its effects, has an evaluative component that examines the meaning of the event and its importance and is often done with other people (Fivush, 2008). For the purposes of the present study, nostalgic recall and nostalgic experiences will be operationalized as the experience of recalling a past autobiographical event that is associated with a sentimental longing for the past.

### **Proneness to Engage in Nostalgia**

To capitalize on and determine the effects of nostalgic experiences, it is important to identify their eliciting factors. Research has demonstrated that there are several determinants that effect the types of memories people recall and their proneness to recall nostalgic memories. For example, both mood and self-esteem influence the types of memories individuals recall. Individuals with high self-esteem tend to recall nostalgic, mood incongruent memories when in a negative mood state, whereas individuals with low self-esteem tend to recall more mood congruent memories (Smith & Petty, 1995). Although individuals with low self-esteem are capable of recalling equally positive memories as those with high self-esteem, higher self-esteem individuals showed a greater mood improvement after these recalls than did lower self-esteem individuals (Setliff & Marmurek, 2002). This suggests that for individuals who spend more time in negative mood states, such as individuals with depression, engaging in nostalgic recall would be less likely to promote mood improvements seen in individual who are primarily in positive mood states.

In addition to mood and self-esteem, perceived self-efficacy and cognitive style may also impact recall of nostalgic memories. Self-efficacy is a construct that is highly linked to self-esteem (Judge, Erez, Bono, & Thoresen, 2002; Lane, Lane, & Kyprianou, 2004), so , it is not surprising that self-efficacy also impacts the recall of autobiographical memories. When presented with 20 positive and negative cue words and asked to recall past events and imagine future events based on the cue words, individuals with higher self-efficacy produced more specific and more positive memories of past events and projections of future events than individuals with lower self-efficacy and exhibited better social problem solving skills (Brown, Dorfman, Marmar, & Bryant, 2012). Since self-identity plays a role in autobiographical memory

recall, projections about the future, and problem solving, which are constructs that have also been linked with nostalgic recall, exploring self-concept and self-esteem with respect to nostalgic recall will be important.

### **Effects and Triggers**

Several theorists (e.g., Bluck, Alea, Habermas, & Rubin, 2005; Bluck, 2003; Sedikides et al., 2014; Wildschut et al., 2006) have classified the effects of autobiographic and nostalgic recall into three categories related to: the self, social bonds, and directive effects. These categories, first established with respect to autobiographical memory were replicated with nostalgic memory. The effects on the self refer to strengthening self-esteem and maintaining a cohesive sense of self-identity and meaning. The social effects help connect individuals with one another, providing additional social support and alternate perspectives on situations. The directive effects enhance problem solving and guides future behaviors through drawing on past successes. Each of these effects will be discussed in further detail in the following sections.

#### **Self.**

With respect to the self, autobiographical memories, such as nostalgic ones, have been associated with creating and sustaining a consistent, coherent life narrative and with making the present meaningful (Conway, 2005; McAdams et al., 2001; Routledge et al., 2011; Sedikides, Wildschut, Gaertner, Routledge, & Arndt, 2008). An exploratory factor analysis found that autobiographical memories help people define their identity through understanding who they are currently, how this person relates to who they were in the past, noting differences and similarities over time (Bluck et al., 2005). Motifs that are most salient and congruent to people's self-conceptualization are captured and stored as rich memories that people retrieve often and tend to be organized by conceptual themes (Conway, Singer, & Tagini, 2004). In this way, what

Conway and colleagues term as self-defining memories are a collection of remembered events that serve as evidence to support people's core beliefs about themselves and can be recalled differentially based on an individual's current goal or affective state. Based on this definition, self-defining memories are likely to be nostalgic ones. In Bluck and Liao's literature review of autobiographical and memory and reminiscence (2013), they propose a conceptual model and build on Conway's argument asserting that memories about one's self function to create continuity of the self throughout life, linking the past with the present.

Conducting a series of six experiments, Routledge and colleagues (2011) tested this theoretical framework by evoking nostalgia. They found that increasing nostalgia increases people's sense of meaning and that this effect was mediated by feeling connected to others. Sedikides and colleagues (2014) also found that experimental induced nostalgia increased self-continuity more than recalling an ordinary or a positive event. They also found that when inducing self-discontinuity in a disruptive manner, people reported higher levels of nostalgia as compared to inducing self-discontinuity in a relatively non-disruptive manner or when preserving self-continuity. However, nostalgic recall may not always be helpful; Iyer and Jetten (2011) manipulated identity continuity and level of nostalgia and found that individuals with greater self-continuity who engaged in nostalgic recall perceived themselves better able to cope with challenges in the present, reported higher levels of psychological well-being, and were more interested in pursuing new opportunities than individuals with low identity continuity. Individuals with low identity continuity who see the past as weakly connected to or disconnected from the present and who engaged in nostalgic recall had a lower perceived ability to cope with challenges in the present, were less interested in pursuing new opportunities, and were more interested in familiar environments. These findings suggest that nostalgic recall does not

function that same way across all individuals. One's self view across time is a key factor in predictor of how nostalgic recall will impact people.

Iyer and Jetten's work (2011) provides support for the idea that nostalgic recall may function differently in depressive mood states than in more positive ones, given that identity continuity is often lower in depressed individuals (Angus & Kagan, 2013). Research suggests that individuals with depressed mood states, who tend to use autobiographical memory for identity clarity and sense of self as well as for problem-solving, show a decrease in depressive symptoms over time through increasing self-worth, meaning in life, and feelings of competence (Hallford & Mellor, 2016). However, depressed individuals are less efficacious at engaging in adaptive, useful autobiographical memory recall that aids with self-continuity. This deficiency is thought to be linked with the ruminative thoughts associated with depression (Grace, Dewhurst, & Anderson, 2016). Nostalgic memories' effects on the self are also connected to emotion regulation (Koole, 2009; Pasupathi, 2003; Pierro, Pica, Klein, Kruglanski, & Higgins, 2013). People tend to seek pleasurable emotional states (Tamir, Chiu, & Gross, 2007) and use memories to help regulate emotions, allowing them to move their attention away from aversive emotions and reappraise the emotional impact of an event (Holland & Kensinger, 2010). This is an example of a healthy coping method and is one that is often arrested in depression due to rumination. Healthy individuals also mentally distance themselves from negative events and failures, placing these occurrences further back in their memories and see positive events as more recent (Ross & Wilson, 2002). Nostalgia helps promote positive self-regard and fosters psychological growth by allowing individuals to strive to maximize their potential (Baldwin & Landau, 2014).

**Social.**

Autographical memories, including nostalgic ones, not only connect people to their past, but also connect them to others in several ways. As nostalgic memories often have a strong social theme (Wildschut et al., 2006), it is not surprising that they foster and promote feelings of social bonds and attachment. Wildschut and colleagues demonstrated that participants engaging in a nostalgic recalled, compared ones engaging in an ordinary recall, reported higher levels of social bonding. This increased perception of social cohesion is important for well-being and adapting to change, given people's inherent need to belong and form interpersonal relationships (Baumeister & Leary, 1995). Conversely, without these social ties, lonely, socially disconnected individuals experience greater difficulty adjusting to change (Duru, 2008). Nostalgic recall has demonstrated the ability to reduce feelings of loneliness and augment feelings of perceived social support (Zhou, Sedikides, Wildschut, & Gao, 2008). More generally, autobiographically memories have been shown to connected people through creating a collective narrative that is constructed with others and then reconstructed with others when recalled (e.g., Fivush, 2008; Fivush, Haden, & Reese, 1996). Thus, the act of recalling social memories with others also serves to connect people and increase bonding.

McAdams (1993) argues that construction and reconstruction of life events is critical for the formation of people's identity. Memories create a collective structure and story that help unite people (Nelson, 2003). These effects parallel nostalgic recall's capacity to engender a united, coherent life narrative. Nostalgic recall connects the past with the present by allowing people to feel connected to others from their past in the present moment as they recall these memories. Engaging in nostalgic recall encourages people to participate in prosocial behaviors and take on other's perspectives through evoking empathy (Zhou, Wildschut, Sedikides, Shi, &

Feng, 2012). Sharing autobiographical memories with others can also help people to understand, learn about, and bond with the person who is recalling the memory (Fivush et al., 1996). It also allows others to provide the person who is recalling the memory with alternative perspectives and interpretations of the situation. In this way, autobiographical and memories serve to impart information, deepen social ties, and broaden perspectives. Research examining nostalgic memories argues that the collective nature of nostalgic memories serves a bidirectional purpose; it strengthens the accessibility of nostalgic memories while also strengthening social bonds with others involved in the memories (Wildschut, Sedikides, Arndt, & Routledge, 2006). Moreover, social interactions also serve as a trigger for nostalgia. This cycle, however, may be disrupted in depression. Depressed individuals tend to have fewer social interactions (Barger, Messerli-Bürgy, & Barth, 2014; Cornwell & Waite, 2009; Joiner, Lewinsohn, & Seeley, 2002), which would decrease the opportunity for nostalgic memories to be triggered and would also likely result in having fewer social memories to encode and later retrieve.

### **Directive.**

Capitalizing on the past, the directive effects of nostalgia helps guide present and future behaviors as well as problem solving efforts. It also overlaps with both the self and social effects of nostalgia. Pillemer (2003) argues that autobiographical memories, such as nostalgic ones, are reminders of personal values and serve as pivotal moments when choosing life directions. Nostalgic recall also amplifies optimism and self-esteem (Cheung et al., 2013), leaving individuals more confident about their ability to take on future challenges. Nostalgic recall serves as a built-in defense mechanism that individuals can summon when they experience existential threats to mortality and life meaning; nostalgic recall helps to buffer against these threats by reducing feelings of meaninglessness and by dissipating distress (Routledge et al., 2011;

Routledge, Arndt, Sedikides, & Wildschut, 2008), allowing people to maintain a sense of well-being. Supporting this idea, the meaning maintenance model asserts that people possess an inherent need for meaning and that when personal meaning, self-esteem, social acceptance, or mortality are challenged, people engage in “fluid compensation.” They turned to antithetical memories and interpretations of themselves to restore meaning and buttress positive self-views (Heine, Proulx, & Vohs, 2006).

In synthesizing past literature, D’Argembeau, Lardi, and Van der Linden (2012) argue that when people organize and recall their memories, they derive meaning and knowledge about themselves, their own attributes/abilities, the world, and their relationship with others. These lessons help guide people’s generation of conceivable future goals, outcomes, and events while also shaping the scope of what they feel is possible for the future. D’Argembeau and colleagues contend that people selectively recall and assemble representations of themselves and the future that are congruent with their future goals. Thus, there is a cyclical interaction between memories of past events and how they shape people’s present self-concept and beliefs about future self-efficacy. Self-efficacy, which nostalgic recall bolsters (Stephan et al., 2014), has been shown to predict more successful future outcomes (Buckelew et al., 1996; Lane et al., 2004; Multon, Brown, & Lent, 1991). This finding suggests that recalling positive memories of the self helps to generate future successes and more positive memories to draw on in the future. Conversely, individuals with lower perceived self-efficacy tend to filter events through a negative lens, as is the case in depression. Engaging in nostalgic recall for these individuals may serve to perpetuate and reinforce negative self-views and outcomes.

As a specific kind of autobiographical memory, nostalgic recall, much like autobiographical recall, has multifaceted effects. It influences self-conceptualization, social

relationships, future goals, and future perceptions of one's self. It can confer these effects and buffer against threats by boosting self-esteem and resilience, reinforcing self-continuity and sense of meaning, and facilitating social connectedness. Many of the areas in which nostalgia generates positive effects are areas that depression impacts, making nostalgic recall a potentially potent tool for fighting depression. However, given the cognitive and attentional biases present in depression, it may be difficult for depressed individuals to garner benefits from nostalgia by itself. The next sections of this paper will outline the cognitive and attentional biases in depression and how they could impact the effects of nostalgic recall as well as why mindfulness may be a way to help bridge these biases and allow nostalgic recall to be a beneficial tool for people with depression.

### **Depression**

To understand how depressive symptomology may mediate the benefits of nostalgic recall, it is necessary to outline the cognitive patterns and attentional biases associated with depression. Diagnostic features of depression include, low mood, thoughts of worthlessness, difficulty concentrating or making decisions, and decreased interest and pleasure in activities (American Psychiatric Association, 2013). In depression, the mind fixates and perseverates on negative mood states. This perseverative focus compromises individuals' ability to engage in problem solving efforts or efforts to distract themselves from this negative mood state (Nolen-Hoeksema & Morrow, 1991). In addition, depression is associated with a negative self-focus and attentional bias to negative, mood congruent information as well as over-general memories of past events. For the purposes of this discussion, this project focuses on how depressive cognitive and attentional styles are related to the three primary effects of nostalgia (i.e., self, social, and directive). Two common frameworks used to describe depression are Beck's cognitive triad

(Clark & Beck, 1999) and the depressive attributional style (Abramson, Seligman, & Teasdale, 1978; Seligman, Abramson, Semmel, & von Baeyer, 1979). Beck's model characterizes the cognitions that accompany depression as negative thoughts about the self, the world, and the future. The depressive attributional style is the tendency for depressed individuals to see their condition as a product of their own fault (i.e. internal), stable over time, and affecting multiple domains of their life (i.e. global). Thus, both models share similar ideas about the internalized negative self-focus, the stable, hopeless outlook on the future, and the pervasiveness of the cognitive bias across domains that shape worldviews.

### **Self-Conceptualization**

Engaging in nostalgic experiences help individuals create meaning in their lives and weave a coherent life story that reaffirms positive aspects of the self. They also help raise self-esteem. This positive view starkly contrasts how the self is conceptualized in depression. Worthlessness is a key diagnostic feature of depression as is low self-esteem. The link between depression and low self-esteem has long been established (Battle, 1978), and a meta-analysis has confirmed that the relationship between the two is bidirectional, meaning that lower levels of self-esteem can also predict depression (Sowislo & Orth, 2013). Much in the same way that remembering nostalgic events enhances self-esteem and healthy coping, contingencies of self-worth have negative effects in depression. Depressed individuals often gauge their self-worth from the outcomes of external events that are outside of individuals' control, rather than the more adaptive strategy of gauging their self-worth from the aspects of an event that they have control over. Given the unpredictable nature of external events, this maladaptive strategy leads to lability in self-esteem, rumination, feelings of helplessness, and depression vulnerability (Crocker, 2002). Nostalgia literature suggests that engaging in nostalgic recall can reduce extrinsic self-

focus, but that this effect is lessened when people were prompted to consider external influences during their recall. Extrinsic self-focus was also negatively associated with state nostalgia (Baldwin, Biernat, & Landau, 2014). Thus, due to their tendency to focus on external events, depressed individuals may be likely to report lower levels of state nostalgia and are unlikely to see the same reduction in extrinsic self-focus as non-depressed individuals. Furthermore, when external events turn out unfavorably, depressed individuals often feel powerless. Feelings of helplessness can result in lower perceived self-efficacy (Bandura, Pastorelli, Barbaranelli, & Caprara, 1999; Maciejewski, Prigerson, & Mazure, 2000) and are in line with Abramowitz's attributional model of depression.

Abramowitz's model argues that individuals possess a perceived external locus of control in depression (Abramowitz, 1969; Benassi, Sweeney, & Dufour, 1988). This suggests that depressed individuals evaluate their worth, and ability to attain goals, and ability to affect change in the future as low, leaving them feeling powerless. Interestingly, although individuals with depression generally see events as outside of their control, they see themselves to blame for failures (Abramson & Sackheim, 1977). They adopt an internal attributional style for explaining the cause of negative events (Peterson & Seligman, 1984) and personalize unfavorable outcomes. This internalized, self-critical attribution style is consistent with the ruminative thought pattern that often accompanies depression. Trapnell and Campbell conceptualize rumination as a "self-attentiveness motivated by perceived threats, losses, or injustices to the self" (1999, p. 297). Work from Pyszczynski and Greenberg (1985) supports this argument, finding that depressed individuals prefer to engage in self-focus after failure, which over time, leads to individuals blaming themselves for these shortcomings (Pyszczynski & Greenberg, 1987). This paradoxical relationship between individuals' view of themselves as helpless, yet to blame for failure makes

it easy to see how feelings of worthlessness emerge in depression. It also illustrates how depressed individuals filter their world through negative schemas, paying greater attention to negative events.

### **Attentional Bias**

The selective attentional bias present in depression helps formulate and support the paradoxical view of low perceived control and a high belief in responsibility for negative outcomes. Individuals with depression possess undesirable cognitive biases that are derived from cognitive appraisal errors and overgeneralizations of event outcomes (Beck, Rush, Shaw, & Emery, 1987). Depressed individuals selectively filter out information that is inconsistent with their existing beliefs while demonstrating a heightened attention to negative, mood-congruent information (Gotlib, Krasnoperova, Yue, & Joormann, 2004; Ilardi, Atchley, Enloe, Kwasny, & Garratt, 2007). As a part of the cognitive distortions that Beck describes (1967), depressed individuals often minimize or discount positive information that is inconsistent with their views. They instead tend to focus on aspects of situations that support their negative beliefs, making these beliefs more stable over time and difficult to change. This bias helps reconfirm and perpetuate their maladaptive views about themselves and the world. Depression is also accompanied by a heighten self-focus (Ingram & Smith, 1984; Mor & Winquist, 2002). The combination of this negativity bias and self-focus are the foundation for the perseverative self-focus after failure (Pyszczynski & Greenberg, 1985) and internalization of blame (Pyszczynski & Greenberg, 1987). The more negative life events a depressed individual faces, the more likely they are to attribute these events to their character as a person, rather than the situation or their behavior at a particular moment. As a result, when depressed individuals blame their character for the causes of negative outcomes, they see these attributions as more stable and global than

when they attribute negative events to their behavior (Peterson, Schwartz, & Seligman, 1981). This is problematic because this type of maladaptive, assimilated self-attribution engenders cognitive dissonance through highlighting the divergence between the perceived self (a failure) and the ideal self (successful).

Cognitive dissonance is typically minimized in non-depressed people through redirecting attention to more positive thoughts such as nostalgic memories or through reappraising the event (De Raedt & Koster, 2010). However, awareness of discrepancies between people's view of who they are and who they want to be can also trigger rumination. In depression, individuals are unable to easily disengage attention from this negative, analytical, self-focused ruminative style. For this reason, these depressotypic ruminations are hypothesized to be a result of dysfunction in cognitive control (Joormann & Gotlib, 2010; Joormann, Yoon, & Zetsche, 2007; Koster, De Lissnyder, Derakshan, & De Raedt, 2011). Higher levels of rumination also play a role in the development of more passive coping styles, which exacerbate depressive symptoms (Marroquín, Fontes, Scilletta, & Miranda, 2010). The style of focus (ruminative versus reflective) people adopt when thinking about low mood states influences memory recall. People who ruminate are likely to recall negative, mood-congruent memories, which keeps them in a low mood state, whereas people who take on a reflective style are more likely to recall positive, mood-incongruent memories (McFarland & Buehler, 1998), which can help them transition out of a low mood state.

Rumination is a self-perpetuating process, in which attempts at emotional suppression through strategies such as overgeneralization lead to avoidance. Avoidance subsequently prevents opportunities for the formulation of new, potentially adaptive explanations and attributions (Watkins & Teasdale, 2004). Instead, depressed individuals get mired in a cognitive

loop in which they try to make sense of past difficulties and unresolved discrepancies in order to create a cohesive self-narrative, but fail due to their rigid, analytical cognitive schemas.

Individuals who are prone to brood on these self-discrepancies show a decrease in autobiographical memory specificity, suggesting that they create over-general memories of the past (Schoofs, Hermans, Griffith, & Raes, 2013) in an attempt to regulate emotions by avoiding unpleasant emotions. This maladaptive coping mechanism may have important implications for how depressive symptoms may impact the effects of nostalgic recall.

### **Cognitive Biases**

#### **Overgeneralization and autobiographical memory specificity.**

The connection between rumination and overgeneralized memories in depression has been well researched. Several studies have linked reduced autobiographical memory specificity to depression course and severity (e.g., Brittlebank et al., 1993; Gibbs & Rude, 2004; Kuyken & Dalgleish, 2011; Park et al., 2002; Van Daele, Griffith, Van den Bergh, & Hermans, 2014; Williams et al., 2007). Additional work has demonstrated that rumination plays a mediating role in this relationship (Raes et al., 2006; Schoofs, Hermans, Griffith, & Raes, 2013; Watkins & Teasdale, 2001). This implies that higher levels of rumination lead to reduced specificity in autobiographical memory and greater depressive symptomology. Moreover, cognitive style is another factor that can affect both memory specificity and mood. Higher levels of self-focused attention lead to negative mood states. This is particularly true of individuals with more analytical self-focused thinking styles, consistent with rumination (as compared to individuals with more experiential self-focused thinking styles, consistent with reflection). This thinking style is associated with greater overgeneralization in memories (Watkins & Teasdale, 2001).

Overgeneralization and rumination are key aspects of depression's maladaptive cognitive structure. They impact individuals' views of self, the world, and others as well as the way in which they remember information. Beck (1967) argues that depressed individuals tend to discount and minimize successes while they perceive failures as representative of global self-attributes. This would then suggest that depressed individuals may have fewer positive memories to draw upon, and the ones they do possess may be vague sketches of events rather than rich, vivid memories, potentially limiting the effectiveness of nostalgic recall as a coping for depressed individuals.

These cognitive biases accompanying depression have important implications for depressed individuals' view of the present and of the future. Cognitive distortions not only reaffirm depressed individuals' views of themselves as worthless, but also contribute to feelings of helplessness as depressed individuals see themselves as a failure across multiple domains of life. This view limits the scope of what they see as possible for themselves in the future and predicts depressive symptom severity over time (Smith, Christensen, Peck, & Ward, 1994). Furthermore, overgeneralization can lead to catastrophizing about future events (Beck et al., 1987; Ellis, 1962).

### **Catastrophizing.**

Catastrophizing is defined as possessing an irrationally negative view of the future that can be triggered by feelings of helplessness and vulnerability, both of which are present in depression. Individuals who are prone to catastrophizing see threats as looming in the future (Riskind & Williams, 1999). This exaggeratedly negative conceptualization of the future links to other aspects of the depressotypic cognitive style. In the development and validation of the Pain Catastrophizing Scale, factor analysis produced three second-order factors that comprise

catastrophizing: magnifying, ruminating, and helplessness (Sullivan, Bishop, & Pivik, 1995).

The magnification of threat mirrors overgeneralization through misconstruing and overvaluing the data obtained from a given situation. This magnification makes threat feel more universal than it actually is and amplifies perceived future threats. Once negative thoughts and attributions are formed, rumination renders individuals unable to inhibit these negative thoughts. Feelings of helplessness, as discussed earlier, are associated with low self-efficacy and a perceived inability to change the situation. These three constructs that underlie catastrophization contribute to stable attributions about the future observed in depression; depressed individuals ruminate on negative events, making them feel ever-present; they see the future as hopeless; and see themselves as unable to change this gloomy prospect (Kovacs & Beck, 1978). Moreover, this rigid, pessimistic style of thinking impairs problem solving and the ability to generate novel solutions or alternative explanations that could potentially challenge these cognitive biases. In both healthy and depressotypic views of the future, individuals rely on past perceptions of the self to guide behavior. The directive effects of nostalgic recall can help highlight past successes that reinforce self-efficacy and serve as a knowledge base for problem solving that healthy individuals can draw upon, giving them a more hopeful view of the present and future. However, depressed individuals may not be able to disengage from their ruminative focus to overcome their catastrophized views of the future. They may also have less vivid and fewer positive memories to draw upon. These memories may highlight discrepancies between a positive past self and a depressed current self, creating dissonance. For these reasons, depressed individuals may have a limited ability to access the directive effects of nostalgia.

### **Problem solving.**

Problem-solving ability in depression is important to include in this discussion not only

because depression impairs problems-solving ability, but also because it relates to the directive effects of nostalgia. The directive effects of nostalgia posit that nostalgic recall fosters emotion regulation. It does so by moving attention away from negative emotions and directing it toward reappraising an event in the context of positive emotions, and by helping to guide problem-solving and future planning (Holland & Kensinger, 2010). This aspect of nostalgia's effects becomes limited in a depressed population as depressed individuals exhibit deficits in their ability to reappraise events and refocus attention. The diminished ability to disengage attention from negative self-focused thoughts is a defining feature of depression. As outlined in the discussion of rumination, depression has often been classified as a problem with disengaging attention from negative self-focused thoughts. The impaired disengagement hypothesis (Koster et al., 2011) asserts that depressed individuals possess low attentional control and subsequently struggle to turn their attention away from rumination and to adaptive emotion regulation skills such as distraction or reappraisal, both of which can be facilitated through nostalgic recall. This difficulty with this disengagement leads to reduced efficacy in problem-solving efforts and difficulty with task performance (e.g., Brown & Watkins, 2002; Meiran, Diamond, Toder, & Nemets, 2011; Watkins & Baracaia, 2002). These deficits are important for two reasons: first, poor task performance provides depressed individuals with data that reaffirms their notion of themselves as inefficacious and can perpetuate rumination; second, impaired problem-solving and prolonged focus on negative information engenders a stable attribution about the future as hopeless.

Studies on rumination and executive function in depressed individuals suggest a mechanism for the observed problem solving difficulties. Depressed individuals have greater difficulties in switching tasks, reflecting deficits in attentional disengagement. When considering

rumination, depressed individuals show a worse ability to update working memory and an impaired ability to integrate information needed to plan and be successful at achieving a goal (Meiran, Diamond, Toder, & Nemets, 2011). Rumination and frequency of thoughts are unrelated to a given task predict task performance. Under high and low levels of cognitive load, rumination negatively predicts ability to attend to and identify target stimuli. Rumination also predicts slower reaction times and along with negative mood, predicts difficulty with response inhibition (Brinker, Campisi, Gibbs, & Izzard, 2013). Depressed individuals also show impairments in removing unnecessary information and in preventing negative information from entering and remaining in working memory (Gohier et al., 2009; Joormann & Gotlib, 2010; Joormann, Yoon, & Zetsche, 2007). Joorman & Gotlib (2010) argue that these deficiencies in inhibition help explain the difficulties with emotion regulation observed in depression. Negative mood can trigger depressotypic thoughts and rumination. To ameliorate mood and disrupt this cycle, individuals need to possess good control over the content of their working memory. Thus, an inability to prevent or remove negative, mood-congruent information that is often irrelevant for the task at hand from entering or remaining in working memory is problematic. It leads to rumination, prolonged negative mood, attention deficits, and cognitive slowness as these negative thoughts deplete cognitive resources.

Neuroimaging data corroborate these behavioral findings, demonstrating aberrant brain activity during working memory tasks. One study found that while depressed individuals are able to perform at levels commensurate with health controls on working memory tasks, they exhibit greater activity in the dorsal lateral prefrontal cortex (dlPFC) and anterior cingulate cortex (ACC) during these tasks (Harvey et al., 2005; Matsuo et al., 2006). The dlPFC is an area of the brain that is responsible for executive function and working memory. The ACC also plays a role

in executive function and working memory as well as in attention inhibition, resolution of cognitive conflict or dissonance, and affect regulation. Taken together, these findings suggest that depression leads to impaired cognitive capacity through consumption of cognitive resources. In order to maintain task performance, depressed individuals have to exert additional cognitive effort, resulting in fatigue and decreased task performance over time (Harvey et al., 2005).

Marazziti, Consoli, Picchetti, Carlini, & Faravelli (2010) contend that the memory deficits in depression are secondary to attention problems. One result they found supporting this argument was that depressed individuals have a harder time than non-depressed individuals transferring information from short-term to long-term memory and have impaired task and problem-solving planning. The combination of several cognitive factors may explain the overgeneralized memories that accompany depression: 1) difficulty encoding information into long-term memory 2) difficulty inhibiting negative cognitions 3) prolonged rumination's consumption of cognitive resources and 4) lower salience of positive information. The difficulty encoding information in depression could interfere with the storing and subsequent retrieval of nostalgic events due to the average age of onset of depression. Three-fourths of lifetime cases of depression start by age 24 and the average age of onset for depression is 30 years of age (Kessler et al., 2005). This window coincides with the "reminiscence bump," the period of time during which most people report experiencing their most important life events, which are likely targets for nostalgic recall (Berntsen & Rubin, 2004; Rubin & Berntsen, 2003). Furthermore, given the chronicity that characterizes depression with a 35% recurrence rate (Eaton et al., 2008; Hardeveld, Spijker, De Graaf, Nolen, & Beekman, 2010), it is possible that individuals could also have depression later in life when trying to recall memories from the past. These deficits potentially limit the ability to encode nostalgic events and subsequently recall them. This

difficulty in turn affects problem-solving through hampering the directive effects of nostalgia. It limits individuals' ability to harness the knowledge gleaned from past experiences and successes to solve current problems and plan for the future.

The attentional problems that Marazziti and colleagues argue lead to memory deficits in depression may be linked to rumination by playing a role in the diminished capacity for task planning and problem solving. Watkins and Teasdale (2001) examined the effects of attentional style on memory specificity by comparing highly self-focused analytical attention styles (i.e., ruminative) to low self-focused experiential attention styles (i.e., reflective) and found that the highly self-focused analytical style reduced autobiographical memory specificity. Successive work in this line of research has examined how these two types of attentional styles impact self-worth and social problem solving. Abstract, analytical styles are more evaluative and self-focused. They predict an increase in feelings of worthlessness (Rimes & Watkins, 2005) and a decreased ability to solve social problems (Watkins & Moulds, 2005). Thus, both nostalgic recall and depression have broad reaching effects across similar cognitive and social domains but in opposite directions: nostalgic recall helps bolster these areas, whereas depression hinders them.

### **Proposed Interaction between Effects of Nostalgia and Depression**

Engaging in nostalgic recall helps construct a continuous self-narrative, brings in outside perspectives through increasing social engagement, aids individuals in problem solving, and heightens hope for the future. These potential effects would be advantageous for depressed individuals, who struggle with low self-efficacy, social isolation, hopelessness, and difficulty escaping their ruminative thoughts. However, minimal research to date has examined whether engaging in nostalgic recall has the same effects in depressed individuals as non-depressed individuals. One study examining the effects of nostalgia in habitual worriers found that

nostalgia amplifies symptoms of depression and anxiety (Verplanken, 2012). Thus, it is possible that the cognitive and attentional biases that accompany depression could affect the specificity and emotional quality of the nostalgic memories depressed individuals recall as well as depressed individual's ability to fully immerse themselves in the nostalgic experience. Subsequently, these differences may restrict nostalgic memory's ability to promote the aforementioned traits associated with psychological well-being. By selectively filtering information according to their negative self-schema, depressed individuals tend to take in more critical information about themselves and have difficulty disengaging attention from perseverative rumination. In this way, depressed individuals likely miss many of the positive moments in life, absorbed in their search for information that reinforces their pessimistic views. Rehashing past failures diminishes working memory, reduces ability to translate information from short-term to long-term memory, and consumes the cognitive resources that would ordinarily allow depressed individuals to focus on their present experience. The combination of highlighting negative information and a diminished ability to extricate themselves from their internal dialogue leaves depressed individuals less equipped to encode and retrieve nostalgic memories. This raises questions as to whether recalling overgeneralized, generic memories possesses the same capability of producing the same effects as recalling distinct, vivid nostalgic memories.

These cognitive and attentional biases also lead to a cascade of negative consequences that may interfere with nostalgia's effects. Among these disruptive beliefs and behaviors are lower perceived self-efficacy, catastrophizing about the future, and a diminished ability to engage in problem solving. The directive effects of nostalgia have the potential to counteract these unfavorable characteristics. However, depressed individuals would need to harness greater

cognitive flexibility and cognitive inhibition to generate multiple future outcomes, encompassing a spectrum of possible future scenarios, rather than becoming stymied by only considering ruinous prospects. Greater flexibility and inhibition would allow them to engender a more hopeful view of the future and see themselves as more efficacious. Given that individuals with depression struggle with many areas nostalgic recall positively affects, it is possible that nostalgic recall could be a powerful adjunctive therapeutic tool in depression treatment if there was a way to assuage these attentional and cognitive biases inherent to depressogenic thinking.

### **Application of Mindfulness**

Research exploring depression's effects on nostalgia's ability to promote well-being could deepen the current understanding of factors that impact depression. If findings in depressed populations are consistent with those in healthy populations, then nostalgic recall may be considered for use as a therapeutic aid. If findings in depressed populations reveal that depression and its cognitive and attentional biases interfere with nostalgia's capacity to embolden coping, as this paper contends, then mitigating these tendencies should restore nostalgia's advantageous outcomes. The growing literature on mindfulness based interventions suggests that engaging in mindfulness practice may be a way to lessen these depressogenic biases.

Mindfulness promotes disciplined attention to the current moment in an objective, accepting manner (Bishop et al., 2004). Mindfulness practices typically carried out in a quiet setting and ask individuals to sit upright in their chair, close their eyes, and focus their attention on a particular topic or sensation, such as one's breath. People are encouraged to return their attention back to their point of focus each time they notice it wandering. In depressed populations, mindfulness based interventions decrease depressive and anxiety-related symptoms

(Barnhofer et al., 2009; Hofmann, Sawyer, Witt, & Oh, 2010), help prevent relapse, and improve quality of life (Kuyken et al., 2008). They also improve distress tolerance (Verplanken & Fisher, 2014), increase autobiographical memory specificity (Heeren et al., 2009), and decrease rumination (Baer, 2009; Kingston, Dooley, Bates, Lawlor, & Malone, 2007).

Research has sought to identify the underlying constructs that mindfulness affects. One such construct is over-identification with thoughts and emotions, which is consistent with the enmeshed, overgeneralized pattern of ruminative thoughts. In over-identification, individuals place more meaning or weight than is warranted on a particular thought or emotion and can see the thoughts or emotions as immutable facts. Dampening over-identification allows individuals to take a more balanced, impartial view of unpleasant thoughts and emotions. One study examining mindfulness's mechanism of action found its ability to decrease over-identification and self-judgment to be the most robust predictors of changes in symptoms related to depression, anxiety, and stress (Van Dam et al., 2014). This result compliments the literature investigating self-focused cognitive styles, which found that cognitive styles high in analytical, evaluative self-focus (e.g., ruminative styles) increase feelings of worthlessness, whereas cognitive styles high in experiential, concrete focus (e.g. mindful, reflective styles) did not (Rimes & Watkins, 2005). Mindfulness promotes objective problem-focused thinking that is grounded in the present experience and prevents individuals from overgeneralizing information (Watkins, Baeyens, & Read, 2009). These changes in cognitive style are part of the way mindfulness disrupts and reduces rumination.

Due to their cognitive biases, depressed individuals lack the ability to effectively reappraise negative emotions. Attempts to do so often result in rumination and the maintenance of negative moods states (Watkins, Moberly, & Moulds, 2008). Teasdale, Segal, and Williams

(1995) contend that mindfulness interferes with the automatic replay of pessimistic thoughts and reinforcement of undesirable schema by shifting focus away from rumination and to unbiased, sensible aspects of individuals' experiences. In accordance with this finding, subsequent research has found that the degree to which mindfulness reduces maladaptive rumination and increases adaptive cognitions mediates mindfulness's efficacy in reducing depressive symptoms (Heeren & Philippot, 2011). Increasing present awareness in lieu of rumination appears to minimize negative cognitive and emotional elaboration on an experience, restricting individuals from reaffirming negative self-conceptualizations (Farb, Anderson, & Segal, 2012).

This shift to a more adaptive form of cognitive processing, which mindfulness facilitates, improves emotion regulation and decreases emotional avoidance. Mindfulness does so by enabling individuals to perceive their emotions in an objective, non-threatening way. These effects are important for two reasons. First, decreasing rumination in favor of attending to the current experience and increasing tolerance of negative emotions allows for more explicit encoding and retrieval of memories, which increases autobiographical memory specificity (Heeren et al., 2009; Williams et al., 2000). This frees individuals' attention from negative self-focus and allows them to notice a fuller experience, which translates into encoding and subsequent retrieval of richer memories. Increased specificity in encoding and retrieval of memories sets the foundation for empowering depressed individuals to effectively engage in nostalgic recall and possibly obtain the proposed benefits it offers. Second, improved emotion regulation nurtures a greater perception of coping and self-efficacy (Luberto, Cotton, McLeish, Mingione, & O'Bryan, 2013). This is useful given that Judge, Erez, Bono, and Thorsen (2002) argue that self-esteem, self-efficacy, and locus of control are likely to be part of the same higher order construct. This means that increasing self-efficacy should also augment internal locus of

control. It stands to reason that greater perceived self-efficacy and internal locus of control would help depressed individuals access the directive, problem-solving facet of nostalgic recall. Furthermore, mindfulness also increases cognitive and attentional flexibility and cognitive inhibition (Brown, Ryan, & Creswell, 2007; Heeren et al., 2009). This should heighten depressed individuals' ability to fully engage in nostalgic recall, which should help them to consider a wider range of possible future outcomes and problem solving solutions.

In summary, mindfulness has been shown to increase cognitive flexibility, decrease overgeneralized memories, help depressed individuals shift attention away from ruminative thought more easily, and boost self-efficacy. These characteristics may serve to dampen the cognitive and attentional biases in depression enough to allow depressed individuals to gain additional coping strategies from engaging in nostalgic recall and further improve recovery efforts. Exploring the effects of mindfulness on nostalgic recall in depressed individuals could help improve our understanding of factors that enhance recovery as well as expand mindfulness's therapeutic applications.

### **Present Study**

Given that the vast majority of prior research has examined the relationship between nostalgic recall and well-being in healthy populations, more work is needed on the nature of this relationship across varying degrees of depressive symptomatology. To address this need, I conducted three experiments investigating the moderating effect of depressive symptomatology on nostalgia's ability to promote well-being. It also evaluated whether mindfulness can augment the benefits to psychological well-being that nostalgic recall can promote. The three experiments were completed concurrently. Experiments 1 and 2 compared the effects of nostalgic recall (versus an ordinary memory recall, serving as a control condition) across varying degrees of

depressive symptomatology in two different populations. Experiment 3 examined the effects of a brief mindfulness intervention on the effects of nostalgic recall across varying degrees of depressive symptomatology. These three studies examined induced rather than naturally occurring nostalgic recall. This approach lays the groundwork for the investigation of the efficacy of nostalgic recall as a therapeutic tool.

### **Specific Aims and Hypotheses**

The specific aims of this study were to 1) examine depressive symptomatology's impact on the effects of nostalgic recall; 2) determine the impact of mindfulness on nostalgic recall 3) determine whether greater nostalgia leads to decreases in depressive symptomatology and whether mindfulness can heighten these effects across varying degrees of depressive symptomatology.

#### **Aim 1: Examine depressive symptomatology's impact on the effects of nostalgic recall.**

Experiments 1 and 2 and Experiment 3 addressed this aim. As previously described, past research has demonstrated that evoking nostalgic memories can promote self-continuity and meaning, encourage social connectedness, and direct future planning and behavior. However, the impact of mood state on these effects has yet to be fully explored. It is important to understand this relationship in order to better treat depression.

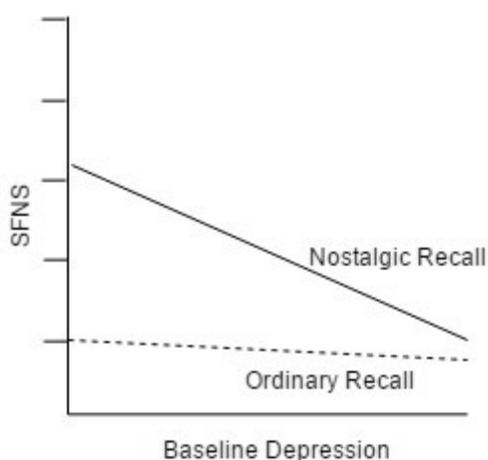
#### ***Hypothesis 1a:*** Main effects –

-*Hypothesis 1a1:* Main effect of depressive symptomatology on **SFNS:** Higher levels of baseline depressive symptomatology should predict lower state levels of nostalgia across recall conditions.

- *Hypothesis 1a2:* Main effect of recall type on SFNS: Engaging in nostalgic recall should predict higher state levels of nostalgia than engaging in an ordinary recall.

#### ***Hypothesis 1b:*** Interaction –

*Hypothesis 1b:* Two-way interaction between recall condition and baseline levels of depressive symptomology: The nostalgic recall group will report higher state levels of nostalgia than the ordinary recall group at low levels of baseline depressive symptomology. However, as depressive symptomology increases, the effects of nostalgic recall will diminish and the nostalgic recall and ordinary recall groups will report similar state levels of nostalgia when higher levels of depressive symptomology are reported. Hypotheses for Aim 1 are illustrated in Figure 1.



*Figure 1.* Depressive symptomology's proposed impact on SFNS score.

**Aim 2: Determine whether mindfulness can heighten reported nostalgia (i.e., SFNS scores) across varying degrees of depressive symptomatology.**

Experiment 3 investigated this aim. Mindfulness based interventions are known to address cognitive and attentional biases in depression. Including a mindfulness based intervention provides a way to evaluate the role that these biases play on nostalgic recall's effects as well as a potential way to augment them.

***Hypothesis 2a: Main effect –***

*-Hypothesis 2a: Main effect of mindfulness on SFNS: Engaging in the mindfulness intervention should predict increases in state levels of nostalgia, as measured by the SFNS, across recall conditions.*

**Hypothesis 2b:** Interactions –

*- Hypothesis 2b1:* Two-way interaction between mindfulness condition and baseline levels of depressive symptomology: In the no mindfulness intervention condition, higher levels of baseline depressive symptomology will predict lower state levels of nostalgia across recall conditions, with the nostalgic recall group showing a sharper decline in SFNS scores at higher levels of depressive symptomology than the ordinary recall group. However, in the mindfulness intervention condition, reported state levels of nostalgia will not be impacted by the severity of baseline depressive symptomology.

*- Hypothesis 2b2:* Three-way interaction between baseline levels of depressive symptomology, mindfulness condition, and recall condition to predict SFNS: If hypothesis 1b is correct, there will be a minimal effect of nostalgic recall among those with high levels of baseline depressive symptomology (two-way interaction between baseline depressive symptomology and recall condition on SFNS). Participating in the mindfulness intervention should alter this interaction such that participating in the mindfulness group should mitigate the effects of baseline depressive symptomology on the relationship. Mindfulness intervention participants in the nostalgic recall condition should report higher state levels of nostalgia than those in the ordinary recall group, regardless of baseline level of depressive symptomology. Individuals who do not take part in the mindfulness intervention should produce results consistent with hypothesis 1b

(i.e., When predicting SFNS, there will be less of a difference between nostalgic recall and ordinary recall at higher levels of depression than at lower levels of depressive symptomology.)

Hypotheses for Aim 2 are illustrated in Figure 2.

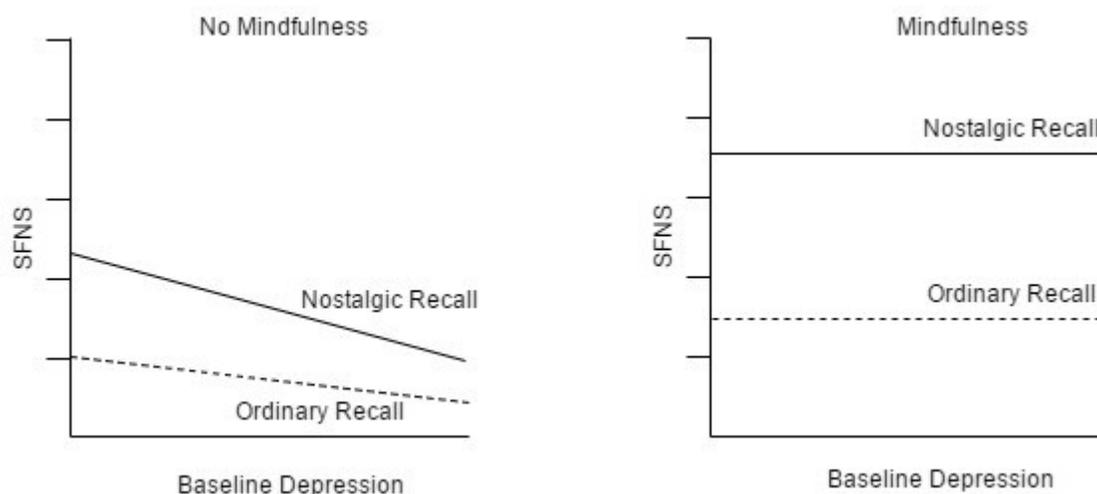


Figure 2. Proposed relationship between mindfulness intervention depressive symptomology and SFNS.

**Aim 3: Determine whether nostalgia can decrease depressive symptomology and whether mindfulness can have an incremental effect.**

Experiment 3 investigated this aim relating to improvements in depressive symptomology. Although it is hypothesized that individuals with higher levels of depressive symptomology may not be able to gain the same degree of benefit from engaging in nostalgic recall as those with lower levels of symptoms, it is important to investigate whether the benefits they do glean can reduce their state level of depressive symptomology. The measure of the state level of nostalgia examines constructs that are related to depression such as social connectedness, but is not a measure of depressive symptomology. Furthermore, mindfulness will be investigated as a means to mitigate the effects of depression and enhance the effects of nostalgic recall, subsequently leading to greater improvement in depression.

**Hypothesis 3a:** Main effects –

*-Hypothesis 3a1:* Main effect of SNFS on change in state level of depressive symptomology: Higher state levels of nostalgia, as measured by the SFNS, should predict larger decreases in state depressive symptomology across recall conditions. It is possible that individuals in both the nostalgic and ordinary recall groups may have some level of nostalgic experiences when engaging in the recall conditions as both nostalgic and ordinary memories are autobiographical ones and share similar impacts (e.g., on self and feelings of social connectedness). However, this main effect is interested in investigating the degree to which experienced nostalgia (as indexed by the SFNS) predicts changes in state depressive symptomology, regardless of recall condition.

*-Hypothesis 3a2:* Main effect of recall condition on changes in state level of depressive symptomology: Overall, participating in nostalgic recall should lead to greater decreases in depressive symptomology than engaging in ordinary recall.

*-Hypothesis 3a3:* Main effect of mindfulness condition on changes in state level of depressive symptomology: Participating in the mindfulness intervention should lead to greater decreases in depressive symptomology across recall conditions. ***The mindfulness based intervention*** will reduce state depressive symptomology including rumination and negative affect, resulting in decreased depressive symptomology.

**Hypothesis 3b:** Interactions –

*-Hypothesis 3b1:* Two-way interaction between recall type and SFNS on changes in levels of depressive symptomology: Hypothesis 3b1 examines the interaction between recall condition and state levels of nostalgia on changes in state level of depressive symptomology. Although nostalgic and ordinary memories are both autobiographical

memories and produce similar effects, nostalgic memories are hypothesized to do so to a greater degree. As such, it is hypothesized that at low state levels of nostalgia, the nostalgic and ordinary recall groups will both predict minimal decreases in state levels of depression. As SFNS increases, those in the nostalgic recall group will demonstrate greater decreases in state level of depressive symptomology compared to the ordinary recall group.

- *Hypothesis 3b2*: Two-way interaction between depressive symptomology and recall type on changes in levels of depressive symptomology: It is expected that as individuals report higher baseline levels of depression, the decrease in depressive symptomology resulting from engaging in nostalgic recall will diminish. Examining whether there is an interaction between level of depressive symptomology and recall condition will determine whether the individuals with higher levels of depression can still benefit from nostalgic recall at in the same way as those with lower levels of depression. One possible meaning of a significant interaction is that individuals engaging in nostalgic recall who report lower baseline levels of depression would experience greater improvement in their depression than individuals with higher baseline levels of depression and will look more like individuals participating in the ordinary recall condition. Those in the ordinary recall condition, should report low levels of change in depression score, regardless of baseline level of depression. A non-significant interaction with a main effect of recall type would signify all individuals can experience a mood boost from engaging in nostalgic recall, regardless of their level of depression.

-*Hypothesis 3b3*: Two-way interaction between depressive symptomology and SFNS on changes in levels of depressive symptomology: Similar to the interaction

between baseline depressive symptomology and recall type, an interaction of baseline depressive symptomology with SNFS would have similar meaning as SFNS should vary with recall type.

*-Hypothesis 3b4:* Three-way interaction between baseline depressive symptomology, mindfulness condition, and recall condition: The relationship proposed in the interaction between baseline depressive symptomology and recall condition (hypothesis 3b2) is consistent with what is expected in the group who does not participate in the mindfulness condition. However, participating in the mindfulness intervention is expected to mitigate the effects of depression, such that the nostalgic recall group should report consistent improvements in depression, regardless of baseline levels of depression and these improvements will be greater than those reported by those in the ordinary recall group. Both the nostalgic and the ordinary recall groups are expected to report greater improvement in depression in the mindfulness group than in the group who did not participate in the mindfulness intervention as mindfulness has been demonstrated to decrease depression symptoms in numerous studies (e.g., Barnhofer et al., 2009; Deyo, Wilson, Ong, & Koopman, 2009; Hofmann et al., 2010; Wu, Shi, Xia, & Lu, 2013)

*-Hypothesis 3b5:* Three-way interaction between baseline depressive symptomology, mindfulness condition, and SFNS on changes in levels of depressive symptomology: Expectations of this 3-way interaction are similar to those expected in the 3-way interaction between baseline depressive symptomology, mindfulness condition, and recall condition, because SFNS and recall should be highly related. The expected effect of baseline depressive symptomology on SFNS in the no mindfulness intervention condition should diminish in the mindfulness intervention condition.

Hypotheses for Aim 3 are illustrated in Figure 3.

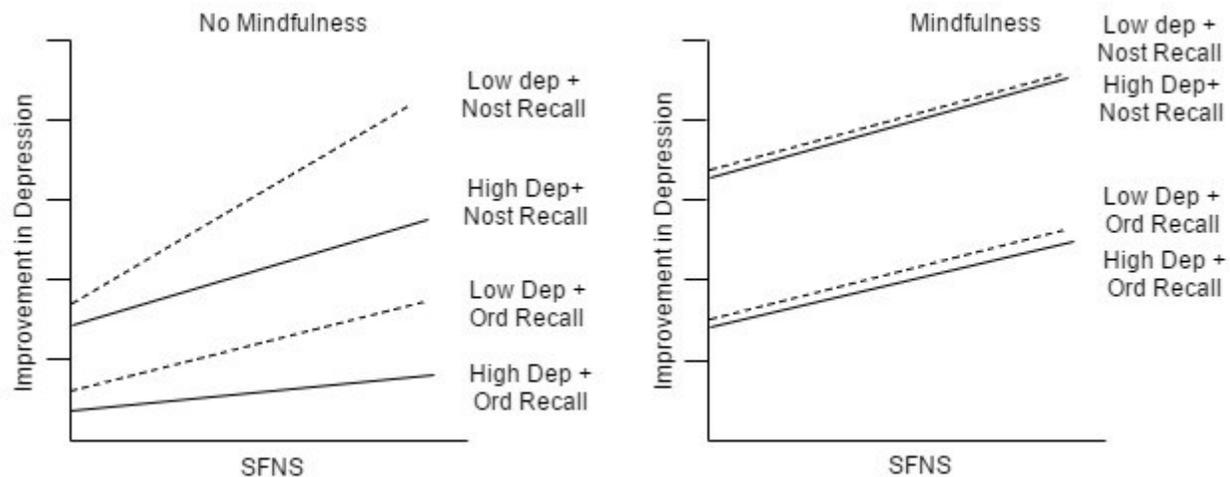


Figure 3. Proposed effects of mindfulness and nostalgia on level of depressive symptomology.

## Method

### Participants

**Experiment 1.** Two hundred two participants were recruited to participate in this online study through Amazon’s Mechanical Turk (MTurk) website. Two participants were excluded from analyses as they reported that English was not their first language, leaving a final sample size of 200. Table 1 summarizes the demographic information of the sample. Ninety-nine participants were randomly assigned to the control condition, during which they were asked to recall an ordinary event, and 101 participants were randomly assigned to the nostalgic recall condition. Participants received \$1.25 for participating in the study. MTurk has been shown to be an effective tool to reach clinical populations. It provides samples with a range of depressive symptomology comparable to that of the general population (Shapiro, Chandler, & Mueller, 2013). Given the differences in report of depressive symptomology across cultures (e.g., Draguns & Tanaka-Matsumi, 2003; Ryder et al., 2008), non-native English speakers were excluded. However, this study did not screen for county of origin and of citizenship.

Table 1  
*Demographics of the Sample*

	<b>Expt. 1</b> ( <i>n</i> = 200)	<b>Expt. 2</b> ( <i>n</i> = 200)	<b>Expt. 3</b> ( <i>n</i> = 473)
% Men	49 ( <i>n</i> = 98)	30.5 ( <i>n</i> = 61)	48.4 ( <i>n</i> = 229)
Mean age	35.66 (11.54)	18.76 (1.31)	18.86 (1.41)
Mean age in memory	Ord = 32.22 (12.13) Nost = 19.99 (10.69)	Ord = 17.65 (2.66) Nost = 14.61 (4.62)	Ord = 17.60 (2.79) Nost = 14.30 (4.60)
Mean education (yrs)	15.31 (3.25)	13.15 (1.42)	12.89 (1.24)
Ethnicity			
% Caucasian	76.5	88.5	82.2
% Asian	10	3.5	4.2
% African America	7	2.5	7.0
% Hispanic/Latino	5.5	3.5	3.0
% Middle Eastern	0	0.5	0.6
% Other	1	1.5	2.9

*Note:* Ord = ordinary recall, Nost = nostalgic recall.

**Experiment 2.** Two hundred twelve participants from undergraduate psychology classes at the University of Kansas were recruited to participate in this online study. Twelve participants were excluded from analysis due to exiting the study on Qualtrics prior to completion, leaving a sample size of two hundred. Listwise exclusion of incomplete responses comprised 5.6% of the data, which is well within the range of data exclusion that is thought to be inconsequential for statistical analysis (Dong & Peng, 2013). Table 1 describes the sample's demographic characteristics. One hundred participants were randomly assigned to the control condition, during which they recalled an ordinary event, and 100 participants were randomly assigned to the nostalgic recall condition, during which they recalled a nostalgic memory. Participants received course credit for participating in this study. Participants were excluded if they had taken part in Experiment 3 of this project. Given the differences in report of depressive symptomology across cultures (e.g., Draguns & Tanaka-Matsumi, 2003; Ryder et al., 2008), non-native English

speakers were also excluded from this experiment. However, this study did not screen for county of origin and of citizenship.

**Experiment 3.** Four hundred seventy-three participants from undergraduate psychology classes at the University of Kansas were recruited to participate in this in-person study. Table 1 summarizes the demographic characteristics of this sample. Two hundred sixty-one participants were randomly assigned to the brief mindfulness intervention. Fifteen participants were excluded due to technical difficulties with the survey as it timed out during the mindfulness intervention, leaving a sample size of 246. Listwise exclusion of incomplete responses comprised 5.7% of the data, which is well within the range of data exclusion that is thought to be inconsequential for statistical analysis (Dong & Peng, 2013). Of these participants, 123 were randomly assigned to complete the ordinary recall and 123 were randomly assigned to complete the nostalgic recall. As was the case in Experiments 1 and 2, there was a group of participants who only completed the recall condition, but not the brief mindfulness intervention. This group, who did not engage in the brief mindfulness intervention, was comprised of 233 participants. Of the 233 participants, six were excluded from analysis due to exiting the study on Qualtrics prior to completion, leaving a sample size of 227. Of these participants, 115 were randomly assigned to complete a nostalgic recall and 112 were randomly assigned to complete an ordinary recall. Including groups that replicated the nostalgic recall and ordinary recall conditions from Experiments 1 and 2 served as way to examine whether there were any differences in the effects of nostalgia due to completing the recall in a laboratory setting versus completing the recall in an online setting. Participants received course credit for participating in this study. Experiment 3 used the same selection criteria as Experiments 1 and 2, with the exception that participants were excluded from Experiment 3 if they have taken part in Experiment 2 of this study. Non-native

English speakers were excluded again due to cultural difference in depression presentation and to ensure that all participants could fully understand and engage in the brief mindfulness intervention in this experiment. However, this study did not screen for county of origin and of citizenship.

## **Procedure**

### **Experiment 1 and 2.**

For Experiment 1, participants were recruited through Amazon's MTurk. For Experiment 2, participants were recruited from an introductory psychology class at the University of Kansas. Both experiments were conducted online and data was collected via Qualtrics. After completing informed consent, participants provided demographic information and completed a PANAS, the MDAS, and the RRQ. Completing these measures at the start of the study provided a baseline measurement of mood and prevented the nostalgia manipulation from influencing these scores. Next, participants assigned to the nostalgic recall condition engaged in nostalgic recall. In line with prior research on nostalgia (e.g., Baldwin & Landau, 2014; Hepper et al., 2012; Routledge et al., 2008; Wildschut et al., 2006; Zhou, Wildschut, Sedikides, Chen, & Vingerhoets, 2012), participants were provided with the *New Oxford Dictionary of English* (1998) definition of nostalgia ("sentimental longing or wistful affection for the past") and asked to think of a nostalgic event from their past (Prompt in Appendix D). They then identified and recorded four keywords from that event and provided a brief description of the event and how it made them feel. Participants assigned to the control condition were given an identical task, but asked to write about an everyday, ordinary experience rather than nostalgic one (Prompt in Appendix D). Following this recall, all participants completed a manipulation check and measures of the constructs linked to the previously established effects of nostalgia (SFNS, SCS, NGSE, and

SCCS). Consistent with the procedure implemented by Verplanken (2012), participants identified and record their most positive attribute to offset any possible negative feelings the study evoked by asking about depression. All participants were debriefed at the conclusion of the study. Table 2 provides a summary of this procedure.

Table 2  
*Summary of Design for Experiments*

<b>Experiment Condition</b>	<b>N</b>	<b>Venue</b>	<b>Pop.</b>	<b>Demo info, Dep Sx Scales</b>	<b>Brief Mindful Session</b>	<b>Nost. Event Recall</b>	<b>Ord. Event Recall</b>	<b>TMS, 2<sup>nd</sup> RRQ &amp; PANAS</b>	<b>Nost. Scales</b>
<b>Expt. 1</b>	200	Online	General						
<i>Nostalgic</i>	101			X		X			X
<i>Control (Ord.)</i>	99			X			X		X
<b>Expt. 2</b>	200	Online	Under-grad						
<i>Nostalgic</i>	100			X		X			X
<i>Control (Ord.)</i>	100			X			X		X
<b>Expt. 3</b>	473	Lab	Under-grad						
<i>Mindful/Nost.</i>	123			X	X	X		X	X
<i>Mindful/Ord.</i>	123			X	X		X	X	X
<i>Nostalgic</i>	115			X		X		X	X
<i>Control (Ord.)</i>	112			X			X	X	X

*Note:* Demo = demographic, Dep Sx Scales = Depressive symptomology (Positive and Negative Affect Schedule (PANAS), Rumination-Reflection Questionnaire (RRQ), Multidimensional Depression Assessment Scale), Nost = nostalgia, Mindful = mindfulness, and Ord. = ordinary, TMS = Toronto Mindfulness Scale, Nost scales = State Functions of Nostalgia Scale, **Social Connectedness Scale, Self-Concept Clarity Scale, New General Self-Efficacy Scale.**

### **Experiment 3.**

This experiment was conducted in-person in classrooms at the University of Kansas. An in-person lab study was chosen for this experiment because, although, research suggests that results from traditional convince samples are nearly indistinguishable from online samples (e.g., Casler, Bickel, & Hackett, 2013; Krupnikov & Levine, 2014; Weinberg, Freese, & McElhattan, 2014), Krupnikov and Levine (2014) found that studies requiring greater participant engagement varied in results between in-person and online formats. Thus, since this experiment included a

brief mindfulness intervention, an in-person design was implemented to help increase the likelihood of participant engagement during this intervention. Additionally, one group of participants in Experiment 3 completed the same nostalgic recall condition described in Experiments 1 and 2 and one group completed the same ordinary recall condition described in Experiments 1 and 2 but in an in-person format rather than online. While this project expected the online and in-person designs to produce consistent results, the inclusion of these groups in Experiment 3 facilitated replication and confirmation of findings from Experiments 1 and 2 and allowed for a direct comparison between online and in-person data collection methods.

As in Experiment 2, participants were recruited from psychology classes at the University of Kansas. Participants completed the experiment in groups of approximately eight people at a time. Each group of participants was randomly assigned to receive either a brief mindfulness intervention prior to engaging in memory recall (nostalgic or ordinary) or to complete the memory recall (nostalgic or ordinary) without having completed the mindfulness intervention.

After completing informed consent, participants provided demographic information and completed a PANAS, the MDAS, and the RRQ. Participants assigned to the to the brief mindfulness intervention/ordinary recall condition and participants assigned to the brief mindfulness intervention/nostalgic recall condition then completed the brief mindfulness induction. For this induction, the experimenter played a 15-minute recorded, focused breathing mindfulness exercise based off Kabat-Zinn's (1990) Mindfulness Based Cognitive Stress Reduction program and that mirrors the methodology of Arch & Craske (2006). This intervention directed participants to focus their attention and awareness to their sensations and experience of breathing. Participants assigned to the nostalgic recall condition or ordinary recall condition without the mindfulness induction did not complete the mindfulness intervention. They

completed the nostalgic or ordinary recall after providing demographic information and completing a PANAS, the MDAS, and the RRQ. Groups of participants assigned to the mindfulness intervention completed the nostalgic or ordinary recall following the brief mindfulness intervention. All participants provided a description of their memory and completed the manipulation check as outlined in Experiments 1 and 2. All participants completed a second PANAS and RRQ as well as the TMS and the measures of constructs related to previously established effects of nostalgia (SFNS, SCS, NGSE, and SCCS). Participants also identified their most positive attribute and were debriefed at the conclusion of the study. Table 2 provides a summary of this procedure.

## Measures

**Demographic Data.** Participants reported their current age, education, gender, and ethnicity.

### **Mood and Depression:**

***Multidimensional Depression Assessment Scale (MDAS).*** The Multidimensional Depression Assessment Scale is a 48-item self-report measure of depression. The four subscales of this instrument (i.e., Emotional, Cognitive, Somatic, and Interpersonal) offer greater ability than measures such as Beck's Depression Inventory to classify depression symptomology as this study argues that cognitive symptoms may play a large role in variation of effects of nostalgic recall. The MDAS has established high reliability ( $\alpha = 0.87$ ) and good convergent validity with other widely used depression measures (Cheung & Power, 2012).

***Rumination-Reflection Questionnaire (RRQ).*** The RRQ is a 24-item self-report measure with two subscales: ruminative self-focus and reflective self-focus. This measure has high

reliability with coefficient alpha of 0.90 and 0.91 for the rumination and reflection components respectively (Trapnell & Campbell, 1999).

***Positive and Negative Affect Schedule (PANAS).*** The PANAS is a commonly administered 20-item self-report measure of affect, on which participants rate mood related adjectives on a 5-point Likert scale (1 = *not at all*, 5 = *extremely*). The instrument has validity for measuring distress, depression, and anxiety and has reported reliability between 0.84 to 0.90 (Watson, Clark, & Tellegen, 1988). Two mood scales (positive affect and negative affect), comprised of 10 items each can then be calculated from it.

#### **Mindfulness:**

***Toronto Mindfulness Scale (TMS).*** The TMS is a 13-item self-report measure of mindfulness with two factors: curious and decentering. The curious factor reflects an open acceptance and desire to learn about present experiences, and the decentering factor reflects a movement away from one's inner-thoughts to a broader awareness. This measure has a reliability coefficient alpha of .95, demonstrating high internal consistency (Lau et al., 2006).

#### **Nostalgia Effects:**

***State Functions of Nostalgia Scale (SFNS).*** This scale is a 16-item self-report measure of the various effects of nostalgia (i.e., positive affect, self-regard, social connectedness, and meaning in life). Items are measured on a 7-point Likert scale (1= Slightly or not at all, 7 = Strongly agree) and begin with the stem: "Thinking about this event..." (e.g., "Thinking about this event makes me feel life is meaningful.") (Hepper et al., 2012). Throughout the remainder of the methods, results, and discussion sections, the construct the SFNS measures will be referred to as the state level of nostalgia since the scale was developed based on analyses of the

content of nostalgic memories as a measure of level of nostalgic experience, and the stem of scale items, which is specific to thinking about the recalled event/memory.

***Social Connectedness Scale (SCS)***. This scale is an eight-item self-report measure of sense of connectedness, belonging, and affiliation with others. Items are measured on a 6-point Likert scale, (1 = *strongly agree*, 6 = *strongly disagree*). The reliability coefficient alpha for this scale is 0.91 (Lee & Robbins, 1995).

***Self-Concept Clarity Scale (SCCS)***. The SCCS is a 12-item self-report measure that examines the consistency and clarity of self-concept. Items are measured on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The instrument has a reliability coefficient alpha of 0.87 (Campbell et al., 1996).

***New General Self-Efficacy Scale (NGSE)***. The NGSE is an 8-item self-report measure of perceived ability to meet the demands of a given situation. This scale is a shorter measure than the General Self-Efficacy Scale. It offers higher reliability (average coefficient alpha across three sample = .87) and is a stronger predictor of self-efficacy in specific situations than the longer General Self-Efficacy Scale (Chen, Gully, & Eden, 2001).

***Nostalgia manipulation check***. Consistent with past research on nostalgia (e.g. (W.-Y. Cheung et al., 2013; Routledge et al., 2011; Sedikides et al., 2014; Wildschut et al., 2006), a 3-item self-report manipulation check scored on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*) will be completed. Items include: “Right now, I am feeling quite nostalgic,” “Right now, I am having nostalgic feelings,” “I feel nostalgic at the moment” (coefficient alpha = 0.91 to 0.98).

Participants were also asked to report how old they were in the memory they recalled.

### **Institutional Review Board (IRB)**

The University of Kansas's IRB approved this study. All participants provided informed consent prior to engaging in the study. All questionnaires were de-identified and completed online through Qualtrics, which is a secured web-based application that complies with Health Information Technology for Economic and Clinical Health Act (HITECH). This study was not expected to increase risk to participants, and participants were informed that if they became uncomfortable and wished to discontinue participation for any reason, they may have done so. The item that assessed suicidal thoughts on the MDAS was omitted from the measure to mitigate the possibility that querying about suicidal thoughts could elicit suicidal ideation.

## **Analysis Methods**

### **Sample Size and Power.**

#### *Experiments 1 and 2.*

In order to determine an adequate sample size for this study, a power analysis was conducted based on four predictors, a medium estimated effect size ( $f = 0.25$ ) (Cohen, 1988) and a statistical threshold of  $p < 0.05$ . A medium effect size was chosen based on reported effect sizes in other studies of the effects of nostalgia and autobiographical memory that typically range from small to medium (e.g., Baldwin, Biernat, & Landau, 2014; Brown et al., 2012; Sedikides, Wildschut, Routledge, & Arndt, 2014; van Tilburg, Sedikides, & Wildschut, 2015) and is in line with Cooper and Findley's work (1982), suggesting that a medium effect size can be expected in social psychological research. A sample size of 200 participants for each experiment yields a power  $> 0.90$ . This sample size will also allow a full spectrum of depressive symptomatology to be represented, given that prevalence of mood disorders is 20.8% in the general population (Kessler et al., 2005).

### ***Experiment 3.***

To determine adequate sample size for this study, an initial power analysis was conducted based on two latent variables (state level of nostalgia and depressive symptomology) and eight observed variables (MDAS,  $\Delta$  RRQ,  $\Delta$  PANAS, TMS, State Functions of Nostalgia Scale, SCCS, NGSE, and Social Connectedness Scale scores) with an anticipated medium effect size ( $f = 0.25$ ) and a statistical threshold of  $p < 0.05$ . A sample size of 100 participants per group yielded a power of 0.90.

#### **Statistical Testing**

Statistical Packages for Social Sciences 22.0 (SPSS) was used to perform descriptive statistics, ANOVAs, regression analyses, and Exploratory Factor Analysis (EFA). EFA was conducted using a principal axis factoring extraction method based on eigenvalues greater than one with a promax rotation. Structural equation models were estimated in Mplus 6.12 (Muthén & Muthén, 1998-2010) using maximum likelihood estimation. To evaluate model fit, the chi-squared statistic ( $\chi^2$ ), the competitive fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) were used (Byrne, 2013). Tradition guidelines (e.g. RMSEA  $< .05$  indicating good fit and RMSEA  $< .09$  indicating adequate fit, SRMR  $< .08$ , CFI  $\geq .95$  indicating good fit and CFI  $\geq .90$  indicating adequate fit) were applied to establish goodness of fit (Brown, 2015; Hu & Bentler, 1999).

#### **Results**

This project aimed to establish whether varying levels of depressive symptomology impact nostalgic recall's effects on markers of well-being and whether observed effects from nostalgic recall can lower state depressive symptomology. It also sought to determine whether

degree of mindfulness and engaging in a brief mindfulness intervention added to these effects, specifically though lowering depressive symptomology.

### **Nostalgia Manipulation Check**

To assess the efficacy of the nostalgia manipulation, scores on the nostalgia manipulation check were compared between recall conditions (nostalgic vs. ordinary). This check was completed using an independent t-tests for Experiments 1 and 2. For experiment 1, results revealed a significant effect of recall type  $t(198) = 10.70, p < .001$  with the nostalgic recall condition yielding greater feelings of nostalgia ( $M = 4.16, SD = 0.64$ ) than the ordinary recall condition ( $M = 2.68, SD = 1.22$ ). For experiment 2, results revealed a significant effect of recall type  $t(198) = 7.31, p < .001$  with the nostalgic recall condition yielding greater feelings of nostalgia ( $M = 3.90, SD = 0.83$ ) than the ordinary recall condition ( $M = 2.88, SD = 1.12$ ). For Experiment 3, a 2x2 ANOVA with the between subjects manipulated variables of recall condition (nostalgic, ordinary) and mindfulness condition (mindfulness intervention, no mindfulness intervention) on the nostalgia manipulation check score was conducted. A significant main effect of recall condition on the nostalgia manipulation check was found,  $F(1, 469) = 80.00, p < .001$  and with nostalgic recall condition yielding greater feelings of nostalgia (higher scores on the nostalgia manipulation check) ( $M = 3.73, SD = 0.86$ ) than the ordinary recall condition ( $M = 2.97, SD = 1.02$ ). A main effect of mindfulness condition on the nostalgia manipulation check was also found,  $F(1,469) = 9.12, p = .003$  with the mindfulness intervention condition yielding greater feelings of nostalgia (higher scores on the nostalgia manipulation check) ( $M = 3.48, SD = 0.93$ ) than the no mindfulness intervention condition ( $M = 3.22, SD = 1.09$ ). There was no significant interaction between mindfulness condition and recall condition on the nostalgia manipulation check score in Experiment 3  $F(1,469) = 2.08, p = .15$ .

### **Mindfulness Manipulation Check**

To assess the efficacy of the mindfulness intervention in Experiment 3, total scores on the TMS were compared using a 2x2 ANOVA. The 2x2 ANOVA was calculated with the between subjects manipulated variables of Mindfulness condition (mindfulness intervention, no mindfulness intervention) and recall condition (nostalgic, ordinary) on the TMS score. There was no significant main effect of recall condition on TMS  $F(1,469) = 3.41, p = .066$ . However, a main effect of mindfulness condition on TMS score was found,  $F(1,469) = 9.06, p = .003$  with the mindfulness intervention condition yielding higher ratings of subjective mindfulness ( $M = 39.12, SD = 7.81$ ) than the no mindfulness intervention condition ( $M = 36.94, SD = 8.20$ ). This was qualified by a significant interaction between mindfulness condition and recall condition  $F(1,469) = 7.07, p = .008$  (Figure 4). When participating in the ordinary recall, participants in the mindfulness condition reported higher levels of mindfulness ( $M = 39.41, SD = 7.91$ ) than those who were assigned to the no mindfulness intervention group ( $M = 35.28, SD = 8.50$ ). However, when participating in the nostalgic recall condition, scores on mindfulness did not differ between the participants who completed the mindfulness intervention ( $M = 38.82, SD = 7.72$ ) and those who did not ( $M = 38.57, SD = 7.59$ ).

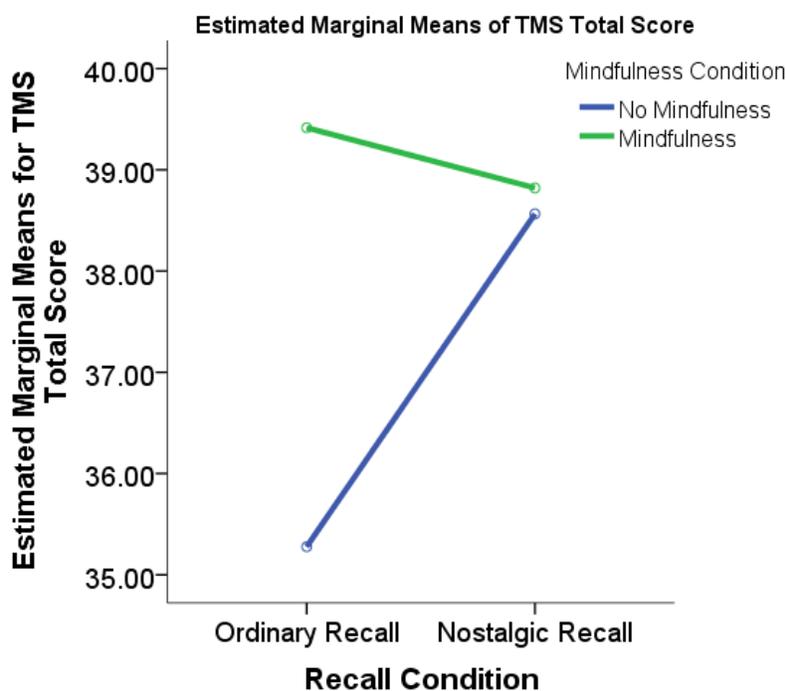


Figure 4. Interaction between mindfulness condition and recall condition to predict subjective mindfulness scores (TMS scores).

### Effects of Nostalgic Recall

The findings of this study were consistent with past research, which has shown that individuals who recall nostalgia memories as compared to ordinary ones report greater self-efficacy, feelings of social connectedness, and a more integrated sense of self (for review: Sedikides, Wildschut, Routledge, Arndt, et al., 2015). In the present study, ANCOVAs were conducted to compare state levels of nostalgia as measured by the SFNS in Experiments 1 and 2, controlling for number of years since the memory. Participants who recalled a nostalgic memory not only reported higher levels of nostalgia on the manipulation check than those who recalled an ordinary one, but also reported greater effects from this recall, as measured by the SFNS for Experiments 1  $F(1, 197) = 5.18, p = .024$  (nostalgic recall ( $M = 80.19, SD = 21.51$ ), ordinary recall ( $M = 66.76, SD = 27.18$ )) and Experiment 2  $F(1, 197) = 7.13, p = .008$  (nostalgic recall ( $M = 82.27, SD = 24.35$ ), ordinary recall ( $M = 71.39, SD = 28.13$ )). The same was true for Experiment 3. These results are consistent with hypothesis 1a2, which predicted a main effect of

recall type on SFNS. To compare state levels of nostalgia as measured by the SFNS in Experiment 3, a 2x2 ANCOVA was calculated with the between subjects manipulated variables of Mindfulness condition (mindfulness intervention, no mindfulness intervention) and recall condition (nostalgic, ordinary) on SFNS scores, controlling for number of years since the memory. This analysis yielded a significant main effect of recall condition  $F(1,468) = 3.97, p = .047$  (nostalgic recall ( $M = 77.11, SD = 21.42$ ), ordinary recall ( $M = 73.55, SD = 21.82$ )) (Figure 5). Contrary to hypothesis 2a, there was no main effect of mindfulness condition on SFNS score  $F(1,468) = 1.01, p = .315$ , and the interaction between recall condition and mindfulness condition was non-significant  $F(1,468) = .57, p = .45$ .

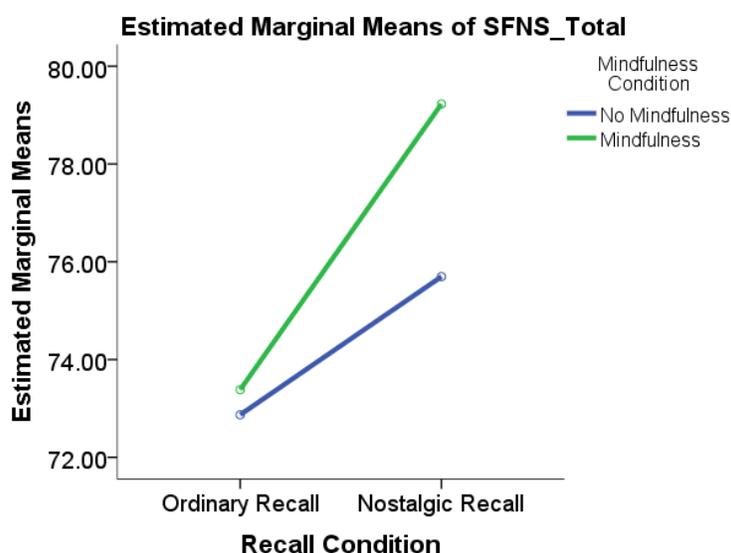


Figure 5. Main effect of recall condition on SFNS scores.

### General Measures of the Constructs Related to Nostalgic Recall's Effects

Several researchers have argued that the effects of engaging in nostalgic recall can be captured by improvements in three constructs: self-efficacy, social connectedness, and integrated sense of self (e.g., Sedikides et al., 2015, 2008; Stephan et al., 2015; Wildschut et al., 2006). This study not only measured how recall type affected feelings of self-efficacy, social connectedness, and sense of self within the context recalling the memory (i.e., SFNS) but also how it affected

these constructs when the measures were not specifically related to the nostalgic experience (i.e., SCS, SCCS, and NGSE). These measures were all highly correlated with one another ( $p < .001$  with correlation coefficients ranging from .225 to .556). Since these measures were strongly related, an Exploratory Factor Analysis (EFA) was used to determine the most parsimonious way to analyze the data and to avoid issues of multicollinearity. A one factor solution containing the four subscales of the SFNS emerged as explaining 44.55% of variance and with strong factor loadings ( $B = .803$  to  $.852$ ). The second factor containing the remaining four scales accounted for an additional 19.84% of the variance (Table 3). However, factors loadings for this second factor were generally problematic, loading on both extracted component factors with near equal loading strength, producing only two items with loadings greater than .4 (a suggested threshold (Costello & Osborne, 2005)), and lacking conceptual congruence, which are reasons that render a factor solution unacceptable. It may be that this second factor was extracted as a function of EFA's well-known over-identification of component structures (Brown, 2015). Given issues with poor factor loadings and a lack of conceptual congruence with the second factor, only the first factor containing the four subscales of the SFNS was used in the SEM models; the SCS, SCCS, and NGSE were analyzed in regression models.

Table 3  
*Summary of EFA for Measures Related to Psychological Well-being*

<b>Measure</b>	<b>Factor 1 Loadings (<i>B</i>)</b>	<b>Factor 2 Loadings (<i>B</i>)</b>
SFNS Self-regulation	.852	.198
SFNS Life Meaning	.831	.147
SFNS Positive Affect	.810	.208
SFNS Social Connectedness	.803	.243
Self-efficacy Scale	.362	-.340
Self-concept Clarity Scale	.392	-.641
SCS Social Connectedness	-.480	.541
SCS Assurance	-.066	.295
% of total variance explained	44.55	19.84

*Note:* SFNS = State Function of Nostalgia Scale, SCS = Social Connectedness Scale, *B* = factor loadings.

## **Measures of depressive symptomology**

This study incorporated several measures of state and trait depressive symptomology. An EFA, using the same parameters as above, was used to determine the best way to characterize these measures. The EFA resulted in a two-factor solution. The first factor contained the rumination subscale of the RRQ, the four subscales of the MDAS, and the negative affect subscale of the PANAS with strong factor loadings ( $B = .586$  to  $.917$ ) and explained 53.42% of the total variance. This factor is conceptually sound and captures several important domains of depressive symptomology. The two measures that did not load highly onto this factor were the positive scale of the PANAS and the reflection subscale of the RRQ, loading instead on a second factor. The second factor explained an additional 13.86% of the total variance with only the PANAS positive affect subscale producing a loading greater than .4, which is suggested as a threshold (Costello & Osborne, 2005). Positive affect is associated with positive coping skills and would not be expected to be consistent with depressive symptomology in the same way as negative affect (Watson, 1988; Wichers, Jacobs, Dermon, Thiery, & van Os, 2007). Therefore, for analyses of depressive symptomology, this study used the six items that loaded onto the first factor (RRQ Rumination, MDAS Emotion, MDAS Cognition, MDAS Somatic, MDAS Interpersonal, PANAS Negative Affect) to define depressive symptomology.

## **Combining of Experiments 1 and 2**

Given that Experiments 1 and 2 used identical methodology and that numerous studies have shown that university student and MTurk samples produce indistinguishable results (e.g., Casler et al., 2013), a one-way ANOVA looking at the MDAS total score, the nostalgia manipulation check, and the SFNS total score between Experiments 1 and 2 was conducted. This ANOVA evaluated whether there were differences between experiments in terms of

depressive symptomology, feelings of nostalgia, or state levels of nostalgia, as measured by the SFNS, which has been shown to increase after engaging in nostalgic recall. As expected, there was no effect of experiment for any of these measures (nostalgia manipulation check  $F(1, 398) = .052, p = .82$ ; SFNS total score  $F(1, 398) = 1.72, p = .19$ ; MDAS total score  $F(1, 398) = .12, p = .73$ ). Furthermore, separate EFAs for the depressive symptomology measures and for the constructs measured in the SFNS for Experiments 1 and 2 yielded nearly identical component loadings (e.g. differences between Experiment 1 and 2 factor loadings for the components of the SFNS ranged in magnitude from .024 to .044 and differences between Experiment 1 and 2 factor loadings for the depressive symptomology measures ranged in magnitude from .005 to .084). As a result, the data from Experiments 1 and 2 were combined and treated as a single data set for all subsequent analyses, which created a larger sample size, increased power and improved external validity through increasing demographic variability. Table 4 provides a summary of descriptive statistics for the experiments and experimental conditions.

Table 4  
*Descriptive Statistics across Experiments and Experimental Conditions*

<i>Condition</i>	<b>Experiments 1 &amp; 2</b>		<b>Experiment 3</b>			
	<i>Nost.</i>	<i>Ord.</i>	<i>Nost. w/o Mind.</i>	<i>Ord. w/o Mind.</i>	<i>Nost. + Mind.</i>	<i>Ord. + Mind.</i>
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
<b>Measure</b>						
<b>Nostalgia</b>						
SFNS (Total)	81.2 (22.9)	69.1 (27.7)	75.5 (23.6)	73.4 (22.6)	78.6 (19.1)	21.2 (21.2)
Positive Affect	19.7 (6.6)	17.7 (7.3)	18.1 (7.0)	18.5 (6.2)	19.5 (6.2)	18.8 (5.5)
Self-regard	19.7 (6.3)	17.3 (7.0)	17.7 (6.9)	18.2 (6.4)	18.1 (5.6)	17.9 (5.9)
Social Connect.	19.7 (7.1)	16.2 (7.8)	18.9 (6.3)	16.7 (6.9)	19.3 (5.9)	16.9 (6.3)
Life Meaning	21.8 (6.3)	18.0 (7.9)	20.8 (6.5)	20.0 (6.1)	21.7 (5.2)	20.2 (6.4)
Nostalgia Check	4.0 (.74)	2.8 (1.2)	3.7 (.94)	2.8 (1.0)	3.8 (.79)	3.2 (.96)
<b>Baseline Depressive Symptoms</b>						
MDAS (Total)	101.7 (36.0)	100.1 (33.6)	105.7 (33.0)	101.3 (26.4)	101.7 (31.5)	100.0 (28.6)
Emotion	29.0 (9.5)	28.3 (9.2)	30.0 (8.3)	29.0 (7.2)	29.5 (8.3)	28.7 (7.4)
Cognitive	23.1 (9.5)	23.0 (9.5)	24.6 (9.5)	23.0 (7.6)	22.8 (8.2)	22.2 (7.7)
Somatic	25.1 (9.2)	24.9 (8.2)	26.4 (8.4)	25.3 (6.8)	25.8 (8.2)	25.8 (7.9)
Interpersonal	24.5 (10.5)	23.9 (9.5)	24.8 (9.8)	24.0 (8.5)	23.6 (9.8)	23.3 (8.6)
PANAS Neg. Affect	16.4 (7.6)	15.3 (6.3)	41.5 (7.7)	40.4 (7.8)	39.8 (8.9)	40.2 (7.8)
RRQ Rumination	40.8 (10.4)	39.1 (10.3)	17.2 (6.4)	15.6 (4.5)	16.3 (6.0)	15.3 (4.6)

Age Difference between memories	10.4 (11.5)	1.8 (4.6)	3.8 (4.1)	.96 (2.3)	5.3 (5.1)	1.5 (2.8)
<b>Mindfulness</b>						
TMS (Total)	N/A	N/A	17.5 (4.5)	16.2 (4.9)	18.0 (4.7)	18.4 (4.7)
Curiosity	N/A	N/A	38.6 (7.6)	35.3 (8.5)	38.8 (7.7)	39.4 (7.9)
Decentering	N/A	N/A	21.1 (4.0)	19.1 (4.6)	20.8 (4.3)	21.0 (4.3)
<b>Time 2 Depressive Symptoms</b>						
PANAS Neg. Affect	N/A	N/A	16.4 (6.2)	14.9 (5.2)	15.8 (6.7)	14.2 (4.8)
RRQ Rumination	N/A	N/A	39.4 (8.8)	38.3 (8.8)	37.8 (9.4)	39.1 (8.5)

*Note:* Social Connect. = Social Connectedness, PANAS Neg. Affect = PANAS Negative Affect, Nost. = Nostalgic Recall, Ord. = Ordinary Recall, Mind. = Mindfulness Exercise

### Evaluation of Constructs Related to SFNS

Constructs of self-efficacy, social connectedness, and self-concept are measured on the SFNS. This study assessed whether independent measures of these constructs were also related to nostalgia. The SFNS's domains assess these constructs, but within the context of a memory recall (e.g., "Thinking about this event makes me feel life is meaningful"). What is unknown, is whether these constructs, when assessed outside the context of a memory (e.g., "In general, I have a clear sense of who I am and what I am."), are influenced by nostalgic recall and depressive symptomology in the same way.

To evaluate this two regression models for each of the constructs were run for Experiments 1 and 2 and two for Experiment 3. Models with SCS, SCCS, and NGSE as the dependent variables were run and results are summarized in Table 5. To control for age difference between the time of the memory and current age, the first model contained the age difference. The second model contained age difference, recall condition, baseline level depressive symptomology, and the interaction between recall condition and baseline level depressive symptomology. Results were consistent across all three constructs and across Experiments 1 and 2 and Experiment 3, results for these three scales differed from those obtained for the SFNS. Baseline level of depressive symptomology but not recall condition predicted self-efficacy, social connectedness, and self-concept clarity.

Table 5

*Summary of Regression Results for SCS, SCCS, and NGSE*

<b>Experiments 1 and 2</b>			
<i>Regression components</i>	<i>F/t (df)</i>	<i>R(R<sup>2</sup>Δ)</i>	<i>SE</i>
<b>Self-Efficacy Scale</b>			
Model 1	.789 (1,398)	.044(.002)	4.72
# of years since memory	-.89		.028
Model 2	38.01*** (4,395)	.527(.276)***	4.72
Age Diff	-1.52		.027
Recall Condition	.841		.527
Depressive Symptomology	-4.03***		.119
Recall Condition * Depressive Sx	.22		.074
<b>Social Connectedness</b>			
Model 1	1.75 (1,398)	.066(.004)	12.96
# of years since memory	-1.32		0.067
Model 2	64.32*** (4,395)	.628(.390)***	10.15
# of years since memory	-2.06*		.058
Recall Condition	1.83		1.13
Depressive Symptomology	4.71***		.257
Recall Condition * Depressive Sx	.19		.160
<b>Self-Concept Clarity</b>			
Model 1	6.09* (1,398)	.123(.015)	10.06
# of years since memory	2.47*		0.067
Model 2	70.20*** (4,395)	.645(.40)***	7.78
# of years since memory	3.08*		.045
Recall Condition	-1.16		.87
Depressive Symptomology	-5.69***		.12
Recall Condition * Depressive Sx	.642		.12
<b>Experiment 3</b>			
<b>Self-Efficacy Scale</b>			
Model 1	3.71 (1,471)	.088(.008)	4.33
# of years since memory	-1.93		.048
Model 2	22.90*** (4,468)	.405(.156)***	3.99
# of years since memory	-.455		.049
Recall Condition	-1.19		.40
Depressive Symptomology	-3.24***		.13
Recall Condition * Depressive Sx	.504		.081
<b>Social Connectedness</b>			
Model 1	2.49 (1,471)	.073(.005)	12.80
# of years since memory	1.58		.142
Model 2	61.88 (4,468)	.588(.341)***	10.41
# of years since memory	-.284		.13
Recall Condition	.964		1.05
Depressive Symptomology	4.24***		.35
Recall Condition * Depressive Sx	.432		.21
<b>Self-Concept Clarity</b>			

Model 1	.958 (1,471)	.002(.002)	
# of years since memory	-.98		.091
Model 2	64.36*** (4,468)	.355 (.353)***	
# of years since memory	.089		.080
Recall Condition	1.25		.660
Depressive Symptomology	-5.24***		.221
Recall Condition * Depressive Sx	.495		.133

*Note:* Sx=symptomology \*= $p < .050$ , \*\*= $p \leq .01$ , \*\*\*= $p \leq .001$

### **Analyses of Hypotheses:**

For the analyses of the hypotheses, both Structural Equation Modeling (SEM) and regression were used. SEM, which is based upon a regression framework, allows for the simultaneous estimation of all relationships in each model and can account for variables that influence the predictors, giving a more accurate representation of real life scenarios. However, SEM is limited in its ability to test for interaction effects, which regression is capable of doing. Using both methods allowed for the evaluation of the hypotheses of this study and capitalized of the strengths of each analysis methodology. Thus, the remainder of the results section is broken into two parts: SEM analyses and regression analyses, with the regression section addressing interactions.

**Aim 1: Evaluating the effect of level of depressive symptomology on state level of nostalgia as measured by SFNS.**

***Structural equation modeling results:***

*Experiments 1 and 2:*

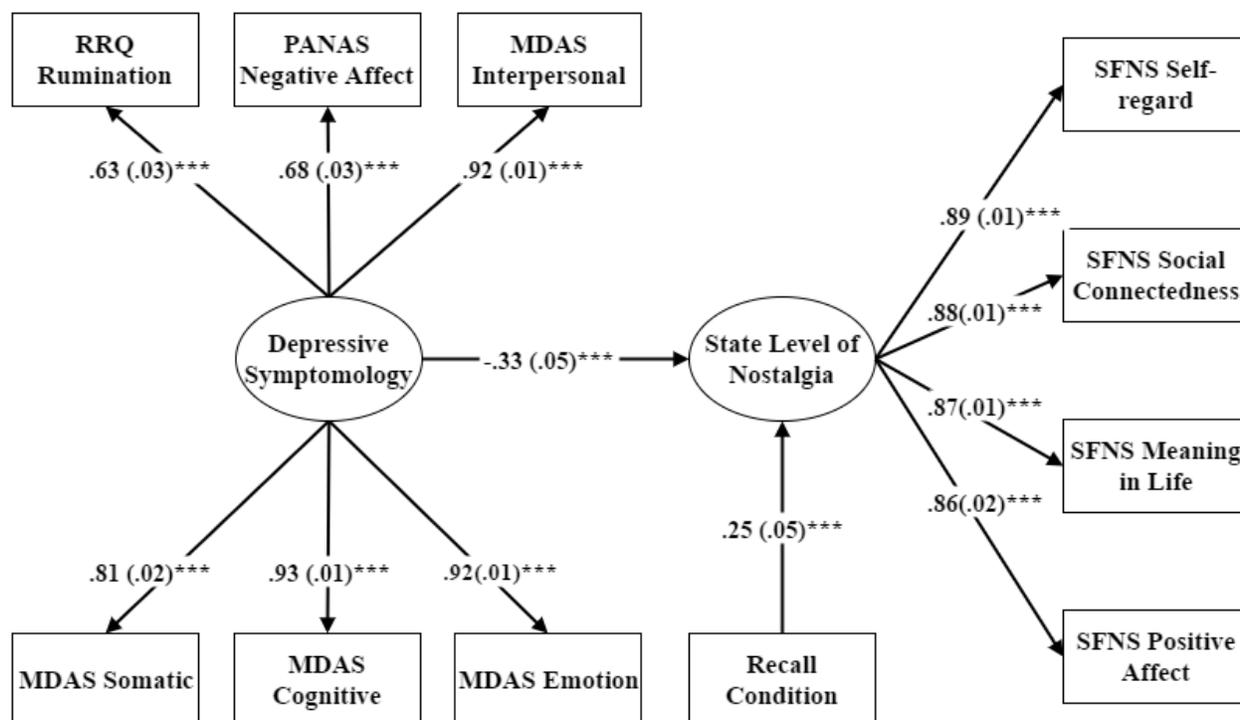


Figure 6. Effects of depressive symptomology on nostalgic benefit, accounting for recall condition.  $B(SE)$  \*\*\* $p < .001$ , two-tailed.

To assess the impact of depressive symptomology on the state level of nostalgia as measured by the SFNS, a SEM was used. The model defined two latent variables: 1) level of depressive symptomology at baseline as defined by the observed variables of the rumination subscale of the RRQ, the four subscales of the MDAS, and the negative affect subscale of the PANAS and 2) State level of nostalgia after memory recall as defined by the observed variables of four subscales of the SFNS. The model also accounted for recall type (using dummy coding with ordinary recall = 0 and nostalgic recall = 1) by adding it as a predictor of the state level of nostalgia (Figure 6). This model yielded a good fit with  $\chi^2(43) = 147.07$ ,  $p < .001$ , RMSEA = .078; SRMR = 0.035; CFI = .97. Higher levels of depressive symptoms negatively predicted state level of nostalgia  $B = -.33$ ,  $SE = 0.046$ ,  $p < .001$ , consistent with hypothesis 1a1.

Additionally, recalling a nostalgic memory predicted higher levels state levels of nostalgia than

recalling an ordinary memory  $B = .25$ ,  $SE = 0.05$ ,  $p < .001$ . These findings support hypothesis 1a2.

*Experiment 3:*

Experiment 3 also assesses the effect of depressive symptomology on the state level of nostalgia as measured by the SFNS and partially replicated findings from Experiments 1 and 2. The model defined two latent variables: 1) level of depressive symptomology at baseline as defined by the observed variables of the rumination subscale of the RRQ, the four subscales of the MDAS, and the negative affect subscale of the PANAS and 2) state level of nostalgia after memory recall as defined by the observed variables of four subscales of the SFNS. The model also accounted for recall condition (using dummy coding with ordinary recall = 0 and nostalgic recall = 1) by adding it as a predictor of the state level of nostalgia (Figure 7). This model yielded a good fit with  $\chi^2(43) = 149.87$ ,  $p < .001$ ,  $RMSEA = .072$ ;  $SRMR = 0.041$ ;  $CFI = .96$ . Higher levels of depressive symptomology predicted lower state levels of nostalgia  $B = -.32$ ,  $SE = 0.046$ ,  $p < .001$ , which further supports hypothesis 1a1. However, type of memory recalled (nostalgic vs. ordinary) did not significantly predict state level of nostalgia in Experiment 3  $B = .078$ ,  $SE = 0.047$ ,  $p = .093$ , which is inconsistent with hypothesis 1a2.

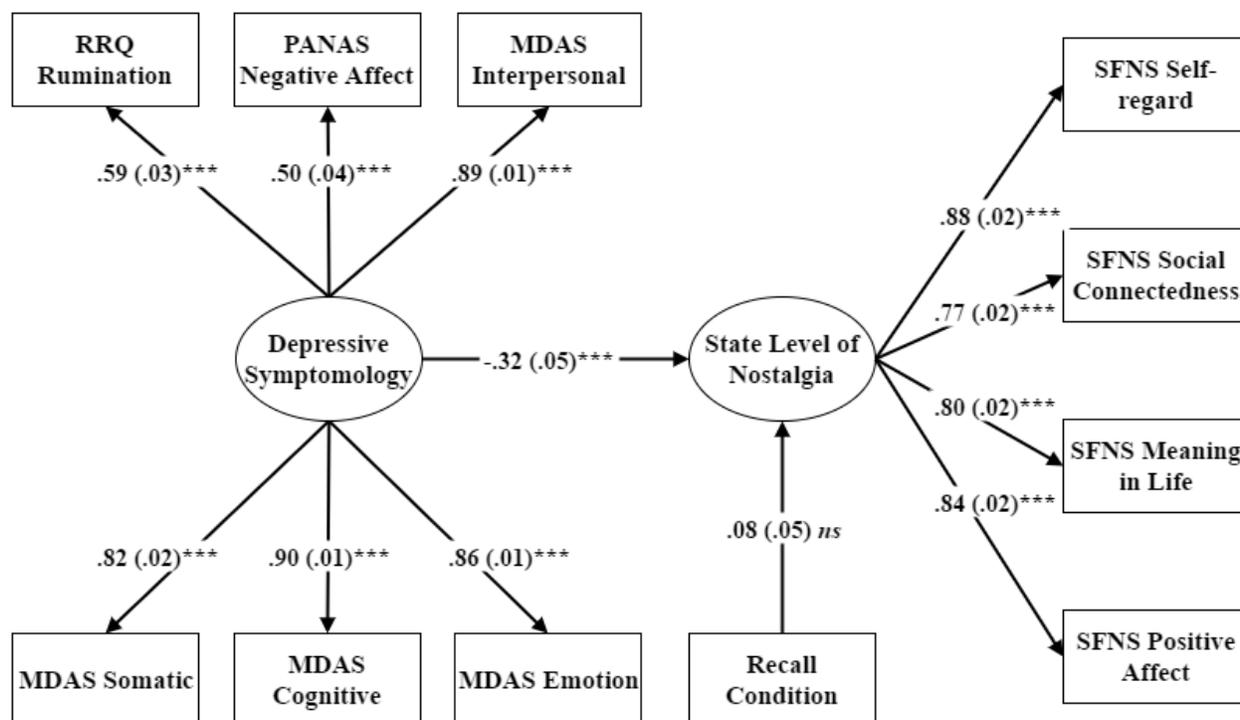


Figure 7. Model illustrating relationship between level of depressive symptomology and benefits of nostalgic recall, accounting for recall condition.  $B(SE)$   $ns$  = not significant; \*\*\* $p < .001$ , two-tailed.

### **Regression results:**

#### *Experiments 1 and 2:*

To assess the impact of depressive symptomology, recall condition, and the interaction between depressive symptomology and recall condition on the state level of nostalgia as measured by the SFNS, regression was used. To control for age difference between current age and age in the memory, a model with age difference predicting SFNS was compared to a model containing age difference, recall condition, baseline level of depressive symptomology, and the interaction between recall type and baseline depressive symptomology. The model with age difference was significant  $F(1, 398) = 8.53, p = .004$  and age difference predicted SFNS score  $t(399) = 2.92, p < .004$ , suggesting that older memories are associated with higher state levels of nostalgia. This makes sense as nostalgic memories tend to be older memories than ordinary ones and nostalgic memories are hypothesized to increase state levels of nostalgia. To directly test for

effects of recall condition along with depressive symptomology and the interaction of the two while controlling for age difference, a second model was run. Recall condition, depressive symptomology, and their interaction accounted for a significance portion of variance the variance after controlling for age difference  $\Delta R^2 = .160, p < .001$ . This model yielded significant main effects of baseline level of depressive symptomology  $t(399) = -2.75, p = .006$  (lower levels of depression predicted higher state levels of nostalgia) and recall condition  $t(399) = 4.84, p < .001$  (nostalgic recall condition predicted higher state levels of nostalgia than the ordinary recall condition did), which supports hypotheses 1a1 and 1a2 respectively. However, the interaction term between recall condition and baseline level of depressive symptomology was not significant, failing to support hypothesis 1b (see Table 6 for summary of results).

Table 6

*Summary of Regression Results for SFNS for Experiments 1 and 2*

<b>Regression Model for state level of nostalgia for Experiments 1 and 2</b>			
<i>Regression components</i>	<i>F/t (df)</i>	<i>R(R<sup>2</sup>Δ)</i>	<i>SE</i>
<b>State level of nostalgia</b>			
Model 1	8.53*** (1, 398)	.145(.021)**	5.81
# of years since memory	2.92***		.030
Model 2	21.79*** (4, 395)	.425(.16)***	5.34
# of years since memory	.565		.031
Recall Condition	4.84***		.596
Depressive Symptomology	-2.75**		.135
Recall Condition * Depressive Sx	.438		.084

*Note:* Sx=symptomology \*= $p < .050$ , \*\*= $p \leq .01$ , \*\*\*= $p \leq .001$

*Experiment 3:*

The same regression analysis as described above for Experiments 1 and 2 was conducted for Experiment 3 to evaluate the relationship between recall type, depressive symptomology, and their interaction on predicting SFNS while controlling for age difference in the memories. The model with age difference was not significant  $F(1, 471) = .069, p = ns$ . This model was significant in Experiments 1 and 2 but not for Experiment 3. Experiments 1 and 2, which were

drawn from MTURK and undergraduate psychology students, had a wider age range of participants (Min age = 18, Max age = 72, mean age = 27.2) than did Experiment 3, which was drawn exclusively from undergraduate psychology students (Min age = 18, Max age = 30, mean age = 18.86). This difference in age range likely accounts for this difference between Experiments 1 and 2 and Experiment 3.

The second model tested for effects of recall condition along with depressive symptomology and the interaction of the two while controlling for age difference. Recall condition, depressive symptomology, and their interaction accounted for a significance portion of variance the variance after controlling for age difference  $\Delta R^2 = .122, p < .001$ . This model yielded a significant main effect of baseline level of depressive symptomology  $t(472) = -3.05, p = .002$  (lower levels of depression predicted higher state levels of nostalgia), which supports again hypothesis 1a1. Recall condition trended towards significance but was not significant  $t(472) = 1.86, p = .063$ , which failed to support hypothesis 1a2 in Experiment 3. The interaction term between recall condition and baseline level of depressive symptomology was not significant, failing to support hypothesis 1b. (see Table 7 for summary of results).

Table 7

*Summary of Regression Results for SFNS for Experiment 3*

<b>Regression Model for state level of nostalgia for Experiment 3</b>			
<i>Regression components</i>	<i>F/t (df)</i>	<i>R(R<sup>2</sup>Δ)</i>	<i>SE</i>
<b>State level of nostalgia</b>			
Model 1	.069 (1, 471)	.012(.0)	4.93
# of years since memory	-.26		.055
Model 2	16.31*** (4, 468)	.350(.121)***	4.63
# of years since memory	-.18		.057
Recall Condition	1.86		.47
Depressive Symptomology	-3.05**		.16
Recall Condition * Depressive Sx	.74		.094

*Note:* Sx=symptomology \*= $p < .050$ , \*\*= $p \leq .01$ , \*\*\*= $p \leq .001$

**Aim 2: Evaluate the mindfulness intervention's ability to heighten reported nostalgia (i.e., scores on the SFNS) across varying degrees of depressive symptomatology.**

***Structural equation modeling results:***

*Experiment 3:*

It was hypothesized that higher levels mindfulness would predict greater levels of state nostalgia. Past research has demonstrated that higher levels of depressive symptomology predict lower levels of mindfulness (e.g., Jimenez, Niles, & Park, 2010). The model in Figure 8 examined these relationships with three latent variables: 1) level of depressive symptomology at baseline, 2) mindfulness, as defined by the two subscales of the TMS, and 3) state level of nostalgia, as measured by the SFNS. This model achieved good fit with  $\chi^2(51) = 147.41, p < .001$ , RMSEA = .063; SRMR = 0.037; CFI = .97. Higher levels of mindfulness yielded greater state levels of nostalgia  $B = .32, SE = 0.052, p < .001$ , supporting hypothesis 2a. Higher levels of baseline depressive symptomology predicted higher levels of mindfulness, as measured by the TMS,  $B = .11, SE = 0.056, p = .042$ . The results from Experiment 3 also replicated findings from Experiments 1 and 2. These results supported hypothesis 1a1, demonstrating that higher levels of baseline depressive symptoms predicted lower state level of nostalgia  $B = -.35, SE = 0.045, p < .001$ .

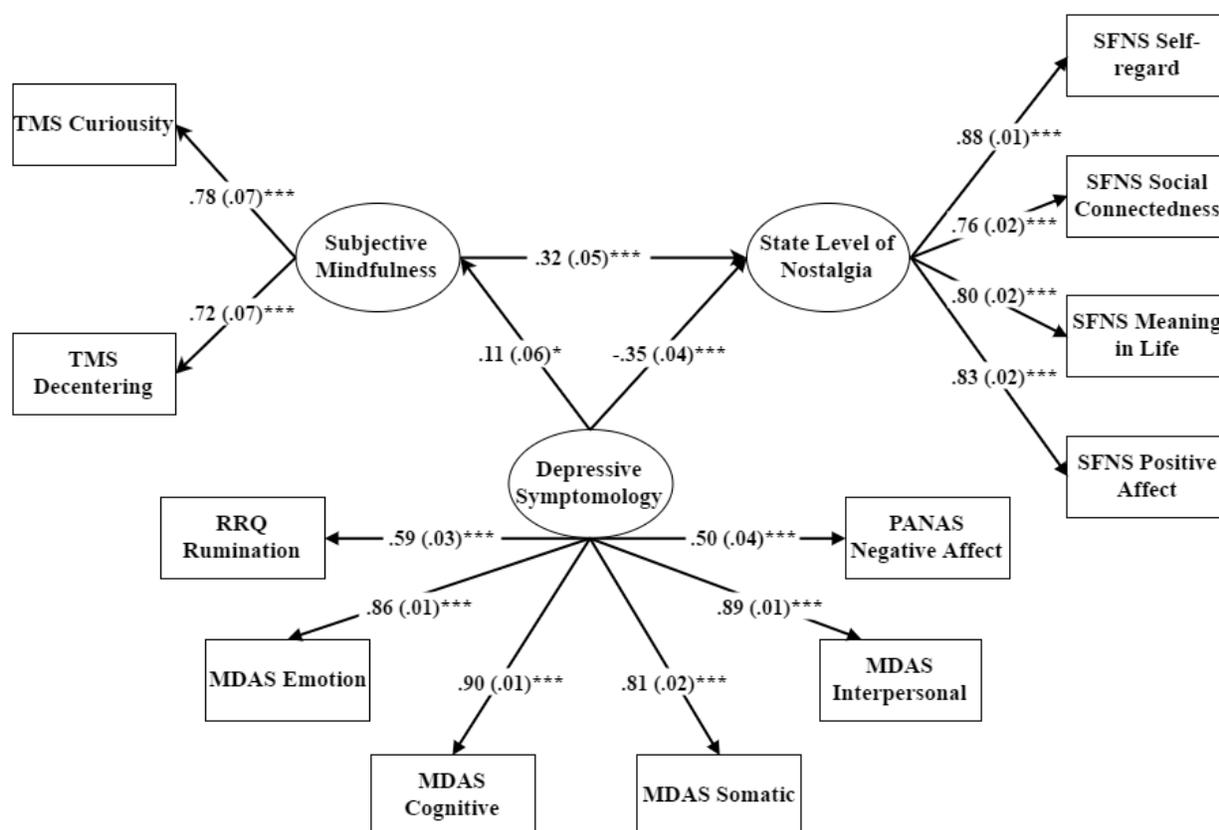


Figure 8. Model demonstrating the relationship between baseline depressive symptomology, mindfulness, and state level of nostalgia.  $B(SE)$ ; \* $p < .05$ ; \*\*\* $p < .001$ , two-tailed.

An additional model incorporated the effects of the two experimental manipulations: mindfulness (using dummy coding with no mindfulness intervention = 0 and mindfulness intervention = 1) and recall condition (using dummy coding with ordinary recall = 0 and nostalgic recall = 1) on report of subjective mindfulness and state level of nostalgia, respectively. This model (Figure 9) achieved good fit with  $\chi^2(74) = 202.97, p < .001$ , RMSEA = .061; SRMR = 0.041; CFI = .96. Individuals who reported lower levels of depressive symptomology reported higher levels of state nostalgia than individuals who reported higher levels of depressive symptomology, regardless of which type of memory they recalled  $B = -.35, SE = 0.045, p < .001$ , supporting hypothesis 1a. Although this model did not test whether the mindfulness manipulation lead to greater state levels of nostalgia, higher levels of reported subjective

mindfulness yielded greater state levels of nostalgia  $B = .31$ ,  $SE = 0.053$ ,  $p < .001$ , partially supporting hypothesis 3a in this basic model. Individuals who participated in the brief mindfulness intervention reported higher levels of subjective mindfulness than individuals who were assigned to the no mindfulness intervention condition  $B = .17$ ,  $SE = 0.052$ ,  $p = .001$ . The effects of the mindfulness manipulation on state levels of nostalgia were tested for and are reported in the regression section. According to this model, assignment to the nostalgic recall condition did not predict significant differences from the ordinary recall condition in state levels of nostalgia  $B = .062$ ,  $SE = 0.045$ ,  $p = .17$ .

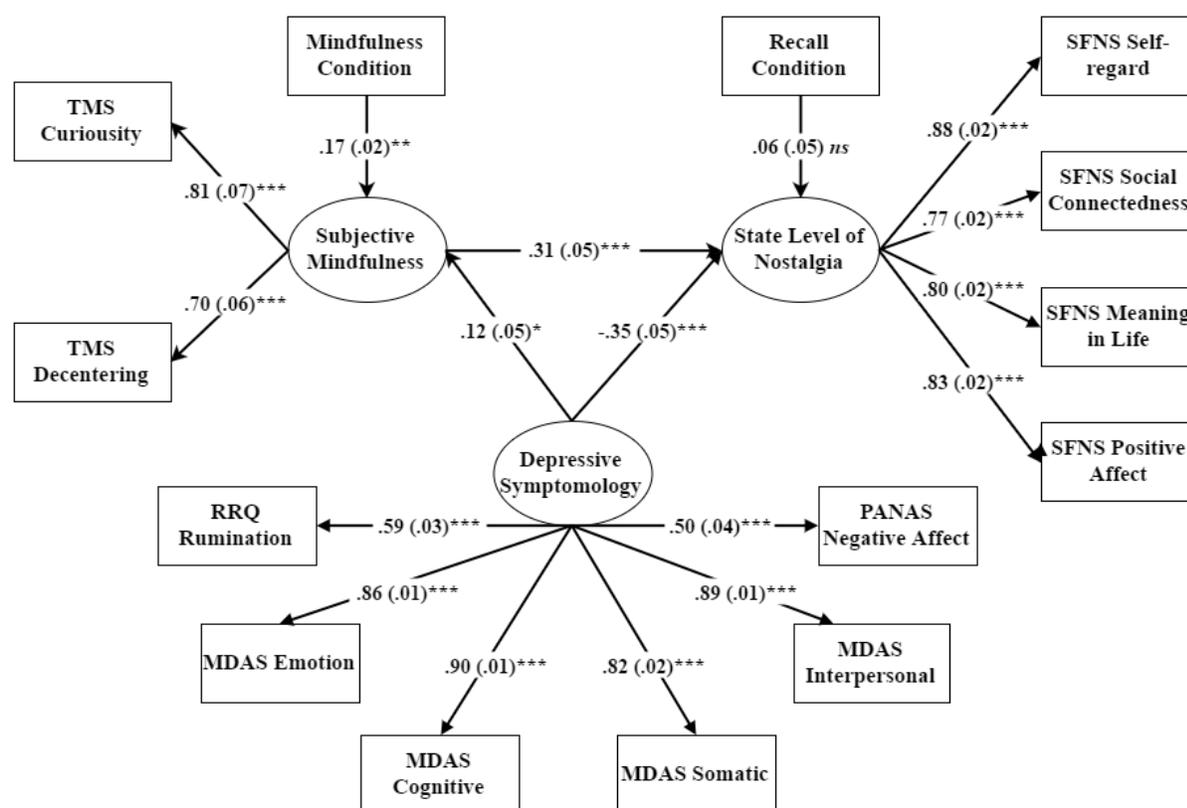


Figure 9. Model illustrating the relationship between baseline depressive symptomology, mindfulness, and nostalgic benefit, accounting for memory recall and mindfulness manipulations.  $B(SE)$ ;  $ns$  = not significant,  $*p < .05$ ;  $***p < .001$ , two-tailed.

Given that recall condition did not predict SFNS in Figure 9, an additional model was created to explore individuals' subjective ratings of nostalgia, as measured by the nostalgia manipulation check and how this variable related to mindfulness condition, TMS score, recall

condition, and SFNS. This model achieved good fit with  $\chi^2(105) = 3474.3, p < .001$ , RMSEA = .059; SRMR = 0.045; CFI = .96. Although the type of memory participants recalled (ordinary vs. nostalgic) did not predict state level of nostalgia in the previous model, participants' report of subjective experience of nostalgia, as measured by the nostalgia manipulation check, after memory recall was related to state levels of nostalgia  $r = .20$ ,  $SE = 0.048, p < .001$  and to subjective levels of mindfulness  $r = .32$ ,  $SE = 0.050, p < .001$ . Furthermore, both engaging in the brief mindfulness intervention  $B = .13$ ,  $SE = 0.041, p < .001$  and engaging in nostalgic recall  $B = .36$ ,  $SE = 0.039, p < .001$  predicted higher feelings of nostalgia, as measured by the nostalgia manipulation check (Figure 10).

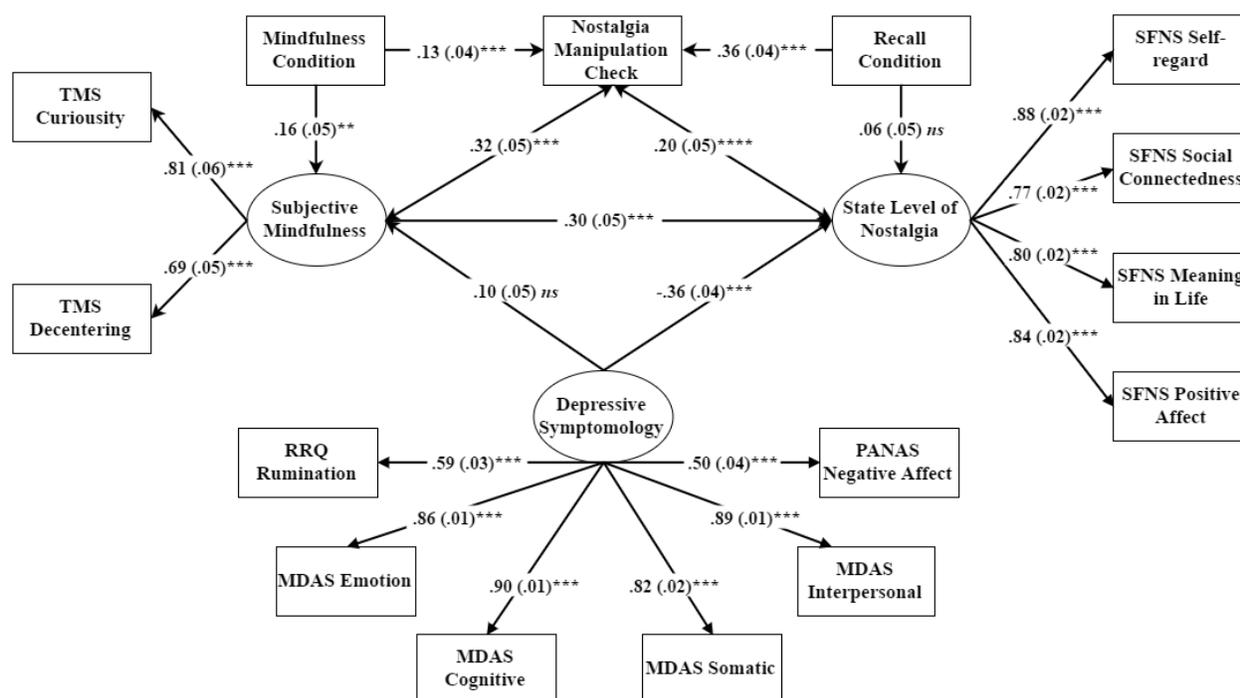


Figure 10. Model examining the relationship between baseline depressive symptomology, mindfulness, and state level of nostalgia, accounting for subjective rating experienced nostalgia, recall condition, and mindfulness condition. Nostalgia Manip. Check = nostalgia manipulation check.  $B(SE)$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed.

#### Regression results:

The SEM models above are unable to evaluate interactions between continuous and

discrete variables (i.e., mindfulness condition, recall condition, and baseline depressive symptomology). To assess the hypothesized interactions on state level of nostalgia as measured by the SFNS, regression was used. To control for age difference between current age and age in the memory, a model with age difference predicting SFNS was compared to a model containing age difference, mindfulness condition, recall condition, baseline level of depressive symptomology, the interaction between mindfulness condition and baseline depressive symptomology, and the interaction between mindfulness condition, recall condition, and baseline level of depressive symptomology. The model containing age difference was not significant, but the second model explained a significant proportion of additional variance  $\Delta R^2 = .126, p < .001$  and was significant  $F(6, 466) = 11.20, p < .001$ . There was no main effect of mindfulness condition in predicting SFNS, failing to support hypothesis 2a. The 2-way interaction between mindfulness condition and baseline depressive symptomology and the 3-way interaction between mindfulness condition, recall condition, and baseline level of depressive symptomology were also non-significant, failing to support hypotheses 2b1 and 2b2 respectively. There was, however, a main effect of baseline level of depressive symptomology  $t(472) = -2.18, p = .030$ , such that higher levels of depressive symptomology predict lower state levels of nostalgia across recall conditions (See Table 8).

Table 8

*Summary of Regression Results for SFNS for Experiment 3 Incorporating Mindfulness Condition*

<b>Regression Model for state level of nostalgia for Experiment 3</b>			
<i>Regression components</i>	<i>F/t (df)</i>	<i>R(R<sup>2</sup>Δ)</i>	<i>SE</i>
<b>State level of nostalgia</b>			
Model 1	.069 (1, 471)	.0(.0)	4.93
# of years since memory	-.26		.055
Model 2	11.20*** (6, 466)	.126(.126)***	4.63
# of years since memory	-.24		.057
Mindfulness Condition	.66		.43
Recall Condition	1.92		.47
Baseline Depressive Symptomology	-2.18*		.33
Mindfulness Condition * Baseline Depressive Symptomology	.59		.099
Mindfulness Condition * Recall Cond *	1.01		.026
Baseline Depressive Symptomology			
Model 3	11.62 (10, 462)	.536(.161)***	4.20
# of years since memory	-.62		.052
Baseline Depressive Symptomology	-2.97*		.30
Recall Condition	.19		.45
Mindfulness Condition	-1.39		.40
Mindfulness Condition * Baseline Depressive Symptomology	1.17		.091
Mindfulness Condition * Baseline Depressive Symptomology * Recall Condition	.90		.024
Subjective Mindfulness (TMS)	7.78***		.063
Nostalgia Manipulation check	4.09***		.22
Subjective Mindfulness * Baseline Depressive Symptomology	.94		.035
Subjective Mindfulness * Baseline Depressive Symptomology * Nostalgia Manipulation Check	-1.11		.010

Note: \*= $p < .050$ , \*\*= $p \leq .01$ , \*\*\*= $p \leq .001$

A regression model was added to mirror the SEM in Figure 10 and examine individuals' subjective ratings of nostalgia, as measured by the nostalgia manipulation check and how this variable related to mindfulness condition, TMS score, recall condition, and SFNS. To do so, a third model was added the model in Table 8 that incorporated subjective level of mindfulness (TMS score), subjective ratings of nostalgia (as measured by the nostalgia manipulation check), the interaction between subjective mindfulness level and baseline depressive symptomology, and

the interaction between subjective mindfulness, subjective ratings of nostalgia, and baseline levels of depressive symptomology. This third model explained a significant proportion of additional variance  $\Delta R^2 = .161, p < .001$  and was significant  $F(10, 462) = 18.62, p < .001$ . There were main effects of subjective level of mindfulness  $t(472) = 7.78, p < .001$  and of the nostalgia manipulation check  $t(472) = 4.09, p < .001$  in predicting SFNS. Higher subjective levels of mindfulness predicted higher SFNS scores, and higher nostalgia manipulation check scores also predicted higher SFNS scores. The interactions were non-significant.

**Aim 3: Determine whether nostalgia (as defined by both engaging in nostalgic recall and by reported state level of nostalgia) can decrease depressive symptomology and whether the mindfulness intervention can have an additive effect.**

***Structural equation modeling results:***

*Experiment 3:*

A SEM model was created to evaluate the relationship between mindfulness condition, recall condition, SFNS, and subjective levels of mindfulness (TMS) on changes in state levels of depressive symptomology. This model achieved a fit of  $\chi^2(97) = 315.85, p < .001, RMSEA = .069; SRMR = 0.048; CFI = .93$  (Figure 11). SFNS predicted reductions in state levels of depression  $B = .42, SE = .14, p = .002$ , supporting hypothesis 3a1. Recall condition and mindfulness condition did not significantly predict change in state depressive symptomology  $B = .044, SE = .12, p = .70; B = -.11, SE = .11, p = .32$ , respectively. This suggests that these conditions were not effective at decreasing depressive symptomology. Given that neither the mindfulness condition nor mindfulness score on the TMS predicted change in state levels of depressive symptomology, hypothesis 3a3 was not supported. Recall condition as a predictor of

nostalgic benefit was also non-significant in this model  $B = .062$ ,  $SE = .045$ ,  $p = .17$ , suggesting that recall type was not an effective predictor of nostalgic benefit in this model.

Given that lower baseline depressive symptomology predicted higher state levels of nostalgia and that greater state levels of nostalgia predicted greater changes in state depressive symptomology, a model was run to test whether baseline depressive symptomology co-varied with depression change score. The model yielded similar fit statistics as the model in Figure 11  $\chi^2(71) = 255.90$ ,  $p < .001$ ,  $RMSEA = .074$ ;  $SRMR = 0.048$ ;  $CFI = .94$  and showed a lack of relationship between baseline depression and change in depression symptomology after experimental intervention  $r = -.069$ ,  $SE = 0.134$ ,  $p = .609$ . This suggests that the changes in state depressive symptomology are not due to regression to the mean, but, instead, may be due to being able to engage with and feel positive after recalling a memory. Furthermore, the interaction between baseline depressive symptomology and SFNS was tested in the regression results section below (See Table 9) and was non-significant. Since nostalgic benefit predicted change in depressive symptoms and there is no interaction between baseline depressive symptoms and state level of nostalgia, changes in depressive symptoms have more to do with ability to access positive well-being benefits after a memory recall than mood at baseline or how baseline mood impacts state levels of nostalgia.

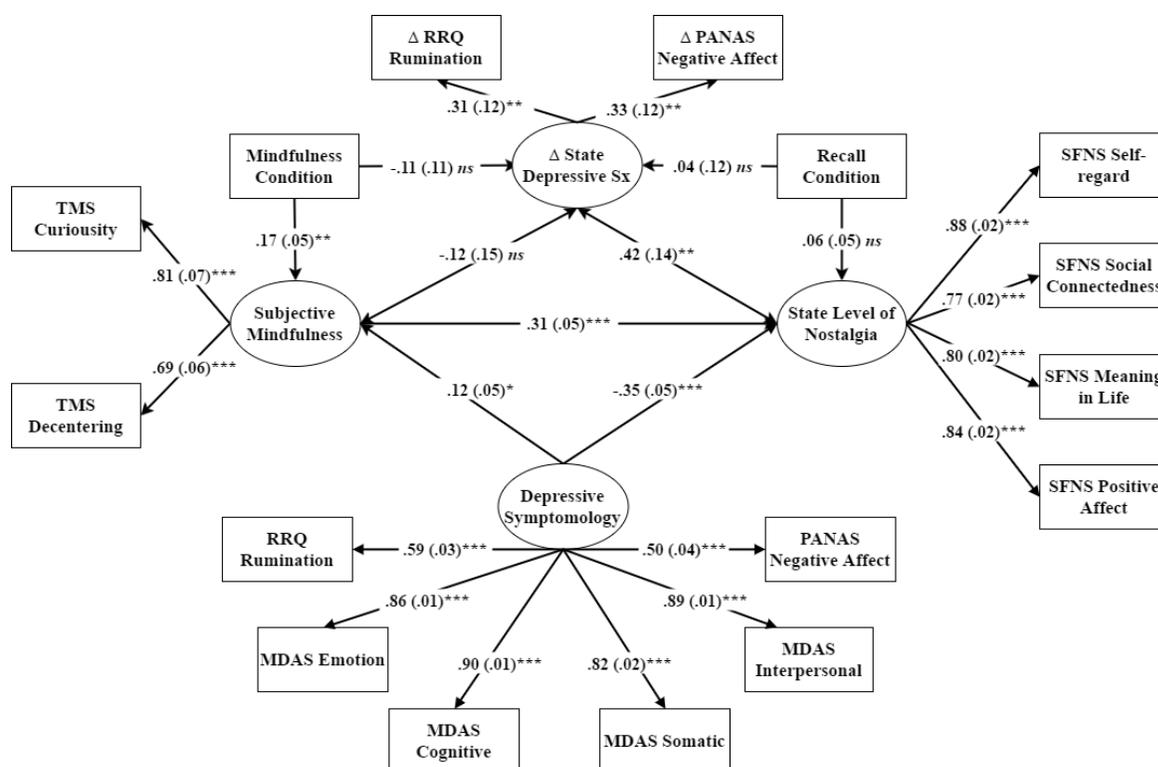


Figure 11. Model examining relationships between baseline depressive symptomology, mindfulness, nostalgic benefit, and change in depressive symptomology after mindfulness and memory recall manipulations, accounting for mindfulness and recall conditions.  $B(SE)$ ;  $ns$  = not significant; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed.

### Regression results:

#### Experiment 3:

To more fully evaluate aim 3 and identify factors leading to reduction in depressive symptomology, regression models were created. One model with age difference between the time of the memory and current age was created to control for this factor. The overall model was not significant  $F(1, 471) = .27, p = .60$ . The second model, added baseline depressive symptomology, recall condition, mindfulness condition, SFNS, two-way interaction between recall condition and SFNS, two-way interaction between recall condition and baseline depressive symptomology, two-way interaction between baseline depressive symptomology and SFNS, three-way interaction between mindfulness condition, recall condition, and baseline depressive symptomology, and three-way interaction between mindfulness condition, SFNS, and baseline

depressive symptomology. This model accounted for a significant portion of variance after controlling for age difference at the time of the memory recalled  $\Delta R^2 = .527, p < .001$ . Results are summarized in Table 9. This model provided support for hypothesis 3a1, which predicted that higher state levels of nostalgia would lead to greater reduction in depressive symptomology  $t(472) = 5.78, p < .001$ . It also supported hypotheses 3a2, which predicted that participating in the nostalgic recall condition would lead to greater decreases in depressive symptomology  $t(472) = 2.20, p = .028$ . There was a significant relationship between mindfulness condition and changes in depressive symptomology, which hypothesis 3a3 predicted, however, the direction of the effect is opposite of what was predicted  $t(472) = -6.87, p < .001$ . This suggests that individuals who did not participate in the mindfulness intervention has a greater decrease in depressive symptomology than did individuals who participated in the intervention. Evidence to support the two- and three-way interactions (hypotheses 3b1-3b5) was not found.

Table 9

*Summary of Regression Results for Change in Depressive Symptomology in Experiment 3*

<b>Regression Model for changes in level of depressive symptomology for Experiment 3</b>			
<i>Regression components</i>	<i>F/t (df)</i>	<i>R(R<sup>2</sup>Δ)</i>	<i>SE</i>
<b>Change in Depressive Symptomology</b>			
Model 1	.27 (1, 471)	.024(.001)	4.93
# of years since memory	-.52		
Model 2	51.62*** (10, 462)	.726(.527)***	4.63
# of years since memory	-.29		.006
Baseline Depressive Symptomology	-.58		.018
Recall Condition	2.20*		.050
Mindfulness Condition	-6.87***		.048
SFNS	5.78***		.016
Recall Condition * SFNS	.32		.010
Recall Condition * Baseline Depressive Symptomology	-.45		.024
Baseline Depressive Symptomology * SFNS	-.64		.007
Baseline Depressive Symptomology *	.47		.006
Mindfulness Condition * Recall Condition			
Baseline Depressive Symptomology *	.57		.002
Mindfulness Condition * SFNS			

Note: \*= $p < .050$ , \*\*= $p \leq .01$ , \*\*\*= $p \leq .001$

## Discussion

### Experiments 1 and 2

Consistent with past research (e.g., Routledge, Wildschut, Sedikides, & Juhl, 2013; Wildschut et al., 2006), Experiments 1 and 2 of the present study found that recalling nostalgic events produced higher state levels of nostalgia (i.e., increased meaning in life, social connectedness, positive affect, and self-regard) than recalling a memories of ordinary, everyday events, which supported hypothesis 1a2. This finding, in addition to the manipulation check, demonstrated that the recall manipulation was successful in producing an experience consistent with nostalgia in this study. The present study advances previous work by demonstrating that there are conditions, such as depressive mood state, that can limit people's ability to benefit from recalling autobiographical memories.

Of note, individuals who recalled nostalgic memories ranked themselves higher in the domains of meaning in life, social connectedness, positive affect, and self-regard than those who recalled ordinary memories. The higher scores in these domains reported by the nostalgic recall group were only seen in measures that specifically referred back to the process of thinking about the memory; group differences were indistinguishable when the same constructs measured by these domains were assessed outside of the context of the memory (i.e., nostalgic recall group reported higher scores on the SFNS than did the ordinary recall group, but both groups scored similarly on the SCS, SCCS, and NGSE). Similar results were observed in Experiment 3, lending a common interpretation across all three experiments. One interpretation of these findings is that nostalgic memories are helpful in bolstering these domains when reflecting on a particular nostalgic moment, but these effects may not generalize beyond that reflection. If this explanation were to be true and nostalgic recall were to be used as a therapeutic intervention, it

would be critical for therapists to help clients identify strategies for generalizing aspects of their memories that engender these feelings of connectedness, self-efficacy, and meaning. The ability to generalize these feelings would help clients recognize positive aspects of current and future situations and cultivate positive feelings across time and settings. Given differences were found between the nostalgic recall group and the ordinary recall group on the SFNS but not on the SCCS, SCS, or the NGSE, then the SFNS may be a more sensitive measure of changes due to nostalgic recall.

Participants who reported greater negative affect, rumination, and symptoms associated with depression also reported lower state levels of nostalgia across both recall conditions. Thus, Experiments 1 and 2 provided support for hypothesis 1a1, which predicted a main effect of depressive symptomology, such that higher levels of depressive symptomology would lead to lower state levels of nostalgia, as measured by the SFNS. However, this effect was not specific to nostalgic memories, and therefore hypothesis 1b predicting an interaction between recall condition and depressive symptomology was not supported. One interpretation of the main effect of depressive symptomology is that the constructs measured by the SFNS overlap with the constructs measured in depression and/or are tapping the same construct. While the SFNS and depression measures were negatively related ( $r = -.335$ ,  $p < .001$ ), they are discrete. Measures of depression thought to be tapping the same construct, such as the Beck Depression Inventory and Hamilton Rating Scale for Depression, have been shown to have a stronger relationship, correlating between  $r = .70$  and  $.85$  (Brown, Schulberg, & Madonia, 1995).

These lower state levels of nostalgia associated with social connectedness, positive affect, self-regard, and meaning in life across both recall groups that are observed with greater depressive symptomology may be due to the cognitive biases in depression. These results

suggest that these biases diminish depressed individual's ability to see themselves in a positive light, regardless of the context. Overall, higher levels of depressive symptomology are associated with lower state levels of nostalgia across both recall groups. However, when comparing equal levels of depressive symptomology, individuals in the nostalgic recall group experience higher state levels of nostalgia than do individuals in the ordinary group, across the spectrum of depressive symptomology. This finding is important because it suggests that nostalgic recall can boost levels of social connectedness, positive affect, self-regard, and meaning of life, even in individuals experiencing more significant depressive symptomology. However, engaging in nostalgic recall alone may not be enough to offset the effects of depressive symptomology on these domains (i.e., they still score lower on the SFNS than individuals with lower baseline levels of depressive symptomology).

Hypothesis 1b, which predicted an interaction between recall type and level of depressive symptomology such that the effects of nostalgic recall would diminish as depressive symptoms increased was not supported. One possible explanation for this lack of interaction could be that both nostalgic and ordinary memories are forms of autobiographical recall and as such produce similar trends. Previous research on nostalgic recall and autobiographical recall suggests that there is substantial overlap in the effects of recalling both these memories (Bluck et al., 2005; Wildschut et al., 2006). Thus, nostalgic memories may vary from ordinary autobiographical memories in the intensity of their effects, rather than the type of effect they produce. However, what this study did not test was if there are difference between autobiographical (i.e., nostalgic and ordinary recall groups) and non-autobiographical memories. Future research comparing nostalgic memories to non-autobiographical memories of a similar emotional valance could help clarify if this relationship.

The lack of interaction between depression and recall type is important from a clinical and therapeutic standpoint. A main effect with no interaction makes engaging in nostalgic memory recall a potentially ubiquitous clinical tool. Interventions aimed at the domains associated with nostalgia should produce an increase in domains associated with well-being and subsequently decrease depressive state. The efficacy of nostalgic recall at creating change in depressive symptomology will be discussed in the discussion of Experiment 3.

Pizzagalli (2014) proposes an integrated model of depression and anhedonia (i.e., loss of pleasure) that is consistent with these findings. Pizzagalli argues that anhedonia, a cardinal symptom of depression, manifests in part from a combination of cognitive and neurological aberrations. Depressed individuals undervalue positive events and less frequently affirm positive self attributes in self-referential tasks. They also demonstrate disruptions in dopamine signaling and in the mesolimbic dopamine reward pathways. These differences lead to a reduced response to positive stimuli, such as positive aspects of nostalgic memories. They also lead to a lack of specificity and detail in autobiographical memory recall (e.g., Mark et al., 2007; Raes et al., 2006; Van Daele et al., 2014) and a tendency for depressed individuals to be self-critical and evaluative rather than reflective (e.g., Watkins & Teasdale, 2001) when recalling memories. These differences may result in the overall decrease in benefit from memory recall, regardless of induction type (nostalgic or ordinary) observed in individuals with higher depressive symptomology. It is possible that after recalling a memory (nostalgic or ordinary), the lower ratings of state levels of nostalgia observed in individuals with greater depressive symptomology are due to being in a low mood state (i.e., higher depressive symptomology is associated with lower psychological well-being). However, it is likely that the cognitive and neurological disruptions outlined above have an additive effect on this relationship. Mindfulness is an

intervention that has been shown to mitigate some of the effects of depression, and specifically decrease rumination while increasing autobiographical memory specificity.

The present study chose to examine induced nostalgia rather than naturally evoked nostalgia, in part to look at nostalgic recall as a potential clinical intervention for depressed individuals. Although this study did not examine naturally evoked nostalgia, it is likely that the findings related to the impact of depressive symptomology on ordinary and nostalgic memories recall will generalize to naturally evoked autobiographical memories as well. Thus, these findings suggest that individuals in lower mood states may receive the same level of mood boost from incidental reminders of positive past events that healthy, non-depressed individuals do on a day-to-day basis. However, despite this boost, individuals in lower mood states report lower state levels of nostalgia than individuals in more positive mood states. Thus, lacking the ability to re-experience positive past events at the same level may make those individuals more vulnerable to depression. Finding a way to mitigate the cognitive aberrations associated with depression may allow individuals to obtain greater benefits from incidental reminders of past events and help them regulate mood. A brief mindfulness intervention was explored as a way to lessen negative mood symptoms and increase access to the benefits of nostalgic recall in Experiment 3.

### **Experiment 3**

In Experiment 3, GML was used to test the effects of the experimental manipulations of recall type (nostalgic vs. ordinary) and the participation in the mindfulness exercise on state levels of nostalgia. SEM models were used to test theoretical relationships between the constructs of mindfulness, state level of nostalgia, and levels of depressive symptomology. As was the case in Experiments 1 and 2, the group who engaged in nostalgic

recall reported greater levels of nostalgia on the manipulation check, suggesting that the manipulation of memory type was successful at eliciting nostalgia.

In Experiments 1 and 2, recall type predicted state level of nostalgia. However, in Experiment 3, manipulating recall type only predicted state levels of nostalgia at a marginal level of significance. This perceived decrease in significance between Experiments 1 and 2 and Experiment 3 may be due any number of potential factors. It is unclear what might have led to this finding as this manipulation has been widely used and produced robust changes in the nostalgia manipulation check of this study. This finding could imply that the manipulation check is more sensitive at measuring nostalgia, especially since the manipulation check asks more general questions about experiencing nostalgia whereas the questions on the SFNS are more specific to ways in which the memory may or may not have impacted the individual. This difference is important to note as research has demonstrated that people define nostalgia in different ways (Hepper, Ritchie, Sedikides, & Wildschut, 2012) and their recall may have elicited nostalgia but not in all the ways defined by the SFNS. Nostalgic recall may not affect the four domains of the SFNS or effect those domains equally. When examining differences between the recall type on the subscales of the SFNS, rather than the latent construct of state level of nostalgia, there were significant differences on the Social Connectedness and the Meaning in Life subscales for Experiment 3. To explore this finding, future work could examine the qualitative summaries participants provided of their memories, such as coding for social engagement, to see if the presence of others people in the memory, for example, influences response style on the SFNS and/or varies by recall condition.

An alternative explanation includes random, idiosyncratic responses from a portion of participants in Experiment 3. The order of responding to questionnaires may have had an impact.

In all experiments, the nostalgia manipulation check immediately followed the memory recall, however, the order of the SNFS varied between Experiments 1 and 2 and Experiment 3. Following the memory recall in Experiments 1 and 2, participants completed the nostalgia manipulation check then the SFNS. Following the memory recall in Experiment 3, participants completed the nostalgia manipulation check, the TMS, and then the SFNS. Thus answering questions about mindfulness prior to completing the SFNS may have also influenced individuals' responses; the mindfulness questionnaire was not a part of Experiments 1 and 2. Research suggests that implicit mindfulness primes can change physiological and psychological responses (Bergeron, Almgren-Doré, & Dandeneau, 2016). Therefore, it is possible that answering questions about mindfulness prior to completing the SFNS may have primed participants in Experiment 3 to respond more similarly across recall conditions.

While baseline level of depressive symptomology predicted state level of nostalgia, which is consistent with the results of Experiments 1 and 2, recall condition only marginally predicted state level of nostalgia ( $p=.051$ ). Mindfulness condition did not predict state level of nostalgia. However, both GLM (Table 8) and SEM (Figure 10) demonstrated that, in conjunction with baseline level of depressive symptomology, subjective levels of mindfulness, regardless of the experimentally assigned mindfulness condition, and subjective levels of nostalgia, as defined by the manipulation check, both predicted state levels of nostalgia. Experienced levels of mindfulness and nostalgia demonstrated greater predictive ability than corresponding manipulated conditions (assignment to mindfulness intervention and/or to nostalgic recall) for SFNS scores. These results suggest that, while the manipulations did not produce the hypothesized results, the theoretical relationship between these variables exists in a

way that is consistent with hypothesis 1a2 and 2a (i.e., greater experience of nostalgia and higher levels of mindfulness lead to higher state levels of nostalgia).

While mindfulness condition predicted higher levels of subjective mindfulness, it was a small effect ( $\eta_p^2=.019$ ). Therefore, it is possible that a more robust manipulation (e.g., longer and/or repeated mindfulness sessions) will increase the effect of the manipulation, and potentially lead to a stronger relationship between mindfulness intervention and state level of nostalgia. This experiment set out to test whether increasing levels of mindfulness predicted increases in state levels of nostalgia. A brief mindfulness intervention was used in an attempt to augment mindfulness level, but from a theoretical standpoint, the specific mindfulness intervention used is less important than its ability to reliably enhance mindfulness and whether or not mindfulness level can influence participants' experienced level of nostalgia.

Another factor to consider in the interpretation of these results is level of engagement, particularly during the nostalgic recall and the mindfulness exercise. The fact that subjective level of nostalgia and mindfulness predicted nostalgic benefit, but recall condition and mindfulness condition did not might suggest that participants who were more engaged in the exercise might have gained more benefit from it. It may also speak to individual differences in natural tendencies and abilities to be nostalgic and/or mindful. Task engagement and natural inclination to be nostalgic and/or mindful may be important factors to consider in future work. Using measures to screen for intervention engagement, task motivation, and frequency of nostalgic recall and mindfulness practice in future work could be used as a covariate to account for task engagement and natural tendencies for these tasks.

Experiment 3 provided further support for the idea that cognitive style influences the ability to experience a nostalgic state after recalling a memory. As previously discussed,

although assignment to a mindfulness exercise did not predict greater state levels of nostalgia, experiencing higher levels of subjective mindfulness did predict greater state levels of nostalgia. Subjective ratings of mindfulness and nostalgia positively correlated with one another (i.e., TMS and nostalgia manipulation check), suggesting that these two constructs are related. Although varying in temporal dimension (i.e., past memory versus present experience), nostalgia and mindfulness are both ways of drawing awareness to one's self. Individuals may have different abilities and natural tendencies to immerse themselves in tasks requiring self-awareness, even when prompted to do so. This finding may also suggest that people's ability or willingness to direct their awareness to a particular task influences their achieved state level of nostalgia.

Experiment 3 also tested the hypothesis that the mindfulness intervention would mitigate the impact of depressive symptomology on the SFNS, whereas, depressive symptomology would predict lower SFNS in those who did not participate in the mindfulness intervention (Hypothesis 2b1). Experiment 3 did not find evidence to support this hypothesis. There was a main effect of depressive symptomology on SFNS but no interaction between mindfulness intervention and depressive symptomology. This suggests that mindfulness possibly does not affect state levels of nostalgia and that the brief, single-shot mindfulness intervention used in this study did not change the way that depression impacts SFNS scores. However, it is unlikely that mindfulness has no relationship with state levels of nostalgia, as TMS scores predicted SFNS scores. It is more likely that the mindfulness intervention used in this study did not produce robust enough effects to find significance. Future work using a longer and/or multi-session mindfulness intervention could explore this explanation.

Mindfulness also did not alter the hypothesized relationship between depressive symptomology and recall type. Hypothesis 2b2 predicted that the mindfulness intervention

would mitigate the effects of depression on SFNS, leaving a main effect of recall type for the mindfulness intervention group and two-way interaction between depressive symptomology and recall type (Hypothesis 1b) in the no mindfulness intervention group. In this study, only depressive symptomology achieved statically significance in predicting state level of nostalgia, with recall type falling just shy of statistical significance. This implies that depressive symptomology highly impacts the way people report about their experience of memories. Research has documented the effect depression has on decreasing memory specificity (e.g., Gibbs & Rude, 2004; Raes et al., 2006; Ricarte et al., 2011). This study adds that as depressive symptomology increases, it seems to decrease the positive attributes less depressed individuals associate with memory recall. What was not investigated in the current study was whether memory specificity or aspects of the memory recall contribute to this decrease in memory recall's impact or if the decreases in the areas of social connectedness, positive affect, meaning, and self-regard observed at higher levels of depressive symptomology are a by-product of generally feeling more depressed.

Aim 3 of this study explored the relationship between mindfulness, recall type, and SFNS with respect to changes in depressive mood level. At the beginning of Experiment 3, participants completed several measures of trait and state depressive symptomology. Then after engaging in the experimental manipulations, participants repeated the measures of depressive symptomology. The analysis of change in depressive symptomology focused on state measures of depressive symptomology. As was the case in Experiments 1 and 2, baseline level of depressive symptomology predicted state level of nostalgia. However, baseline depressive symptomology did not predict change in state depressive symptomology after the experimental manipulations, meaning that it was possible for all individuals to attain a decrease in negative mood state

regardless of their level of symptomology at baseline. This also indicates that initial depressive symptomology affects constructs related to positive well-being (i.e., SFNS) and negative mood (i.e., change in depressive symptomology) differently. This finding reinforces the research that has posited positive and negative mood are not merely the inverse of one another (Watson & Clark, 1997; Wichers, Jacobs, Dermon, Thiery, & van Os, 2007). It is also possible that this overall decrease in symptomology across time points could be due to a testing effect.

Main effects of SFNS, recall condition, and mindfulness condition predicted changes in depressive symptomology, supporting hypotheses 3a1-3a3. Regardless if individuals recalled a nostalgic or an ordinary memory, higher state levels of nostalgia predicted decreases in depressive symptomology (Hypothesis 3a1). This suggests that the more a memory activates constructs linked to social connectedness, positive affect, meaning, and self-regard (constructs comprising the SFNS), the greater its potential to decrease depressive symptomology.

Recall condition was related to changes in depressive symptomology, such that nostalgic recall predicted greater decreases in depressive symptomology than did ordinary recall, which is consistent with hypothesis 3b2. Although there was not an interaction between recall condition and SFNS with respect to change in depressive symptomology (Hypothesis 3b1), recall type predicted SFNS and both SFNS and recall type predicted changes in depressive symptomology suggesting that nostalgia, whether experimentally induced (recall) or whether subjectively reported (SFNS score) are related to decreases in depressive symptomology. These findings reinforce the influence of the way people think about the past on depressive symptomology. Past research has demonstrated a link between rumination and critical evaluation of past behaviors to be detrimental to mood (e.g., Mor & Winquist, 2002; Rimes & Watkins, 2005), and the current

study demonstrated a link between warm, nostalgic reflection on the past to be beneficial to mood.

Previous research has found mindfulness interventions to be an effective way to decrease depressive symptomology and increase autobiographical specificity in depressed populations (e.g., Barnhofer et al., 2009; Deyo, Wilson, Ong, & Koopman, 2009; Mark, Teasdale, Segal, & Soulsby, 2000). Based on this research, Experiment 3 incorporated a mindfulness intervention and assessed its effects on changes in depressive symptomology. It was hypothesized that the mindfulness intervention should lead to greater decreases in depressive symptomology (hypothesis 3a3). There was a main effect of mindfulness intervention on depressive symptomology. However, the effect was in the opposite direction of what was hypothesized. Not participating in the mindfulness intervention predicted larger decreases in depressive symptomology than participating in the mindfulness intervention. This finding is inconsistent with the literature on depressive symptomology and mindfulness interventions, and the current literature does not provide a framework to explain this abnormality. This phenomenon deserves further consideration if the direction of this effect is replicated.

None of the interactions tested in Experiment 3 were significant. While recall condition and SFNS both predicted change in depressive symptomology, the interaction between recall condition and SFNS did not predict change in depressive symptomology. SFNS had the same effect on changing depressive symptomology across recall conditions. The nostalgic and ordinary recall conditions had the same effect on changing depressive symptomology, regardless of SFNS, with the nostalgic recall predicted greater improvements in depressive symptomology than ordinary recall. The main effects with a lack of interaction between SFNS and recall

condition may provide further evidence for the argument that nostalgic and ordinary recall may vary in intensity rather than in the type of effect they produce.

Analyses of Experiment 3 found no evidence for an interaction between baseline depressive and recall type in predicting change in depression scores (hypothesis 3b2). The difference in nostalgic and ordinary recall conditions in predicting changes in depressive symptomology remained the same across all levels of baseline depressive symptomology. Similarly, there was no interaction between baseline depressive and SFNS in predicting change in depression scores (hypothesis 3b3). These results suggest that baseline level of depressive symptomology did not impact the relationships between change in depression score and either measure of nostalgia (recall condition and SFNS). In both cases, nostalgia, whether experimentally manipulated (recall condition) or subjectively reported (SFNS) produced greater decreases in depressive symptomology, regardless of baseline depressive symptomology, than did measures associated with lower levels of nostalgia (i.e., ordinary recall condition and lower SFNS scores).

Two three-way interactions were predicted for Experiment 3 and neither were significant. Hypothesis 3b4 posited that the mindfulness intervention should mitigate the differential effects of depression on recall condition, and hypothesis 3b5 posited that the mindfulness intervention should mitigate the differential effects of depression on SFNS. The mindfulness intervention did not change the relationship between depressive symptomology and recall condition or the one between depressive symptomology and SFNS.

### **Method of Delivery**

Experiments 1 and 2 were conducted online while experiment 3 was conducted in person in a classroom setting. All experiments used independent samples and implemented the same

protocol for the memory recall. This use of the same measures and methods allowed for a comparison of results between online and in-person delivery methods. Factor loadings for the latent variables of depressive symptomology and nostalgic benefit were similar. Furthermore, in all experiments, higher levels of depressive symptomology predicted lower state levels of nostalgia. The replication of these findings across experiments suggests a congruence of findings and suggests that the presence of an experimenter does not affect the effect of induced nostalgia.

Similarities across methods of delivery could have implications for telemedicine and for web- or mobile-based interventions. Although research on the efficacy of such intervention methods is still in its naissance and has yielded mixed findings (Maher et al., 2014; Wantland, Portillo, Holzemer, Slaughter, & McGhee, 2004), preliminary research has shown the use of technology in the provision of healthcare at a distance is an effective method of delivering treatment for a range of problematic behaviors. For instance, issues such as weight loss and physical activity (Harvey-Berino et al., 2010; Neve, Morgan, Jones, & Collins, 2010; Stephens & Allen, 2013), glucose monitoring in diabetes (Cho, Lee, Lim, Kwon, & Yoon, 2009), and alcohol consumption (Gustafson et al., 2014) have been treated effectively utilizing technology aided, distance-based interventions. Research has also pointed to the delivery of various psychotherapy interventions via telemedicine as equally efficacious to their in-person counterparts (Gros, Yoder, Tuerk, Lozano, & Acierno, 2011; Mitchell et al., 2008). Telemedicine as well as other web- and mobile-based interventions reduce cost and improve access to care (Hilty et al., 2013; Spaulding, Belz, DeLurgio, & Williams, 2010). Given these benefits, research testing the application of interventions through these modalities with clinical or clinically similar populations, such as the present study, have potential benefits. Furthermore, since research on

these delivery methods is still in its early stages, further work is needed to determine factors that enhance and hinder efficacy.

### **Limitations and Future Directions**

Several limitations of the present study warrant discussion. One such limitation was that this study examined experimentally prompted nostalgic rather than naturally evoked nostalgic feelings. Measuring the effects of naturally occurring feelings of nostalgia is difficult from a methodological standpoint as a variety of stimuli can evoke these feelings and the stimuli can vary between individuals. Given that this study did not evaluate naturally occurring nostalgia, it cannot be assumed that naturally occurring nostalgia would produce the same pattern of results. However, exploring induced nostalgia is of clinical value. If results from this study demonstrating that nostalgic benefit can reduce state depressive symptomology can be replicated in a broader sample and in clinically depressed samples, then nostalgic recall may be a helpful, adjunctive therapeutic tool.

This study employed a brief, single session mindfulness intervention. Such brief interventions can induce changes in state levels of mindfulness but are unlikely to cause substantial changes to underlying cognitive patterns that are seen in experienced meditators (Davidson, 2010). Furthermore, Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) demonstrated that the components comprising the construct of mindfulness change with experience level of the meditator. This study can only comment on how state level changes in mindfulness affect the relationship between depressive symptomology and state levels of nostalgia, which may or not be the same way that higher trait level changes in mindfulness affect these relationships. Given that individuals can become more proficient at mindfulness with practice (Morgan, Graham, Hayes-Skelton, Orsillo, & Roemer, 2014) and longer interventions

have demonstrated greater effects (Wu et al., 2013), the brevity the current study's mindfulness intervention may limit the potential effects of mindfulness on state depressive symptomology and state levels of nostalgia. Future longitudinal studies could address the efficacy of longer mindfulness interventions as well as the duration of the effects of both the mindfulness intervention and the nostalgic recall.

Another limitation may be varying degrees of motivation to engage in the memory recall or mindfulness exercise. Motivation, adherence, and quality of practice are suggested to play a role in the effectiveness of mindfulness based interventions (de Vibe et al., 2012; Del Re, Flückiger, Goldberg, & Hoyt, 2013). Degree of motivation to engage in the exercise may vary between undergraduates participating in a study for course credit and individuals seeking treatment in a clinical setting to improve quality of life and address depressive symptoms.

One potential way to assess engagement in the memory recall is to examine the qualitative content of participants' memory accounts. Degree of detail, word count, and memory specificity may be indicators of engagement. Additional variables such as amount of emotional language, emotional valence, past focus, and number of verbs may also be valuable predictors of nostalgic benefit and resultant mood change. Assessing emotional valence may be especially valuable as nostalgic memories often contain both positive and negative affect (Hepper et al., 2014). Evaluating the centrality of positive and negative affect may be an important consideration with respect to depressive symptomology's effects on state level of nostalgia and to changes in depressive symptomology. Furthermore, there is debate as to the core emotional focus in nostalgic recall with some scholars arguing that it is positive, others contending that is negative, and others suggesting that it is mixed (Hepper et al., 2012). Manipulating the nostalgic

memory prompt to focus on each of these orientations may be useful for assessing whether the emotional focus of the memory affects the effects of nostalgia.

Obtaining a more diverse age range of participants would help expand the current study. One study comparing the extent to which younger and older adults use of autobiographical memory to help promote a cohesive sense of self found that younger adults tend to use autobiographical recall more frequently for this purpose than older adults who have accumulated more life experiences to rehearse and reaffirm their identity over the years (Bluck & Alea, 2008). This suggests that the effects of nostalgic recall may vary with age and may not bear the same relationship with depressive symptomology across the lifespan.

This study was an initial step at elucidating how varying degrees of negative mood symptomology affect state levels of nostalgia. The current study investigated hypotheses about the effects of engaging in nostalgic recall and state levels of nostalgia on reducing depressive symptomology in a general population. Future work investigating these relationships in samples of clinical depressed individuals is needed to determine if nostalgic recall could be a useful adjunctive therapeutic tool. Nostalgic interventions could be implemented much like Cognitive Process Therapy (CPT) for Post-Traumatic Stress Disorder (PTSD), emphasizing the importance of self-referential memories and narrative frameworks as intervention tools.

From an approach/avoidance framework, individuals with PTSD have an increased avoidance to thoughts and reminders of traumatic events much as individuals with depression have a decreased approach to and devaluing of positive events (Trew, 2011). In CPT, therapists work with clients to build skills then use these skills to address avoidance and process traumatic memories. Like in CPT, interventions that may be effective for depression and incorporate nostalgic recall could entail the therapist working with clients to build skills and process positive

aspects memories they overlook. In this case, such skills may include greater awareness into the occurrence of ruminative thoughts and how to be more reflective and mindful when they do occur, as well as increasing insights into how depression has changed individuals' beliefs and how to challenge maladaptive beliefs by learning to accommodate positive information and reduce assimilation of negative information. Then, therapists could work with clients to approach positive memories and help clients to bridge their past and present selves as well as to process the meaning that clients ascribe to these memories. This type of treatment would aid individuals in becoming more aware of their maladaptive thoughts, in becoming more aware of how these thoughts influence their interpretation of positive events (e.g., nostalgic memories), and in learning ways to reframe these thoughts. These skills may then allow depressed individuals to recognize and attain boosts in well-being from incidental exposure to positive events such as nostalgic reminders that they often miss. These changes, with the aid of nostalgic recall, should in turn decrease depressive symptomology.

### **Conclusion**

The present study explored the effects of nostalgia on depressive symptomology. To date, nostalgia and its effects have been examined in numerous contexts. Past research has demonstrated engaging in nostalgic recall is associated with higher scores on measures related to well-being. However, research had yet to investigate the effects of nostalgic recall with respect to depressive symptomology and mindfulness as a potential way to enhance nostalgic recall's effects. Exploring nostalgic recall in the context of depressive symptomology is important because the cognitive processing biases inherent in depressive symptoms can influence the way depressed individuals recall and interrupt memories. The present study expanded previous work on nostalgic recall in several ways. This study demonstrated that higher levels of depressive

symptomology reduced state levels of nostalgia when recalling both ordinary and nostalgic memories. It also found that higher self-reported levels of mindfulness, a skill often used to address this aberrant pattern of information processing in depression, can increase state levels of nostalgia. Although the mindfulness intervention did not predict changes in depressive symptomology in the expected direction, it is possible that people's engagement partially mediates the relationship between mindfulness and state levels of nostalgia. Finally, both engaging in a nostalgic recall (compared to ordinary recall) and experiencing higher state levels of nostalgia predicted decreases in state depressive symptomology. If these findings hold true in clinically depressed samples, evoking feelings of nostalgia may be a useful therapeutic tool for treating depression when paired with treatments such as mindfulness.

## References

- Abramowitz, S. I. (1969). Locus of control and self-reported depression among college students. *Psychological Reports, 25*(1), 149–150. <https://doi.org/10.2466/pr0.1969.25.1.149>
- Abramson, L. Y., & Sackheim, H. A. (1977). A paradox in depression: Uncontrollability and self-blame. *Psychological Bulletin, 84*(5), 838–851. <https://doi.org/10.1037/0033-2909.84.5.838>
- Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49–74. <https://doi.org/10.1037/0021-843X.87.1.49>
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders*. American Psychiatric Association. Retrieved from <http://dsm.psychiatryonline.org/doi/book/10.1176/appi.books.9780890425596>
- Angus, L. E., & Kagan, F. (2013). Assessing client self-narrative change in emotion-focused therapy of depression: An intensive single case analysis. *Psychotherapy, 50*(4), 525–534. <https://doi.org/10.1037/a0033358>
- Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behaviour Research and Therapy, 44*(12), 1849–1858. <https://doi.org/10.1016/j.brat.2005.12.007>
- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology, 63*(4), 596–612. <https://doi.org/10.1037/0022-3514.63.4.596>

- Baer, R. A. (2009). Self-Focused Attention and Mechanisms of Change in Mindfulness-Based Treatment. *Cognitive Behaviour Therapy*, 38(S1), 15–20.  
<https://doi.org/10.1080/16506070902980703>
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using Self-Report Assessment Methods to Explore Facets of Mindfulness. *Assessment*, 13(1), 27–45.  
<https://doi.org/10.1177/1073191105283504>
- Baldwin, M. (2015). Bringing the past to the present: Temporal self-comparison processes moderate nostalgia's effect on well-being. (Unpublished Doctoral Dissertation).  
University of Kansas, Lawrence, Kansas.
- Baldwin, M., Biernat, M., & Landau, M. J. (2014). Remembering the Real Me: Nostalgia Offers a Window to the Intrinsic Self. *Journal of Personality and Social Psychology*.  
<https://doi.org/http://dx.doi.org.www2.lib.ku.edu/10.1037/a0038033>
- Baldwin, M., & Landau, M. J. (2014). Exploring Nostalgia's Influence on Psychological Growth. *Self & Identity*, 13(2), 162–177. <https://doi.org/10.1080/15298868.2013.772320>
- Bandura, A., Pastorelli, C., Barbaranelli, C., & Caprara, G. V. (1999). Self-efficacy pathways to childhood depression. *Journal of Personality and Social Psychology*, 76(2), 258–269.  
<https://doi.org/10.1037/0022-3514.76.2.258>
- Barger, S. D., Messerli-Bürgy, N., & Barth, J. (2014). Social relationship correlates of major depressive disorder and depressive symptoms in Switzerland: nationally representative cross sectional study. *BMC Public Health*, 14(1), 273. <https://doi.org/10.1186/1471-2458-14-273>
- Barnhofer, T., Crane, C., Hargus, E., Amarasinghe, M., Winder, R., & Williams, J. M. G. (2009). Mindfulness-based cognitive therapy as a treatment for chronic depression: A preliminary

- study. *Behaviour Research and Therapy*, 47(5), 366–373.  
<https://doi.org/10.1016/j.brat.2009.01.019>
- Batcho, K. I. (1998). Personal nostalgia, world view, memory, and emotionality. *Perceptual and Motor Skills*, 87(2), 411–432. <https://doi.org/10.2466/pms.1998.87.2.411>
- Battle, J. (1978). Relationship between self-esteem and depression. *Psychological Reports*, 42(3 PT 1), 745–746. <https://doi.org/10.2466/pr0.1978.42.3.745>
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497–529. <https://doi.org/10.1037/0033-2909.117.3.497>
- Beck, A. T. (1967). *Depression: Clinical, Experimental, and Theoretical Aspects*. University of Pennsylvania Press.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1987). *Cognitive Therapy of Depression*. New York: The Guilford Press.
- Benassi, V. A., Sweeney, P. D., & Dufour, C. L. (1988). Is there a relation between locus of control orientation and depression? *Journal of Abnormal Psychology*, 97(3), 357–367. <https://doi.org/10.1037/0021-843X.97.3.357>
- Berntsen, D., & Rubin, D. C. (2004). Cultural life scripts structure recall from autobiographical memory. *Memory & Cognition*, 32(3), 427–442. <https://doi.org/10.3758/BF03195836>
- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., ... Devins, G. (2004). Mindfulness: A Proposed Operational Definition. *Clinical Psychology: Science and Practice*, 11(3), 230–241. <https://doi.org/10.1093/clipsy.bph077>
- Bluck, S. (2003). Autobiographical memory: Exploring its functions in everyday life. *Memory*, 11(2), 113–123. <https://doi.org/10.1080/741938206>

- Bluck, S., & Alea, N. (2008). Remembering being me: The self continuity function of autobiographical memory in younger and older adults. In F. Sani (Ed.), *Self continuity: Individual and collective perspectives* (pp. 55–70). New York, NY, US: Psychology Press.
- Bluck, S., Alea, N., Habermas, T., & Rubin, D. C. (2005). A TALE of Three Functions: The Self-Reported Uses of Autobiographical Memory. *Social Cognition*, 23(1), 91–117. <https://doi.org/10.1521/soco.23.1.91.59198>
- Bluck, S., & Liao, H.-W. (2013). I Was Therefore I Am: Creating Self-Continuity Through Remembering Our Personal Past. *The International Journal of Reminiscence and Life Review*, 1(1), 7–12.
- Brinker, J. K., Campisi, M., Gibbs, L., & Izzard, R. (2013). Rumination, Mood and Cognitive Performance. *Psychology*, 04(03), 224–231. <https://doi.org/10.4236/psych.2013.43A034>
- Brittlebank, A. D., Scott, J., Williams, J. M., & Ferrier, I. N. (1993). Autobiographical memory in depression: state or trait marker? *The British Journal of Psychiatry*, 162(1), 118–121. <https://doi.org/10.1192/bjp.162.1.118>
- Brown, A. D., Dorfman, M. L., Marmar, C. R., & Bryant, R. A. (2012). The impact of perceived self-efficacy on mental time travel and social problem solving. *Consciousness and Cognition*, 21(1), 299–306. <https://doi.org/10.1016/j.concog.2011.09.023>
- Brown, C., Schulberg, H. C., & Madonia, M. J. (1995). Assessment depression in primary care practice with the Beck Depression Inventory and the Hamilton Rating Scale for Depression. *Psychological Assessment*, 7(1), 59–65. <https://doi.org/10.1037/1040-3590.7.1.59>

- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822–848. <https://doi.org/10.1037/0022-3514.84.4.822>
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical Foundations and Evidence for its Salutary Effects. *Psychological Inquiry*, *18*(4), 211–237. <https://doi.org/10.1080/10478400701598298>
- Brown, R. G., & Watkins, E. (2002). Rumination and executive function in depression: An experimental study. (Short Report). *Journal of Neurology, Neurosurgery and Psychiatry*, *72*(3), 400–402. <https://doi.org/doi:10.1136/jnnp.72.3.400>
- Brown, T. A. (2015). *Confirmatory Factor Analysis for Applied Research* (Second Edition edition). New York ; London: The Guilford Press.
- Buckelew, S. P., Huysen, B., Hewett, J. E., Johnson, J. C., Conway, R., Parker, J. C., & Kay, D. R. (1996). Self-efficacy predicting outcome among fibromyalgia subjects. *Arthritis & Rheumatism*, *9*(2), 97–104. [https://doi.org/10.1002/1529-0131\(199604\)9:2<97::AID-ANR1790090205>3.0.CO;2-F](https://doi.org/10.1002/1529-0131(199604)9:2<97::AID-ANR1790090205>3.0.CO;2-F)
- Byrne, B. M. (2013). *Structural Equation Modeling With AMOS: Basic Concepts, Applications, and Programming* (2nd ed.). Ottawa, Ontario, Canada: Routledge.
- Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavalley, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology*, *70*(1), 141–156. <https://doi.org/10.1037/0022-3514.70.1.141>
- Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of participants and data gathered via Amazon’s MTurk, social media, and face-to-face behavioral

- testing. *Computers in Human Behavior*, 29(6), 2156–2160.  
<https://doi.org/10.1016/j.chb.2013.05.009>
- Chang, V. Y., Paresh, O., Caldwell, R., Glasgow, N., Abramson, M., Luskin, F., ... Koopman, C. (2004). The effects of a mindfulness-based stress reduction program on stress, mindfulness self-efficacy, and positive states of mind. *Stress and Health*, 20(3), 141–147.  
<https://doi.org/10.1002/smi.1011>
- Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a New General Self-Efficacy Scale. *Organizational Research Methods*, 4(1), 62–83.  
<https://doi.org/10.1177/109442810141004>
- Cheung, H. N., & Power, M. J. (2012). The development of a new multidimensional depression assessment scale: preliminary results. *Clinical Psychology & Psychotherapy*, 19(2), 170–178. <https://doi.org/10.1002/cpp.1782>
- Cheung, W.-Y., Wildschut, T., Sedikides, C., Hepper, E. G., Arndt, J., & Vingerhoets, A. J. J. M. (2013). Back to the Future Nostalgia Increases Optimism. *Personality and Social Psychology Bulletin*, 39(11), 1484–1496. <https://doi.org/10.1177/0146167213499187>
- Cho, J.-H., Lee, H.-C., Lim, D.-J., Kwon, H.-S., & Yoon, K.-H. (2009). Mobile communication using a mobile phone with a glucometer for glucose control in Type 2 patients with diabetes: as effective as an Internet-based glucose monitoring system. *Journal of Telemedicine and Telecare*, 15(2), 77–82. <https://doi.org/10.1258/jtt.2008.080412>
- Clark, D. A., & Beck, A. T. (1999). *Scientific Foundations of Cognitive Theory and Therapy of Depression*. New York: John Wiley & Sons.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. L. Erlbaum Associates.

- Conway, M. A. (2005). Memory and the self. *Journal of Memory and Language*, 53(4), 594–628. <https://doi.org/10.1016/j.jml.2005.08.005>
- Conway, M. A., Singer, J. A., & Tagini, A. (2004). The Self and Autobiographical Memory: Correspondence and Coherence. *Social Cognition*, 22(5), 491–529. <https://doi.org/10.1521/soco.22.5.491.50768>
- Cooper, H., & Findley, M. (1982). Expected Effect Sizes Estimates for Statistical Power Analysis in Social Psychology. *Personality and Social Psychology Bulletin*, 8(1), 168–173. <https://doi.org/10.1177/014616728281026>
- Cornwell, E. Y., & Waite, L. J. (2009). Social Disconnectedness, Perceived Isolation, and Health among Older Adults. *Journal of Health and Social Behavior*, 50(1), 31–48.
- Costello, A. B., & Osborne, J. W. (2005). Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most From Your Analysis. *Practical Assessment, Research & Evaluation*, 10(7), 1–9.
- Crocker, J., & Wolfe, C. T. (2001). Contingencies of self-worth. *Psychological Review*, 108(3), 593–623.
- Crocker, Jennifer. (2002). Contingencies of Self-Worth: Implications for Self-Regulation and Psychological Vulnerability. *Self and Identity*, 1(2), 143–149. <https://doi.org/10.1080/152988602317319320>
- D'Argembeau, A., Comblain, C., & Van der Linden, M. (2003). Phenomenal characteristics of autobiographical memories for positive, negative, and neutral events. *Applied Cognitive Psychology*, 17(3), 281–294. <https://doi.org/10.1002/acp.856>

- D'Argembeau, A., Lardi, C., & Van der Linden, M. (2012). Self-defining future projections: exploring the identity function of thinking about the future. *Memory (Hove, England)*, 20(2), 110–120. <https://doi.org/10.1080/09658211.2011.647697>
- Davidson, R. J. (2010). Empirical explorations of mindfulness: Conceptual and methodological conundrums. *Emotion (Washington, D.C.)*, 10(1), 8–11. <https://doi.org/10.1037/a0018480>
- de Diego, F. F., & Ots, C. V. (2014). Nostalgia: a conceptual history. *History of Psychiatry*, 25(4), 404–411. <https://doi.org/10.1177/0957154X14545290>
- De Raedt, R., & Koster, E. H. W. (2010). Understanding vulnerability for depression from a cognitive neuroscience perspective: A reappraisal of attentional factors and a new conceptual framework. *Cognitive, Affective & Behavioral Neuroscience*, 10(1), 50–70. <https://doi.org/10.3758/CABN.10.1.50>
- de Vibe, M., Bjørndal, A., Tipton, E., Hammerstrøm, K. T., Kowalski, K., Vibe, M. D., ... Kowalski, K. (2012). Mindfulness Based Stress Reduction (MBSR) for Improving Health, Quality of Life, and Social Functioning in Adults. *Campbell Systematic Reviews*, 8(3). <https://doi.org/http://doi.org/10.4073/csr.2012.3>
- Del Re, A. C., Flückiger, C., Goldberg, S. B., & Hoyt, W. T. (2013). Monitoring mindfulness practice quality: An important consideration in mindfulness practice. *Psychotherapy Research*, 23(1), 54–66. <https://doi.org/10.1080/10503307.2012.729275>
- Deyo, M., Wilson, K. A., Ong, J., & Koopman, C. (2009). Mindfulness and Rumination: Does Mindfulness Training Lead to Reductions in the Ruminative Thinking Associated With Depression? *EXPLORE: The Journal of Science and Healing*, 5(5), 265–271. <https://doi.org/10.1016/j.explore.2009.06.005>

- Dong, Y., & Peng, C.-Y. J. (2013). Principled missing data methods for researchers. *SpringerPlus*, 2(1), 222. <https://doi.org/10.1186/2193-1801-2-222>
- Draguns, J. G., & Tanaka-Matsumi, J. (2003). Assessment of psychopathology across and within cultures: issues and findings. *Behaviour Research and Therapy*, 41(7), 755–776. [https://doi.org/10.1016/S0005-7967\(02\)00190-0](https://doi.org/10.1016/S0005-7967(02)00190-0)
- Dunlop, W. L., & Tracy, J. L. (2013). Sobering stories: narratives of self-redemption predict behavioral change and improved health among recovering alcoholics. *Journal of Personality and Social Psychology*, 104(3), 576–590. <https://doi.org/10.1037/a0031185>
- Duru, E. (2008). The Predictive Analysis of Adjustment Difficulties from Loneliness, Social Support, and Social Connectedness. *Educational Sciences: Theory and Practice*, 8(3), 849–856.
- Eaton, W. W., Shao, H., Nestadt, G., Lee, H. B., Lee, B. H., Bienvenu, O. J., & Zandi, P. (2008). Population-based study of first onset and chronicity in major depressive disorder. *Archives of General Psychiatry*, 65(5), 513–520. <https://doi.org/10.1001/archpsyc.65.5.513>
- Ellis, A. (1962). *Reason And Emotion In Psychotherapy*. Oxford, England: Lyle Stuart.
- Ersner-Hershfield, H. (2009). Don't stop thinking about tomorrow: Individual differences in future self-continuity account for saving. *Judgment and Decision Making*, 4(4), 280–286.
- Farb, N. A. S., Anderson, A. K., & Segal, Z. V. (2012). The Mindful Brain and Emotion Regulation in Mood Disorders. *Canadian Journal of Psychiatry*, 57(2), 70–77.
- Fivush, R. (2008). Remembering and reminiscing: How individual lives are constructed in family narratives. *Memory Studies*, 1(1), 49–58. <https://doi.org/10.1177/1750698007083888>

- Fivush, R., Haden, C., & Reese, E. (1996). Remembering, recounting, and reminiscing: The development of autobiographical memory in social context. In D. C. Rubin (Ed.), *Remembering our past* (pp. 341–359). Cambridge, UK: Cambridge University Press. Retrieved from <http://dx.doi.org/10.1017/CBO9780511527913.014>
- Gibbs, B. R., & Rude, S. S. (2004). Overgeneral Autobiographical Memory as Depression Vulnerability. *Cognitive Therapy and Research*, 28(4), 511–526. <https://doi.org/10.1023/B:COTR.0000045561.72997.7c>
- Gohier, B., Ferracci, L., Surguladze, S. A., Lawrence, E., El Hage, W., Kefi, M. Z., ... Le Gall, D. (2009). Cognitive inhibition and working memory in unipolar depression. *Journal of Affective Disorders*, 116(1–2), 100–105. <https://doi.org/10.1016/j.jad.2008.10.028>
- Gotlib, I. H., Krasnoperova, E., Yue, D. N., & Joormann, J. (2004). Attentional Biases for Negative Interpersonal Stimuli in Clinical Depression. *Journal of Abnormal Psychology*, 113(1), 127–135. <https://doi.org/10.1037/0021-843X.113.1.121>
- Grace, L., Dewhurst, S. A., & Anderson, R. J. (2016). A dysphoric's TALE: The relationship between the self-reported functions of autobiographical memory and symptoms of depression. *Memory (Hove, England)*, 24(9), 1173–1181. <https://doi.org/10.1080/09658211.2015.1084009>
- Gros, D. F., Yoder, M., Tuerk, P. W., Lozano, B. E., & Acierno, R. (2011). Exposure Therapy for PTSD Delivered to Veterans via Telehealth: Predictors of Treatment Completion and Outcome and Comparison to Treatment Delivered in Person. *Behavior Therapy*, 42(2), 276–283. <https://doi.org/10.1016/j.beth.2010.07.005>
- Gustafson, D. H., McTavish, F. M., Chih, M.-Y., Atwood, A. K., Johnson, R. A., Boyle, M. G., ... Shah, D. (2014). A smartphone application to support recovery from alcoholism: a

- randomized clinical trial. *JAMA Psychiatry*, *71*(5), 566–572.  
<https://doi.org/10.1001/jamapsychiatry.2013.4642>
- Hallford, D. J., & Mellor, D. (2016). Autobiographical Memory and Depression: Identity-continuity and Problem-solving Functions Indirectly Predict Symptoms over Time through Psychological Well-being. *Applied Cognitive Psychology*, *30*(2), 152–159.  
<https://doi.org/10.1002/acp.3169>
- Hardeveld, F., Spijker, J., De Graaf, R., Nolen, W. A., & Beekman, A. T. F. (2010). Prevalence and predictors of recurrence of major depressive disorder in the adult population. *Acta Psychiatrica Scandinavica*, *122*(3), 184–191. <https://doi.org/10.1111/j.1600-0447.2009.01519.x>
- Harvey, P.-O., Fossati, P., Pochon, J.-B., Levy, R., LeBastard, G., Lehericy, S., ... Dubois, B. (2005). Cognitive control and brain resources in major depression: An fMRI study using the n-back task. *NeuroImage*, *26*(3), 860–869.  
<https://doi.org/10.1016/j.neuroimage.2005.02.048>
- Harvey-Berino, J., West, D., Krukowski, R., Prewitt, E., VanBiervliet, A., Ashikaga, T., & Skelly, J. (2010). Internet delivered behavioral obesity treatment. *Preventive Medicine*, *51*(2), 123–128. <https://doi.org/10.1016/j.ypmed.2010.04.018>
- Heeren, A., & Philippot, P. (2011). Changes in Ruminative Thinking Mediate the Clinical Benefits of Mindfulness: Preliminary Findings. *Mindfulness*, *2*(1), 8–13.  
<https://doi.org/10.1007/s12671-010-0037-y>
- Heeren, A., Van Broeck, N., & Philippot, P. (2009). The effects of mindfulness on executive processes and autobiographical memory specificity. *Behaviour Research and Therapy*, *47*(5), 403–409. <https://doi.org/10.1016/j.brat.2009.01.017>

- Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The Meaning Maintenance Model: On the Coherence of Social Motivations. *Personality and Social Psychology Review, 10*(2), 88–110. [https://doi.org/10.1207/s15327957pspr1002\\_1](https://doi.org/10.1207/s15327957pspr1002_1)
- Helen, S., & Teasdale, J. D. (2004). Mindfulness-Based Cognitive Therapy for Depression: Replication and Exploration of Differential Relapse Prevention Effects. *Journal of Consulting and Clinical Psychology, 72*(1), 31–40. <https://doi.org/10.1037/0022-006X.72.1.31>
- Hepper, E. G., Ritchie, T. D., Sedikides, C., & Wildschut, T. (2012). Odyssey's end: Lay conceptions of nostalgia reflect its original homeric meaning. *Emotion, 12*(1), 102–119. <https://doi.org/http://dx.doi.org/10.1037/a0025167>
- Hepper, E. G., Wildschut, T., Sedikides, C., Ritchie, T. D., Yung, Y.-F., Hansen, N., ... Zhou, X. (2014). Pancultural nostalgia: Prototypical conceptions across cultures. *Emotion, 14*(4), 733–747. <https://doi.org/http://dx.doi.org/10.1037/a0036790>
- Hertz, D. G. (1990). Trauma and nostalgia: new aspects on the coping of aging Holocaust survivors. *The Israel Journal of Psychiatry and Related Sciences, 27*(4), 189–198.
- Hilty, D. M., Ferrer, D. C., Parish, M. B., Johnston, B., Callahan, E. J., & Yellowlees, P. M. (2013). The Effectiveness of Telemental Health: A 2013 Review. *Telemedicine and E-Health, 19*(6), 444–454. <https://doi.org/10.1089/tmj.2013.0075>
- Hipwell, A. E., Sapotichne, B., Klostermann, S., Battista, D., & Keenan, K. (2011). Autobiographical Memory as a Predictor of Depression Vulnerability in Girls. *Journal of Clinical Child and Adolescent Psychology, 40*(2), 254–265. <https://doi.org/10.1080/15374416.2011.546037>

- Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*(2), 169–183. <https://doi.org/10.1037/a0018555>
- Holland, A. C., & Kensinger, E. A. (2010). Emotion and autobiographical memory. *Physics of Life Reviews, 7*(1), 88–131. <https://doi.org/10.1016/j.plrev.2010.01.006>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Ilardi, S. S., Atchley, R. A., Enloe, A., Kwasny, K., & Garratt, G. (2007). Disentangling attentional biases and attentional deficits in depression: An event-related potential P300 analysis. *Cognitive Therapy and Research, 31*(2), 175–187.
- Ingram, R. E., & Smith, T. W. (1984). Depression and internal versus external focus of attention. *Cognitive Therapy and Research, 8*(2), 139–151. <https://doi.org/10.1007/BF01173040>
- Iyer, A., & Jetten, J. (2011). What's left behind: Identity continuity moderates the effect of nostalgia on well-being and life choices. *Journal of Personality and Social Psychology, 101*(1), 94–108. <https://doi.org/http://doi.org/10.1037/a0022496>
- Jimenez, S. S., Niles, B. L., & Park, C. L. (2010). A mindfulness model of affect regulation and depressive symptoms: Positive emotions, mood regulation expectancies, and self-acceptance as regulatory mechanisms. *Personality and Individual Differences, 49*(6), 645–650. <https://doi.org/10.1016/j.paid.2010.05.041>
- Joiner, T. E., Lewinsohn, P. M., & Seeley, J. R. (2002). The Core of Loneliness: Lack of Pleasurable Engagement—More So Than Painful Disconnection—Predicts Social Impairment, Depression Onset, and Recovery From Depressive Disorders Among

- Adolescents. *Journal of Personality Assessment*, 79(3), 472–491.  
[https://doi.org/10.1207/S15327752JPA7903\\_05](https://doi.org/10.1207/S15327752JPA7903_05)
- Joormann, J., & Gotlib, I. H. (2010). Emotion Regulation in Depression: Relation to Cognitive Inhibition. *Cognition & Emotion*, 24(2), 281–298.  
<https://doi.org/10.1080/02699930903407948>
- Joormann, J., Yoon, K. L., & Zetsche, U. (2007). Cognitive inhibition in depression. *Applied and Preventive Psychology*, 12(3), 128–139. <https://doi.org/10.1016/j.appsy.2007.09.002>
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2002). Are measures of self-esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology*, 83(3), 693–710.  
<https://doi.org/10.1037/0022-3514.83.3.693>
- Kabat-Zinn, J. (1990). *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness*. Delta Trade Paperbacks.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 593.
- Kingston, T., Dooley, B., Bates, A., Lawlor, E., & Malone, K. (2007). Mindfulness-based cognitive therapy for residual depressive symptoms. *Psychology and Psychotherapy*, 80(Pt 2), 193–203. <https://doi.org/10.1348/147608306X116016>
- Koole, S. L. (2009). The psychology of emotion regulation: An integrative review. *Cognition and Emotion*, 23(1), 4–41. <https://doi.org/10.1080/02699930802619031>
- Koster, E. H. W., De Lissnyder, E., Derakshan, N., & De Raedt, R. (2011). Understanding depressive rumination from a cognitive science perspective: the impaired disengagement

- hypothesis. *Clinical Psychology Review*, 31(1), 138–145.  
<https://doi.org/10.1016/j.cpr.2010.08.005>
- Kovacs, M., & Beck, A. T. (1978). Maladaptive cognitive structures in depression. *The American Journal of Psychiatry*, 135(5), 525–533. <https://doi.org/10.1176/ajp.135.5.525>
- Krupnikov, Y., & Levine, A. S. (2014). Cross-Sample Comparisons and External Validity. *Journal of Experimental Political Science*, 1(01), 59–80.  
<https://doi.org/10.1017/xps.2014.7>
- Kuyken, W., Byford, S., Taylor, R. S., Watkins, E., Holden, E., White, K., ... Teasdale, J. D. (2008). Mindfulness-based cognitive therapy to prevent relapse in recurrent depression. *Journal of Consulting and Clinical Psychology*, 76(6), 966–978.  
<https://doi.org/10.1037/a0013786>
- Kuyken, W., & Dalgleish, T. (2011). Overgeneral autobiographical memory in adolescents at risk for depression. *Memory*, 19(3), 241–250.  
<https://doi.org/10.1080/09658211.2011.554421>
- Lane, J., Lane, A. M., & Kyprianou, A. (2004). Self-efficacy, self-esteem and their impact on academic performance. *Social Behavior and Personality: An International Journal*, 32(3), 247–256. <https://doi.org/10.2224/sbp.2004.32.3.247>
- Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., ... Devins, G. (2006). The toronto mindfulness scale: Development and validation. *Journal of Clinical Psychology*, 62(12), 1445–1467. <https://doi.org/10.1002/jclp.20326>
- Lee, R. M., & Robbins, S. B. (1995). Measuring belongingness: The Social Connectedness and the Social Assurance scales. *Journal of Counseling Psychology*, 42(2), 232–241.  
<https://doi.org/10.1037/0022-0167.42.2.232>

- Luberto, C. M., & Cotton, S. (2013). Mindfulness Skills and Emotion Regulation: the Mediating Role of Coping Self-Efficacy. *Mindfulness*, 5(4). <https://doi.org/10.1007/s12671-012-0190-6>
- Luberto, C. M., Cotton, S., McLeish, A. C., Mingione, C. J., & O'Bryan, E. M. (2013). Mindfulness Skills and Emotion Regulation: the Mediating Role of Coping Self-Efficacy. *Mindfulness*, 5(4), 373–380. <https://doi.org/10.1007/s12671-012-0190-6>
- Maciejewski, P. K., Prigerson, H. G., & Mazure, C. M. (2000). Self-efficacy as a mediator between stressful life events and depressive symptoms. *The British Journal of Psychiatry*, 176(4), 373–378. <https://doi.org/10.1192/bjp.176.4.373>
- Maher, C. A., Lewis, L. K., Ferrar, K., Marshall, S., De Bourdeaudhuij, I., & Vandelanotte, C. (2014). Are health behavior change interventions that use online social networks effective? A systematic review. *Journal of Medical Internet Research*, 16(2), e40. <https://doi.org/10.2196/jmir.2952>
- Marazziti, D., Consoli, G., Picchetti, M., Carlini, M., & Faravelli, L. (2010). Cognitive impairment in major depression. *European Journal of Pharmacology*, 626(1), 83–86. <https://doi.org/10.1016/j.ejphar.2009.08.046>
- Mark, J., Barnhofer, T., Crane, C., Herman, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*, 133(1), 122–148. <https://doi.org/10.1037/0033-2909.133.1.122>
- Marroquín, B. M., Fontes, M., Scilletta, A., & Miranda, R. (2010). Ruminative subtypes and coping responses: Active and passive pathways to depressive symptoms. *Cognition and Emotion*, 24(8), 1446–1455. <https://doi.org/10.1080/02699930903510212>

- Matsuo, K., Glahn, D. C., Peluso, M. A., Hatch, J. P., Monkul, E. S., Najt, P., ... Soares, J. C. (2006). Prefrontal hyperactivation during working memory task in untreated individuals with major depressive disorder. *Molecular Psychiatry*, *12*(2), 158–166.  
<https://doi.org/10.1038/sj.mp.4001894>
- McAdams, D. P. (1993). *The Stories We Live by: Personal Myths and the Making of the Self*. Guilford Press.
- McAdams, D. P., & McLean, K. C. (2013). Narrative Identity. *Current Directions in Psychological Science*, *22*(3), 233–238. <https://doi.org/10.1177/0963721413475622>
- McAdams, D. P., Reynolds, J., Lewis, M., Patten, A. H., & Bowman, P. J. (2001). When Bad Things Turn Good and Good Things Turn Bad: Sequences of Redemption and Contamination in Life Narrative and their Relation to Psychosocial Adaptation in Midlife Adults and in Students. *Personality and Social Psychology Bulletin*, *27*(4), 474–485.  
<https://doi.org/10.1177/0146167201274008>
- McCann, W. H. (1941). Nostalgia: a review of the literature. *Psychological Bulletin*, *38*(3), 165–182. <https://doi.org/http://doi.org/10.1037/h0057354>
- McFarland, C., & Buehler, R. (1998). The impact of negative affect on autobiographical memory: the role of self-focused attention to moods. *Journal of Personality and Social Psychology*, *75*(6), 1424–1440.
- Meiran, N., Diamond, G. M., Toder, D., & Nemets, B. (2011). Cognitive rigidity in unipolar depression and obsessive compulsive disorder: Examination of task switching, Stroop, working memory updating and post-conflict adaptation. *Psychiatry Research*, *185*(1–2), 149–156. <https://doi.org/10.1016/j.psychres.2010.04.044>

- Mitchell, J. E., Crosby, R. D., Wonderlich, S. A., Crow, S., Lancaster, K., Simonich, H., ...  
Cook Myers, T. (2008). A randomized trial comparing the efficacy of cognitive–  
behavioral therapy for bulimia nervosa delivered via telemedicine versus face-to-face.  
*Behaviour Research and Therapy, 46*(5), 581–592.  
<https://doi.org/10.1016/j.brat.2008.02.004>
- Mor, N., & Winquist, J. (2002). Self-focused attention and negative affect: a meta-analysis.  
*Psychological Bulletin, 128*(4), 638–662.
- Morgan, L. P. K., Graham, J. R., Hayes-Skelton, S. A., Orsillo, S. M., & Roemer, L. (2014).  
Relationships between amount of post-intervention mindfulness practice and follow-up  
outcome variables in an acceptance-based behavior therapy for Generalized Anxiety  
Disorder: The importance of informal practice. *Journal of Contextual Behavioral  
Science, 3*(3), 173–178. <https://doi.org/10.1016/j.jcbs.2014.05.001>
- Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic  
outcomes: A meta-analytic investigation. *Journal of Counseling Psychology, 38*(1), 30–  
38. <https://doi.org/http://dx.doi.org/10.1037/0022-0167.38.1.30>
- Muthén, L. K., & Muthén, B. O. (1998). *Mplus User's Guide* (Sixth). Los Angeles, CA: Muthén  
& Muthé.
- Nelson, K. (2003). Self and social functions: individual autobiographical memory and collective  
narrative. *Memory, 11*(2), 125–136. <https://doi.org/10.1080/741938203>
- Neve, M., Morgan, P. J., Jones, P. R., & Collins, C. E. (2010). Effectiveness of web-based  
interventions in achieving weight loss and weight loss maintenance in overweight and  
obese adults: a systematic review with meta-analysis. *Obesity Reviews, 11*(4), 306–321.  
<https://doi.org/10.1111/j.1467-789X.2009.00646.x>

- Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology, 109*(3), 504–511.
- Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: the 1989 Loma Prieta Earthquake. *Journal of Personality and Social Psychology, 61*(1), 115–121.
- Oba, K., Noriuchi, M., Atomi, T., Moriguchi, Y., & Kikuchi, Y. (2016). Memory and reward systems coproduce “nostalgic” experiences in the brain. *Social Cognitive and Affective Neuroscience, 11*(7), 1069–1077. <https://doi.org/10.1093/scan/nsv073>
- Park, R. J., Goodyer, I. M., & Teasdale, J. D. (2002). Categorical overgeneral autobiographical memory in adolescents with major depressive disorder. *Psychological Medicine, 32*(02), 267–276. <https://doi.org/10.1017/S0033291701005189>
- Pasupathi, M. (2003). Emotion regulation during social remembering: differences between emotions elicited during an event and emotions elicited when talking about it. *Memory, 11*(2), 151–163. <https://doi.org/10.1080/741938212>
- Peterson, C., Schwartz, S. M., & Seligman, M. E. (1981). Self-blame and depressive symptoms. *Journal of Personality and Social Psychology, 41*(2), 253–259.
- Peterson, C., & Seligman, M. E. (1984). Causal explanations as a risk factor for depression: theory and evidence. *Psychological Review, 91*(3), 347–374.
- Pierro, A., Pica, G., Klein, K., Kruglanski, A. W., & Higgins, E. T. (2013). Looking back or moving on: How regulatory modes affect nostalgia. *Motivation and Emotion, 37*(4), 653–660. <https://doi.org/10.1007/s11031-013-9350-9>

- Pillemer, D. B. (2003). Directive functions of autobiographical memory: the guiding power of the specific episode. *Memory (Hove, England)*, *11*(2), 193–202.  
<https://doi.org/10.1080/741938208>
- Pizzagalli, D. A. (2014). Depression, Stress, and Anhedonia: Toward a Synthesis and Integrated Model. *Annual Review of Clinical Psychology*, *10*, 393–423.  
<https://doi.org/10.1146/annurev-clinpsy-050212-185606>
- Pyszczynski, T., & Greenberg, J. (1985). Depression and preference for self-focusing stimuli after success and failure. *Journal of Personality and Social Psychology*, *49*(4), 1066–1075.
- Pyszczynski, Tom, & Greenberg, J. (1987). Self-regulatory perseveration and the depressive self-focusing style: A self-awareness theory of reactive depression. *Psychological Bulletin*, *102*(1), 122–138. <https://doi.org/10.1037/0033-2909.102.1.122>
- Raes, F., Hermans, D., Williams, M., Beyers, W., Brunfaut, E., & Eelen, P. (2006). Reduced autobiographical memory specificity and rumination in predicting the course of depression. *Journal of Abnormal Psychology*, *115*(4), 699–704.  
<https://doi.org/10.1037/0021-843X.115.4.699>
- Rimes, K. A., & Watkins, E. (2005). The effects of self-focused rumination on global negative self-judgements in depression. *Behaviour Research and Therapy*, *43*(12), 1673–1681.  
<https://doi.org/10.1016/j.brat.2004.12.002>
- Riskind, J. H., & Williams, N. L. (1999). Specific Cognitive Content of Anxiety and Catastrophizing: Looming Vulnerability and the Looming Maladaptive Style. *Journal of Cognitive Psychotherapy*, *13*(1), 41–54.

- Ross, M., & Wilson, A. E. (2002). It feels like yesterday: Self-esteem, valence of personal past experiences, and judgments of subjective distance. *Journal of Personality and Social Psychology, 82*(5), 792–803. <https://doi.org/10.1037/0022-3514.82.5.792>
- Routledge, C., Arndt, J., Sedikides, C., & Wildschut, T. (2008). A blast from the past: The terror management function of nostalgia. *Journal of Experimental Social Psychology, 44*(1), 132–140. <https://doi.org/10.1016/j.jesp.2006.11.001>
- Routledge, C., Arndt, J., Wildschut, T., Sedikides, C., Hart, C. M., Juhl, J., ... Schlotz, W. (2011). The past makes the present meaningful: Nostalgia as an existential resource. *Journal of Personality and Social Psychology, 101*(3), 638–652. <https://doi.org/http://doi.org/10.1037/a0024292>
- Routledge, C., Wildschut, T., Sedikides, C., & Juhl, J. (2013). Nostalgia as a Resource for Psychological Health and Well-Being. *Social and Personality Psychology Compass, 7*(11), 808–818. <https://doi.org/10.1111/spc3.12070>
- Rubin, D. C., & Berntsen, D. (2003). Life scripts help to maintain autobiographical memories of highly positive, but not highly negative, events. *Memory & Cognition, 31*(1), 1–14. <https://doi.org/10.3758/BF03196077>
- Ryder, A. G., Yang, J., Zhu, X., Yao, S., Yi, J., Heine, S. J., & Michael, R. (2008). The cultural shaping of depression: Somatic symptoms in China, psychological symptoms in North America? *Journal of Abnormal Psychology, 117*(2), 300–313. <https://doi.org/10.1037/0021-843X.117.2.300>
- Schoofs, H., Hermans, D., Griffith, J. W., & Raes, F. (2013). Self-discrepancy and reduced autobiographical memory specificity in ruminating students and depressed patients. *Cognition & Emotion, 27*(2), 245–262. <https://doi.org/10.1080/02699931.2012.703640>

- Sedikides, C., Wildschut, T., Gaertner, L., Routledge, C., & Arndt, J. (2008). Nostalgia as enabler of self-continuity. In Fabio Sani (Ed.), *Self-continuity: Individual and collective perspectives* (pp. 227–239). New York: Psychology Press. Retrieved from <http://eprints.soton.ac.uk/63109/>
- Sedikides, C., Wildschut, T., Routledge, C., & Arndt, J. (2014). Nostalgia counteracts self-discontinuity and restores self-continuity. *European Journal of Social Psychology, 45*(1), 52–61. <https://doi.org/10.1002/ejsp.2073>
- Sedikides, C., Wildschut, T., Routledge, C., Arndt, J., Hepper, E. G., & Zhou, X. (2015). To Nostalgize: Mixing Memory with Affect and Desire. *Advances in Experimental Social Psychology, 51*(1), 189–273. <https://doi.org/doi:10.1016/bs.aesp.2014.10.001>
- Seligman, M. E., Abramson, L. Y., Semmel, A., & von Baeyer, C. (1979). Depressive attributional style. *Journal of Abnormal Psychology, 88*(3), 242–247. <https://doi.org/10.1037/0021-843X.88.3.242>
- Setliff, A. E., & Marmurek, H. H. C. (2002). The mood regulatory function of autobiographical recall is moderated by self-esteem. *Personality and Individual Differences, 32*(4), 761–771. [https://doi.org/10.1016/S0191-8869\(01\)00078-2](https://doi.org/10.1016/S0191-8869(01)00078-2)
- Shapiro, D. N., Chandler, J., & Mueller, P. A. (2013). Using Mechanical Turk to Study Clinical Populations. *Clinical Psychological Science, 1*(2), 213–220. <https://doi.org/10.1177/2167702612469015>
- Singer, J. A., Blagov, P., Berry, M., & Oost, K. M. (2013). Self-Defining Memories, Scripts, and the Life Story: Narrative Identity in Personality and Psychotherapy. *Journal of Personality, 81*(6), 569–582. <https://doi.org/10.1111/jopy.12005>

- Smith, S. M., & Petty, R. E. (1995). Personality moderators of mood congruency effects on cognition: the role of self-esteem and negative mood regulation. *Journal of Personality and Social Psychology*, *68*(6), 1092–1107.
- Smith, T. W., Christensen, A. J., Peck, J. R., & Ward, J. R. (1994). Cognitive distortion, helplessness, and depressed mood in rheumatoid arthritis: a four-year longitudinal analysis. *Health Psychology*, *13*(3), 213–217.
- Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin*, *139*(1), 213–240.  
<https://doi.org/10.1037/a0028931>
- Spaulding, R., Belz, N., DeLurgio, S., & Williams, A. R. (2010). Cost Savings of Telemedicine Utilization for Child Psychiatry in a Rural Kansas Community. *Telemedicine and E-Health*, *16*(8), 867–871. <https://doi.org/10.1089/tmj.2010.0054>
- Stephan, E., Sedikides, C., Wildschut, T., Cheung, W.-Y., Routledge, C., & Arndt, J. (2015). Nostalgia-Evoked Inspiration Mediating Mechanisms and Motivational Implications. *Personality and Social Psychology Bulletin*, *41*(10), 1395–1410.  
<https://doi.org/10.1177/0146167215596985>
- Stephan, E., Wildschut, T., Sedikides, C., Zhou, X., He, W., Routledge, C., ... Vingerhoets, A. J. J. M. (2014). The mnemonic mover: nostalgia regulates avoidance and approach motivation. *Emotion (Washington, D.C.)*, *14*(3), 545–561.  
<https://doi.org/10.1037/a0035673>
- Stephens, J., & Allen, J. (2013). Mobile Phone Interventions to Increase Physical Activity and Reduce Weight. *The Journal of Cardiovascular Nursing*, *28*(4), 320–329.  
<https://doi.org/10.1097/JCN.0b013e318250a3e7>

- Sullivan, M. J. L., Bishop, S. R., & Pivik, J. (1995). The Pain Catastrophizing Scale: Development and validation. *Psychological Assessment, 7*(4), 524–532.  
<https://doi.org/10.1037/1040-3590.7.4.524>
- Tamir, M., Chiu, C.-Y., & Gross, J. J. (2007). Business or pleasure? Utilitarian versus hedonic considerations in emotion regulation. *Emotion, 7*(3), 546–554.  
<https://doi.org/10.1037/1528-3542.7.3.546>
- Teasdale, J. D., Segal, Z. V., Williams, J. M., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology, 68*(4), 615–623.
- Teasdale, J. D., Segal, Z., & Williams, J. M. (1995). How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help? *Behaviour Research and Therapy, 33*(1), 25–39.
- The New Oxford Dictionary of English.* (1998). Oxford, UK: Oxford University Press.
- Trapnell, P. D., & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology, 76*(2), 284–304. <https://doi.org/10.1037/0022-3514.76.2.284>
- Trew, J. L. (2011). Exploring the roles of approach and avoidance in depression: An integrative model. *Clinical Psychology Review, 31*(7), 1156–1168.  
<https://doi.org/10.1016/j.cpr.2011.07.007>
- Trost, W., Ethofer, T., Zentner, M., & Vuilleumier, P. (2012). Mapping Aesthetic Musical Emotions in the Brain. *Cerebral Cortex (New York, NY), 22*(12), 2769–2783.  
<https://doi.org/10.1093/cercor/bhr353>

- Van Daele, T., Griffith, J. W., Van den Bergh, O., & Hermans, D. (2014). Overgeneral autobiographical memory predicts changes in depression in a community sample. *Cognition & Emotion, 28*(7), 1303–1312. <https://doi.org/10.1080/02699931.2013.879052>
- Van Dam, N. T., Hobkirk, A. L., Sheppard, S. C., Aviles-Andrews, R., & Earleywine, M. (2014). How Does Mindfulness Reduce Anxiety, Depression, and Stress? An Exploratory Examination of Change Processes in Wait-List Controlled Mindfulness Meditation Training. *Mindfulness, 5*(5), 574–588. <https://doi.org/10.1007/s12671-013-0229-3>
- van Tilburg, W. A. P., Sedikides, C., & Wildschut, T. (2015). The mnemonic muse: Nostalgia fosters creativity through openness to experience. *Journal of Experimental Social Psychology, 59*, 1–7. <https://doi.org/10.1016/j.jesp.2015.02.002>
- Verplanken, B. (2012). When bittersweet turns sour: Adverse effects of nostalgia on habitual worriers. *European Journal of Social Psychology, 42*(3), 285–289. <https://doi.org/10.1002/ejsp.1852>
- Verplanken, B., & Fisher, N. (2014). Habitual Worrying and Benefits of Mindfulness. *Mindfulness, 5*(5), 566–573. <https://doi.org/10.1007/s12671-013-0211-0>
- Wantland, D. J., Portillo, C. J., Holzemer, W. L., Slaughter, R., & McGhee, E. M. (2004). The effectiveness of Web-based vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes. *Journal of Medical Internet Research, 6*(4), e40. <https://doi.org/10.2196/jmir.6.4.e40>
- Watkins, E. R., Baeyens, C. B., & Read, R. (2009). Concreteness training reduces dysphoria: Proof-of-principle for repeated cognitive bias modification in depression. *Journal of Abnormal Psychology, 118*(1), 55–64. <https://doi.org/10.1037/a0013642>

- Watkins, E., & Teasdale, J. D. (2004). Adaptive and maladaptive self-focus in depression. *Journal of Affective Disorders, 82*(1), 1–8.
- Watkins, Ed, & Baracaia, S. (2002). Rumination and social problem-solving in depression. *Behaviour Research and Therapy, 40*(10), 1179–1189. [https://doi.org/10.1016/S0005-7967\(01\)00098-5](https://doi.org/10.1016/S0005-7967(01)00098-5)
- Watkins, Ed, Moberly, N. J., & Moulds, M. L. (2008). Processing mode causally influences emotional reactivity: distinct effects of abstract versus concrete construal on emotional response. *Emotion, 8*(3), 364–378. <https://doi.org/10.1037/1528-3542.8.3.364>
- Watkins, Ed, & Moulds, M. (2005). Distinct modes of ruminative self-focus: Impact of abstract versus concrete rumination on problem solving in depression. *Emotion, 5*(3), 319–328. <https://doi.org/10.1037/1528-3542.5.3.319>
- Watkins, Ed, & Teasdale, J. D. (2001). Rumination and overgeneral memory in depression: Effects of self-focus and analytic thinking. *Journal of Abnormal Psychology, 110*(2), 353–357. <https://doi.org/10.1037/0021-843X.110.2.333>
- Watson, D., & Clark, L. A. (1997). Measurement and mismeasurement of mood: recurrent and emergent issues. *Journal of Personality Assessment, 68*(2), 267–296. [https://doi.org/10.1207/s15327752jpa6802\\_4](https://doi.org/10.1207/s15327752jpa6802_4)
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063–1070.
- Watson, David. (1988). Intraindividual and interindividual analyses of positive and negative affect: Their relation to health complaints, perceived stress, and daily activities. *Journal*

- of Personality and Social Psychology*, 54(6), 1020–1030. <https://doi.org/10.1037/0022-3514.54.6.1020>
- Weinberg, J., Freese, J., & McElhattan, D. (2014). Comparing Data Characteristics and Results of an Online Factorial Survey between a Population-Based and a Crowdsourcing-Recruited Sample. *Sociological Science*, 1, 292–310. <https://doi.org/10.15195/v1.a19>
- Wichers, M., Jacobs, N., Dermon, C., Thiery, E., & van Os, J. (2007). Depression: Too Much Negative Affect or Too Little Positive Affect? *Twin Research and Human Genetics*, 10, 19–20.
- Wildschut, T., Sedikides, C., Arndt, J., & Routledge, C. (2006). Nostalgia: Content, Triggers, Functions. *Journal of Personality and Social Psychology*, 91(5), 975–993. <https://doi.org/http://dx.doi.org.www2.lib.ku.edu/10.1037/0022-3514.91.5.975>
- Williams, J. M. G. (2008). Mindfulness, Depression and Modes of Mind. *Cognitive Therapy and Research*, 32(6), 721–733. <https://doi.org/10.1007/s10608-008-9204-z>
- Williams, J. M. G., Barnhofer, T., Crane, C., Hermans, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical Memory Specificity and Emotional Disorder. *Psychological Bulletin*, 133(1), 122–148. <https://doi.org/10.1037/0033-2909.133.1.122>
- Williams, J. M. G., Teasdale, J. D., Segal, Z. V., & Soulsby, J. (2000). Mindfulness-based cognitive therapy reduces overgeneral autobiographical memory in formerly depressed patients. *Journal of Abnormal Psychology*, 109(1), 150–155. <https://doi.org/http://dx.doi.org.www2.lib.ku.edu/10.1037/0021-843X.109.1.150>
- Wu, Q., Shi, L., Xia, Z., & Lu, L. (2013). Effects of Duration and Contents of Mindfulness Training on Depression. *Psychology*, 04(06), 8–17. <https://doi.org/10.4236/psych.2013.46A1002>

Zhou, X., Sedikides, C., Wildschut, T., & Gao, D.-G. (2008). Counteracting Loneliness: On the Restorative Function of Nostalgia. *Psychological Science, 19*(10), 1023–1029.

Zhou, X., Wildschut, T., Sedikides, C., Chen, X., & Vingerhoets, A. J. J. M. (2012). Heartwarming memories: Nostalgia maintains physiological comfort. *Emotion (Washington, D.C.), 12*(4), 678–684. <https://doi.org/10.1037/a0027236>

Zhou, X., Wildschut, T., Sedikides, C., Shi, & Feng, C. (2012). Nostalgia: The Gift That Keeps on Giving. *Journal of Consumer Research, 39*(1), 39–50. <https://doi.org/10.1086/662199>

## APPENDICIES

## Appendix A

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

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer to indicate to what extent you are currently feeling that emotion.

Very Slightly or Not at All	A little	Moderately True	Quite a bit	Extremely	
1	2	3	4	5	
_____	Interested	_____	Hostile	_____	Nervous
_____	Distressed	_____	Enthusiastic	_____	Determined
_____	Excited	_____	Proud	_____	Attentive
_____	Upset	_____	Irritable	_____	Jittery
_____	Strong	_____	Alert	_____	Active
_____	Guilty	_____	Ashamed	_____	Afraid
_____	Scared	_____	Inspired		

## Appendix B

Rumination and Reflection Questionnaire  
(Trapnell & Campbell, 1999)

For each of the statements, please indicate your level of agreement or disagreement.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

- \_\_\_\_\_ My attention is often focused on aspects of myself I wish I'd stop thinking about.
- \_\_\_\_\_ I always seem to be rehashing in my mind recent things I've said or done.
- \_\_\_\_\_ Sometimes it is hard for me to shut off thoughts about myself.
- \_\_\_\_\_ Long after an argument or disagreement is over with, my thoughts keep going back to what happened.
- \_\_\_\_\_ I tend to "ruminate" or dwell over things that happen to me for a really long time afterward.
- \_\_\_\_\_ I don't waste time rethinking things that are over and done with.
- \_\_\_\_\_ Often I'm playing back over in my mind how I acted in a past situation.
- \_\_\_\_\_ I often find myself reevaluating something I've done.
- \_\_\_\_\_ I never ruminate or dwell on myself for very long.
- \_\_\_\_\_ It is easy for me to put unwanted thoughts out of my mind.
- \_\_\_\_\_ I often reflect on episodes in my life that I should no longer concern myself with.
- \_\_\_\_\_ I spent a great deal of time thinking back over my embarrassing or disappointing moments.
- \_\_\_\_\_ Philosophical or abstract thinking doesn't appeal to me that much.
- \_\_\_\_\_ I'm not really a meditative type of person.
- \_\_\_\_\_ I love exploring my "inner" self.
- \_\_\_\_\_ My attitudes and feelings about things fascinate me.
- \_\_\_\_\_ I don't really care for introspective or self-reflective thinking.
- \_\_\_\_\_ I love analyzing why I do things.
- \_\_\_\_\_ People often say I'm a "deep," introspective type of person.
- \_\_\_\_\_ I don't care much for self-analysis.
- \_\_\_\_\_ I'm very self-inquisitive by nature.
- \_\_\_\_\_ I love to meditate on the nature and meaning of things.
- \_\_\_\_\_ I often love to look at my life and philosophical ways.
- \_\_\_\_\_ Contemplating myself isn't my idea of fun.

## Appendix C

Multidimensional Depression Assessment Scale  
(H. N. Cheung & Power, 2012)

Please indicate how often you have experienced the previous items in the past two weeks.

Not at all 1	Rarely 2	Sometimes 3	Often 4	All the time 5
_____	Low mood	_____	Problems with sleeping	
_____	Sadness	_____	Changes in appetite	
_____	Low spirits	_____	Lower sex drive	
_____	Gloominess	_____	Feel slowed down	
_____	Sad mood	_____	Fatigue	
_____	Guilt	_____	Change in weight	
_____	Unhappiness	_____	Crying	
_____	Not cheerful	_____	Agitation	
_____	Irritable mood	_____	Slowed movement	
_____	Dysphoric mood	_____	More pain sensitivity	
_____	Shame	_____	Intestinal problems	
_____	Anxiety	_____	Decrease in activities	
_____	Feelings of hopelessness	_____	Social withdrawal	
_____	Loss of interest	_____	Feeling worse than others	
_____	No pleasure	_____	Feel a burden on others	
_____	The future feels bleak	_____	Social avoidance	
_____	Feelings worthless	_____	Feeling undeserving of others care	
_____	Poor concentration	_____	Hypersensitive to criticism	
_____	Self-blame	_____	Feeling less attractive than others	
_____	Life feels meaningless	_____	Feel too sensitive to others	
_____	Feeling a failure	_____	Feeling let down by others	
_____	Ruminations	_____	Unable to love others	
_____	Unable to make decisions	_____	Aggression towards others	
_____	Low energy			

## Appendix D

### Memory prompts

#### Nostalgic:

Please bring to mind a nostalgic event in your life. Nostalgia is often defined as a sentimental longing or affection for the past. Specifically, try to think of a past event that makes you feel most nostalgic. Bring this nostalgic experience to mind. Immerse yourself in the nostalgic experience. How does it make you feel? Please continue to think about the experience for a few moments.

In the space below, write about this nostalgic event. Please describe the experience and how it made you feel.

#### Ordinary:

Please bring to mind an ordinary event in your life. Specifically, try to think of a past event that is ordinary. Bring this ordinary experience to mind. Immerse yourself in the ordinary experience. How does it make you feel? Please continue to think about the experience for a few moments.

In the space below, write about this ordinary event. Please describe the experience and how it made you feel.

## Appendix E

## Nostalgic Manipulation Check

(W.-Y. Cheung et al., 2013; Routledge et al., 2011; Sedikides et al., 2014; Wildschut et al., 2006)

For each of the statements, please indicate your level of agreement or disagreement.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	2	3	4	5

\_\_\_\_\_ Right now, I am feeling quite nostalgic.  
 \_\_\_\_\_ Right now, I am having nostalgic feelings.  
 \_\_\_\_\_ I feel nostalgic at the moment.



## Appendix G

State Functions of Nostalgia Scale  
(Hepper et al., 2012)

For each of the statements, please indicate your level of agreement or disagreement.

Strongly  
Disagree

1

2

3

4

5

6

Strongly  
Agree

7

**Thinking about this event...**

- \_\_\_\_\_ makes me feel happy
- \_\_\_\_\_ puts me in a good mood
- \_\_\_\_\_ makes me feel active
- \_\_\_\_\_ makes me feel calm
- \_\_\_\_\_ makes me value myself more
- \_\_\_\_\_ makes me feel like I have many positive qualities
- \_\_\_\_\_ makes me feel good about myself
- \_\_\_\_\_ makes me like myself better
- \_\_\_\_\_ makes me feel loved
- \_\_\_\_\_ makes me feel connected to loved ones
- \_\_\_\_\_ makes me feel protected
- \_\_\_\_\_ makes me feel I can trust others
- \_\_\_\_\_ makes me feel that life is worth living
- \_\_\_\_\_ makes me feel life is meaningful
- \_\_\_\_\_ makes me feel life has a purpose
- \_\_\_\_\_ makes me feel there is a greater purpose to life

## Appendix H

New General Self-Efficacy Scale  
(Chen et al., 2001)

For each of the statements, please indicate your level of agreement or disagreement.

Strongly Disagree 1	Disagree 2	Neither Agree nor Disagree 3	Agree 4	Strongly Agree 5
_____				
_____				
_____				
_____				
_____				
_____				
_____				
_____				

I will be able to achieve most of the goals that I have set for myself.

When facing difficult tasks, I am certain that I will accomplish them.

In general, I think that I can obtain outcomes that are important to me.

I believe I can succeed at most any endeavor to which I set my mind.

I will be able to successfully overcome many challenges.

I am confident that I can perform effectively on many different tasks.

Compared to other people, I can do most tasks very well.

Even when things are tough, I can perform well.



