

Running Head: MBCT, DEPRESSION, META-ANALYSIS

Efficacy of Mindfulness Based Cognitive Therapy in the Treatment of Symptoms Active

Depression: A Meta-Analysis

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Abstract

Efficacy of Mindfulness Based Cognitive Therapy in the Treatment of Symptoms Active Depression: A Meta-Analysis

Angela Toscano

Mindfulness Based-Cognitive Therapy (MBCT) was designed to prevent relapse of depression although its uses have recently expanded. The current meta-analysis examines the effect sizes for eight studies of MBCT for treatment of depression ($N = 350$). The average intervention effect size ($M^* = 1.02$, $SE_M^* = 0.14$) was significantly larger than the average control effect size ($M^* = 0.37$, $SE_M^* = 0.15$; $Z_{Diff} = 3.19$, $p < .01$). These results indicate that MBCT is an effective treatment for reducing the severity of active depression in both the standard and shorted version of the treatment. Specific comparisons to control groups are discussed. Overall, MBCT appears to be a viable alternative treatment for active depression.

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Efficacy of Mindfulness Based Cognitive Therapy

in the Treatment of Symptoms

Active Depression:

A Meta-Analysis

For the past several decades, mindfulness has been gaining popularity as a treatment for several forms of mental disorders (Scherer-Dickson, 2004). Among other uses, mindfulness and related therapies have been linked to improvement in multiple mood and anxiety disorders (Hofmann, Sawyer, Witt, & Oh, 2010), reductions in stress and enhancement of adaptive coping strategies (Edenfield & Saeed, 2012) and reductions in suffering from chronic pain (Edenfield & Saeed, 2012). Studies indicate that mindfulness meditation, the process by which one gains mindfulness, may be more effective and preferable to certain potential clients than psychotherapy and psychotropic medications (Edenfield & Saeed, 2012)

Depression is a serious problem in today's society. According to the World Health Organization 2010's estimation, depression affects 121 million people worldwide, and is projected to be the second leading cause of disability worldwide by 2020 (Klainin-Yobas, Cho, & Creedy, 2012). Approximately 12% of men and 20% of women will experience a depressive episode during their lives (Williams, Teasdale, Segal, & Kabat-Zinn, 2007). In the United States in 2007, 10 million people were taking anti-depressant medications (Williams et al., 2007), but 30% - 70% have a relapse of depressive symptomology (Klainin-Yobas et. al., 2012). The average American with depression spent between \$1000 and \$2500 each year on direct treatment, not counting other costs such as missed work (Luppa, Heinrich, Angermeyer, König, & Riedel-Heller, 2007).

Although a variety of treatments for depression have been proposed, more recently researchers have investigated the efficacy of mindfulness meditation as a treatment of depression (Marchand, 2012).

Overview of Mindfulness

“Mindfulness” is commonly defined as “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to things as they are.” (Williams, Teasdale, Segal, & Kabat-Zinn, 2007, p.5). To cultivate mindfulness, one adopts an attitude of openness and curiosity, and learns to accept sensory input, emotional experiences and mental events without judgment or resistance (Williams et al. 2007). The mental events, including thoughts, are not labeled as true or untrue, and are often metaphorically compared with passing clouds in terms of power and substance (Marchand, 2012). The individual places emphasis only on the present moment, and strives to be fully aware of the here and now (Scherer-Dickson, 2004).

Baer, Smith, and Allen (2004) identified four skills involved in mindfulness which they labeled as observing, describing, acting with awareness, and accepting without judgment. Observing involves attending to a variety of internal and external stimuli, including bodily sensations, cognitions, emotions, and sensory input. Describing or labeling is the act of putting words to internal phenomenon to nonjudgmentally describe what is happening. In this way, the individual is able to notice thinking patterns. It is important to note that after labeling a particular thought, the individual moves on to refocus on the present moment. Acting with awareness involves being fully engaged in the present moment with all of one’s attention, as opposed to acting on “automatic pilot” (Bear et al., 2004, p 193). Accepting without judgment involves being non-evaluative

about the present moment experienced. As noted early, any labels applied to an experience or thought are purely descriptive (e.g. “thinking”), not evaluative (e.g. “this is dumb”). The individual does not attempt to avoid or change reality, but accepts it as it is. These four skills can be taught using a variety of mindfulness exercises, and are incorporated into mindfulness-based therapies.

Mindfulness based therapies have been linked to success in treating or preventing both physical and mental ailments. Mindfulness may prevent illness through changing the individual’s reaction to stress (Edenfield & Saeed, 2012). According to Edenfield and Saeed (2012), the skill of mindfulness clarifies the individual’s primary appraisal of stressors, and may facilitate an accurate appraisal of the demands of a stressor and the individual’s ability to cope with it. In addition, individuals who are skilled in mindfulness may demonstrate a preference for adaptive coping processes as opposed to dysfunctional coping styles, improved metacognitive skills, and decreases in distress, psychophysiological activation, and emotional interference. Mindfulness traits are also negatively correlated with experiential avoidance strategies such as distraction.

The skills of mindfulness are developed and trained using mindfulness meditation techniques. The meditation practices involve formal guided meditation including exercises focusing on breathing, physical sensations which occur while sitting, walking, or during gentle yoga, and focusing on individual areas of the body, a technique known as the body scan (Sipe & Eisendrath, 2012). Meditation practices have been linked to increases in cerebral blood flow, and reductions in metabolic activity, heart and respiratory rates, blood pressure, oxygen consumption, and muscle tension (Edenfield & Saeed, 2012). Additionally, researchers speculate that mindfulness breathing exercises

balance the sympathetic and parasympathetic systems (Edenfield & Saeed, 2012). Once mindfulness skills, such as those outlined above by Baer et al. (2004), are integrated into daily life, formal mindfulness meditation practice is no longer necessary (Marchand, 2012).

Overview of Mindfulness Based Treatments

Mindfulness practice began over 2500 years ago, with Asian spiritual practices, particularly the Zen Buddhist practice of Vipassana meditation (Kabat-Zinn, 1994). It was not until the end of the 20th century that secular versions of the practice began to appear in mainstream psychology and medicine (Klufpel et. al., 2003). One pioneer of secular mindfulness is Jon Kabat-Zinn, who developed Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 1994). MBSR is designed to promote stress reduction through teaching accurate appraisal of the demands of the stressor and the individual's coping resources, and through increasing the individual's self-regulation of stress reaction. MBSR has been shown to be useful for patients with a variety of physical and psychological diagnoses (Klufpel et al., 2013).

Since the creation of MBSR, mindfulness based therapies have been used to treat a variety of disorders. Mindfulness based therapies often mix traditional psychotherapy techniques (e.g. psychoeducation or cognitive behavioral therapy) with aspects of mindfulness such as staying present focused and accepting situations without judging (Klufpel et al., 2013). Many of these treatments are manualized. For example, Dialectical Behaviour Therapy (DBT) introduced by Marsha Linehan as a treatment of borderline personality disorder combines mindfulness techniques with behavioral problem oriented techniques such as problem solving, contingency management and exposure (Linehan,

Armstrong, Suarez, Allmon, & Heard, 1991). The treatment involves weekly individual and group therapy for a full year (Linehan et al., 1991), and has been shown to be effective in reducing the occurrence and severity of parasuicidal actions, and hospitalization (Linehan et al., 1991) as well as eating disorders (Kristeller et al. 2006).

Acceptance and Commitment Therapy (ACT) was first introduced in 1989 though the manual was not published until 1999 by Hayes, Strosahl, and Wilson (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The focus of the intervention is not to change behaviors through changing thoughts and feelings like many second generation behavioral techniques, but instead to change the context which gave rise to the thoughts and feelings, in part through efforts to reduce experiential avoidance (Hayes et al., 2006). More specific treatments were also developed. For example, mindfulness-based eating awareness training (MB-EAT), was developed to reduce symptoms of binge eating disorders and other eating disorders, and to improve self-awareness and control (Kristeller & Wolever, 2010). Mindfulness-Based Relapse Prevention (MBRP) is a combination of MBSR, Mindfulness-Based Cognitive Therapy (MBCT), and relapse prevention programs to reduce the rates of relapse for individuals with substance use disorders (Bowen et. al., 2009).

Perhaps the most widely researched use of mindfulness based therapies is as a treatment of mood and anxiety disorders. Hofmann et. al., (2010) conducted a meta-analysis of 39 studies (1140 adults). The studies which were included examined the use of MBSR or MBCT as a treatment for various mood (i.e. depression, bipolar), anxiety (i.e. generalized anxiety disorder, social anxiety disorder, panic disorder), other psychological disorders (e.g. attention-deficit hyperactivity disorder), and somatic

disorders (e.g. chronic pain, fibromyalgia). The researchers found a moderate effect size for reduction in mood symptoms across all the individuals in the studies, with individuals with anxiety and mood diagnoses showing greater reductions in comparison to those without diagnoses.

Mindfulness based treatments have also been shown to reduce symptoms of bipolar disorder (Deckersbach et al., 2012), eating disorders (Kristeller, Baer, & Quillian-Wolever, 2006), disorders of sleep (Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003), psychosis (Chadwick, Taylor, & Abba, 2005), and substance use (Bower et al., 2009). Mindfulness treatments also have been linked to prevention of relapse in recurrent depression (Teasdale, et al., 2000), and with improved subjective wellbeing (Keng, Smoski, & Robins, 2011).

Mindfulness Based Cognitive Therapy

Mindfulness Based Cognitive Therapy (MBCT) was introduced by Segal, Williams, and Teasdale in 2002, and has steadily gained popularity. MBCT was founded in the principals of MBSR, in combination with Cognitive Behavioral Therapy (CBT). The goal of the MBCT was originally to prevent relapse in recurrent depression through cultivating an attitude of being an impartial witness to one's own experience, accepting the experiences of the present moment, and not censoring one's thoughts (Segal et al., 2002). According to Marchard, (2012) MBCT is similar to the beliefs of CBT, in that it teaches that depression is caused by negative self-schemas which result in automatic thoughts. Excessive self-focus and rumination is associated with depression, while narrative self-referential thinking is associated with over-generalization of autobiographical memories into global negative self-judgments and dysphoria.

Unlike CBT, which focuses on challenging negative thoughts, MBCT attempts to change one's relationship with any thought which arises (Marchand, 2012). As such, the treatment focuses on the thought process instead of content (Sipe & Eisendrath, 2012). Consistent with all mindfulness practice, MBCT emphasizes accepting the world without judgment, observing details in daily life, and remaining focused on the present moment, with the explicit goal of decreasing rumination (Segal et al., 2002). Marchand (2012) identified additional goals of MBCT, including re-perceiving one's thoughts and emotions as detached from oneself (e.g. "This depression is not me, just what I am currently feeling"). By becoming less identified with the thoughts and emotions the individual feels less distress when the concept of self is threatened and is instead able to feel compassion and concern. MBCT also includes increase self-regulation, self-management, emotional cognitive and behavioral flexibility, value clarification, and exposure to unpleasant affect, which decreases experiential avoidance.

MBCT is a manualized treatment consisting of eight weekly two hour sessions, and up to four follow up classes (Segal et al., 2002). The treatment is designed for use with groups to increase cost efficiency (Scherer-Dickson, 2004), but can be delivered individually (Tovote et. al., 2014). According to Segal et al. (2002), the first four sessions are designed to increase mindfulness skills and metacognitive awareness via training attention to focus on the task at hand and reduce automatic reactions, by being mindful of everyday situations, and refocusing the mind on the present. The sessions also include education about thoughts and emotions which arise when the mind wanders, and the effects of these often unnoticed thoughts. In Williams, Teasdale, Segal, and Kabat-Zinn's 2007 book, during the first half of treatment the individual begins practicing meditations,

including a body scan (focusing on each part of the body in turn and non-judgmentally notice what sensations are arising) mindfully eating (engaging all five senses in the act of eating) and mindful breathing exercises (experiencing the physical sensations associated with breathing).

According to Segal et al. (2002), in the second half of treatment, the individual becomes more vigilant of mood shifts, and learns to cope with shifts to unpleasant affect by diverting attention to physical sensations for a period, to avoid reactivity. The individual also learns specific triggers and signs of worsening mood, and prepares for coping with negative thoughts and emotions. In the book by Williams et al. (2007) during the second half of treatment, the individual continues with the above mentioned meditation practices, but also expanding the breathing exercise to include the full body, as well as the mind.

Current Study

MBCT has become a well-established treatment for prevention of relapse in recurrent depression. The technique has been shown to be more effective at preventing relapse than maintenance medications (Kuyken et al., 2008). Recently, researches have begun to test the effectiveness of this procedure for the treatment of other disorders, including active depression (e.g. Finucane, & Mercer, 2006; Tovote et al., 2014). Active depression is defined as the individual currently experiencing an episode of depression as described by the American Psychiatric Association's Diagnosis and Statistical Manual, 4th edition (DSM-IV) or 5th edition (DSM-5; 2013), or the World Health Organization's International Classification of Diseases, 9th edition (ICD-9). The DSM-5 criteria includes at least five of the following symptoms for a period of at least two weeks:

- Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful). Note: In children and adolescents, can be irritable mood.
- Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation made by others).
- Significant weight loss when not dieting or weight gain (e.g., a change of more than 5 percent of body weight in a month), or decrease or increase in appetite nearly every day. Note: In children, consider failure to make expected weight gains.
- Insomnia or hypersomnia nearly every day.
- Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down).
- Fatigue or loss of energy nearly every day.
- Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick).
- Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).

- Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

While research on MBCT as a treatment of active depression is encouraging, given the small sample sizes of the studies, many of which were described as pilot studies, the actual effectiveness of the treatment remains questionable. The purpose of the current study is to conduct a meta-analytical review of the current research pertaining to the use of MBCT as applied to active depression, to allow the reader to draw stronger conclusions about the usefulness of MBCT as a treatment of active depression. The researcher expects to find significant treatment effects for MBCT. Additionally, individuals who receive MBCT are expected to show greater reductions in depressive symptoms compared to the control participants who do not receive MBCT.

Method

Search Strategies

Multiple search strategies were used. First the researcher conducted a literature search using the following electronic databases: PsyINFO, PsyARTICALS, ProQuest, ProQuest Dissertations and Theses Open, PubMed, Medline (EBSCO), TRIP, and Google Scholar. The following key words were used individually or in various combinations: mindfulness, Mindfulness-Based Cognitive Therapy, MBCT, active depression, depressive episode, depression, depressed, depressive symptoms, major depressive disorder, mood disorders. Secondly, the references of relevant articles and meta-analytic studies were reviewed. Third, the researcher contacted the first author of the relevant articles to request any additional articles or unpublished work.

Inclusion and Exclusion Criteria

To present the full scope of research on the topic, the meta-analysis included any relevant study dated before December 2014. Relevant studies were those which included use of MBCT with adult individuals specifically described as having a current episode of depression, and that used a standardized self-report or clinician rated questionnaire or checklist for depression. Excluded studies were those which were not written in English, included adolescents or children, examined comorbid disorders without specifically reporting information about depressive symptoms separately, were case studies, and did not report adequate statistics for computation of effect sizes.

Data Analysis

Hedge's g effect sizes for difference scores based on mean and standard deviations were calculated individually for each group in each study. The effect sizes were aggregated under the random effects models for the intervention groups and control groups, and the compared using a z -test. Heterogeneity statistics were calculated for the intervention group. Finally, effect sizes were calculated for the subgroups, and compared to the aggregated intervention effect size.

Article Search

The researcher searched nine data bases, and requested articles based on promising abstracts. Approximately 76 articles were read. Fifty-three articles were excluded for failing to meet inclusion criteria. The researcher searched the references of the remaining 23 articles and read an additional 14 studies. Of the 37 studies, 29 were excluded for failing to meet inclusion criteria or containing exclusion criteria. The researcher contacted the author of the eight remaining studies, and the authors of four meta-analyses to request any relevant unpublished data. The authors did not provide the researcher with relevant studies, and the final number of studies was eight. See Figure 1.

Results

Description of Studies

The current analysis included eight studies (N=350) from six countries (Four European countries, one Middle Eastern country, and one from Australia). Seven of the studies were published in academic journals, and one study was available on Google Scholar, accepted to an academic journal but is still in press. The studies were published in journals related to psychology or psychiatry (four studies), scientific research (two studies), mindfulness (one study), or a medical journal (one study). The studies were published between 2006 and 2014.

Four studies used the Beck Depression Inventory (BDI) by Beck and Steer (1987), a 21 item self-report measure of symptoms and attitudes characteristic of depression. Three studies used the Beck Depression Inventory- Revised (BDI-II) by Beck, Brown, and Steer (1996), a revised version of the original BDI to match criteria listed in the DSM-IV. One study used the seven item depression subscale of the Hospital Anxiety and Depression Scale by Zigmond and Snaith (1983).

The interventions in the studies were all based on the MBCT manual, and, with one exception, were conducted by a licensed medical or mental health professional. Ghasemian, Kuzehkana and Hassanzadeh (2014) was the only study to have a research assistant host the MBCT group. The intervention was conducted individually or in groups of up to 14 participants. Five of the studies followed the manual with no alterations. One study (Manicavasagar, Parker & Perisch, 2012) used the traditional two hour session format, but had participants complete a second body scan instead of engaging in yoga. Two studies (Finucane & Mercer, 2006; Tovote et al., 2014) followed the traditional

eight week session layout, but the sessions only lasted for one hour instead of two.

Tovote et al. (2014) is also unique in that they used individual MBCT instead of the traditional group format. (Table 1).

Effectiveness of mindfulness based interventions

Eight Hedge's g treatment effect sizes were calculated using the pre and post intervention means and standard deviations for the mindfulness intervention groups in the studies. The intervention group showed significant heterogeneity ($Q(8) = 7.4933, p < .05, I^2 = 58.82\%$); therefore the random effects model was used. Participants in the intervention group showed significant pre to post-test reduction in symptoms of depression ($z = 7.49, p < .001$) with a large average effect size of (Hedge's $g = 1.02$, CI [0.76, 1.29] see Figure 1).

For further analysis, and based on the significant Q statistic, separate treatment effect sizes were calculated for studies in which the participants completed the standard two hour MBCT sessions (6 studies), and for studies in which the participants completed the shortened one hour MBCT sessions (2 studies). Participants who completed the standard MBCT group had a large aggregated effect size (Hedge's $g = 1.06$, CI [0.75, 1.38]). The shortened MBCT group also had a large aggregated effect size (Hedge's $g = 0.91$, CI [0.40, 1.43]). No difference was found for the effect size between the two subgroups ($Z_{\text{Diff}} = -0.49, p = 0.63$).

Control Group Effect Sizes

Eight effect sizes were calculated using the pre and post intervention means for the control group in seven of the eight studies, with one study using two different control groups. The control group also showed pre to post reduction in symptoms according to

measures of depression, ($Z = 2.48, p < .05$) though with a small effect size (Hedge's $g = 0.37$, CI [0.08, 0.67]. See Figure 2.

The control group was divided into three subgroups: those which used a CBT control group (2 studies), those which used a treatment as usual (TAU) subgroup (3 studies), and those which used a waitlist subgroup (3 studies). The CBT subgroup showed significant reduction in symptoms as measured by the depression questionnaire ($z = 2.79, p < .01$) with a large effect size (Hedge's $g = 0.8228$). The Treatment as Usual (Hedge's $g = 0.30$) and waitlist (Hedge's $g = 0.04$) subgroups did not show significant reductions ($Z=1.24, p = .11$, and $Z= 0.16, p = .87$, respectively).

Comparison of Intervention and Control Groups

The intervention group showed a significantly larger effect size than the control group ($Z_{Diff} = 3.19, p < .01$). When compared to subgroups, the effect size in the intervention group was significantly larger than that for the TAU subgroup ($Z_{Diff} = 2.54, p < .05$) and the waitlist control subgroup ($Z_{Diff} = 3.08, p < .01$). The intervention group did not significantly differ from the CBT subgroup ($Z_{Diff} = 0.62, p = .54$).

Publication Bias

Despite efforts made to be inclusive, including efforts to contact researchers for unpublished data, the Begg's test of publication bias was significant ($z = 2.97, p < .01$), suggesting that publication bias may affect the studies presented in the current analysis. The possibility of bias was also evident in the funnel plot (Figure 4). However, given the small sample size, the applicability of the Begg's test is questionable, as it is recommended for meta-analyses with a "reasonable number of studies" (Borenstein, Hedges, Higgins, & Rothstein, 2009, p. 284).

To further explore the possible publication bias in the current analysis and its potential impact on the results, Orwin's adaptation of Rosenthal's *Fail-safe N* was calculated. According to this statistic, an additional 14 unpublished studies with an effect size of zero would need to exist in order to reduce the current analysis's aggregated effect size to equal that of the control group (Hedge's $g = 0.37$). An additional 33 studies with an effect size of zero would need to exist to reduce the current analysis's aggregated effect size to a small effect size (Hedge's $g = 0.20$). Given that the earliest published research on the use of MBCT for the treatment of active depression is only 9 years old, it is unlikely that 14 additional studies were conducted, found an effect size of zero and were not published.

Discussion

Participants in the MBCT groups showed significant reductions in scores on the measures of depression with a large effect size. Due to the limited research on the current topic, specific subgroup analysis was limited. Though true differences in effect sizes likely exist between studies, as evident by the significant Q statistic, the confidence interval of the aggregate effect size remains in the large effect size category, as does the effect size for each individual study. One should feel confident in assuming that MBCT, while perhaps more or less effective for certain subcategories of individuals, is likely an effective treatment for people with active depression.

The intervention group was divided into those studies using the full manualized treatment, and those using a shortened session length, and the two subgroups did not significantly differ. However, in interpreting the results, the reader is cautioned to bear in mind the size of the subgroups. The shortened session subgroup had only two studies, and half the sample size of the standard session subgroup. The standard session subgroup was only comprised for six studies. The small subgroups could contain large amounts of error variance which contributed to the lack of significant findings. While the results are promising for the efficacy of the shortened session, future analysis should continue to explore this assumption.

Participants in the MBCT groups showed significantly greater reduction in scores on the measure of depression in comparison to participants in the waitlist and treatment as usual subgroups, but not compared to the CBT subgroup. The lack of significant differences between MBCT and CBT is not surprising considering the overlap in the theoretical understanding of depression and focus on cognitive processes (Marchand

2012). The two treatments do differ on their specific focus on cognitions (i.e CBT is focused on thought content, and MBCT is focused on thought process; Sipe & Eisendrath, 2012). CBT is considered a highly recommended treatment for depression and is often considered a gold-standard (Bulter, Chapman, Forman, & Beck, 2004), so the lack of significant differences could further support the use of MBCT. Gloaguen, Cottraux, Cucherat, and Blackburn, (1998) conducted a meta-analysis of 48 controlled trials, and found that compared to waitlist conditions, CBT has large aggregated effect size (Hedge's $g = 0.82$), adding support to the current study's preliminary claim that MBCT may be as effective as CBT. Taken in conjunction with previous research (e.g. Edenfield & Saeed, 2012) MBCT may be an effective treatment for individuals who do not wish to have traditional psychotherapy but would be willing to engage in meditation practice. Again, one must consider the small number of samples in the subgroups when making inferences.

Limitations

Like all research, the current analysis should be interpreted within the scope of its limitations. Despite efforts to be inclusive of all published and unpublished research, the analysis was conducted using only 8 studies, with a total sample size of 350 participants. The limited number of studies likely increased the heterogeneity and error variance in the analysis. Analyses with a small number of groups are more likely to be affected by publication bias. However, while the use of MBCT for the treatment of active depression is still a new application, the results of the current study are promising.

Generalizability is affected by the exclusion criteria imposed by the original studies. Seven of the eight studies stated their exclusion criteria, and all seven excluded

substance use disorders, and a history of mania or psychosis. Five of the seven studies exclude individuals with other comorbid disorders, and four excluded suicidal individuals. The exclusion criteria limits the generalizability of these studies, and therefore of the meta-analysis. However, other studies suggest that the treatment may still be effective for individuals which were excluded from the original research. For instance, mindfulness programs have been shown to be effective in treatment of substance use disorders (Bowen et al., 2009), psychosis (Chadwick, 2005) and parasuicidal actions (Linehan et al., 1991), and reduction in treatment resistance depression with suicidal individuals, though not suicidal actions (Sipe & Eisendrath, 2012). However, while studies have addressed these particular populations, future research should examine the effectiveness of MBCT on the treatment of depression with comorbid disorders.

A possible limitation of the original studies involves the episodic nature of depression. Some participants may experience spontaneous symptom remission regardless of treatment type. However, one would expect such spontaneous remission would occur in both the intervention and control groups. The waitlist subgroup did not show a significant effect from pre to post treatment, suggesting that changes in symptomology simply due to time is unlikely. Additionally, research suggests that the average episode of depression lasts for 20 weeks (Williams & Swales, 2004), which is over twice as long as the intervention is scheduled to last.

Implications and Future Research

The results of the current analysis suggest that MBCT is an effective treatment for active depression. Because depression is a common diagnosis and the treatment is expensive (Luppa et al., 2007), effective treatments for the disorder are in high demand.

MBCT, which is delivered in a group format, may offer a cost effective form of treatment for depressive episodes. As MBCT has previously been linked to reductions in relapse of depression (e.g. Teasdale, et al., 2000, Kuyken et la., 2008), the benefits gained by practicing MBCT may extend past the end of the current episode to prevent relapse in the future. Future research should examine if MBCT is effective in inpatient settings, where effective group therapy may be particularly useful and readily attended. Future research should also continue to compare the length of session necessary for effective treatment of active depression, as suggested earlier in the study.

Study	Country	Sample Size	Intervention	Control Group	Depression Measure	Exclusion Criteria
Finnegan & Mercer (2006)	Scotland	13	Shortened MBCT	None	BDI ²	History of brain disease, psychosis, mania, personality disorder, suicidal ideation, SUD, SUD, schizophrenia spectrum, bipolar disorder
Kingston, Dooley, Bates, Lawlor, & Malone (2007)	Ireland	19	Standard MBCT	TAU	BDI	No history of suicidal ideation; History of Mania, psychosis, OCD ³ , eating disorder, pervasive develop disorder, self-harm, SUD ⁴ , Psychotropic medication
Banhofer, Crane, Hargus, Amarasinghe, Winder, & Williams (2009)	UK	28	Standard MBCT	TAU ⁵	BDI-II ²	Less than 3 episodes of depression; Change in medications; Mania, SUD, cognitive impairment
van Aalderen, Donders, Gijmna, Spinhoven, Barendse, & Speckens (2010)	Netherlands	69	Standard MBCT	TAU	BDI	Score of less than 20 on BDI-II
Manicavasagar, Parker, & Perich (2012)	Australia	45	MBCT without yoga	CBT ⁶	BDI-II	Melancholic depression, bipolar, psychotic, dementia; History of suicidal ideation, hospitalization, more than 2 antidepressant medications; Concurrent CBT, SUD, antenatal or postnatal
Tovole, Flier, Snippe, Peeters, Emmelkamp, Sandeman, Links & Schroevers (2014)	Netherlands	94	Shortened MBCT, Individual	CBT and Waitlist	BDI-II	Not being able to read and write Dutch; Pregnancy; Severe psychiatric comorbidity; Suicidal ideations; Concurrent psychological treatment
Ghasseini, Kuzehkani, & Hasanizadeh (2014)	Iran	20	Standard MBCT	Waitlist	BDI	Not specified
O'Doherty, Carr, McGrann, O'Neill, Dinan, Graham, & Maher (In Press)	Ireland	62	Standard MBCT	Waitlist	HADS ⁷	Major medical or psychiatric disorder; Concurrent psychosocial interventions

¹ Treatment as Usual

² Beck Depression Inventory-Revised (Beck, Brown, & Steer, 1996)

³ Obsessive Compulsive Disorder

⁴ Substance Abuse Disorder

⁵ Beck Depression Inventory (Beck & Steer, 1987)

⁶ Cognitive Behavioral Therapy

⁷ Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983)

Table 1: Descriptions of the studies included in the meta-analysis

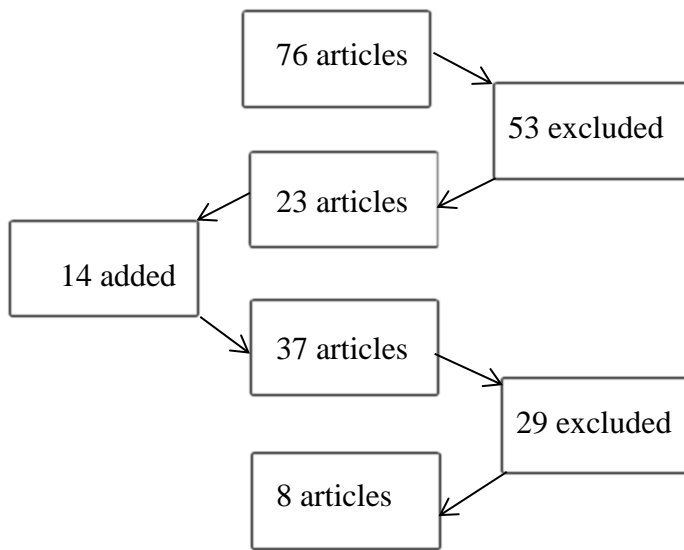


Figure 1: Flow chart of article search

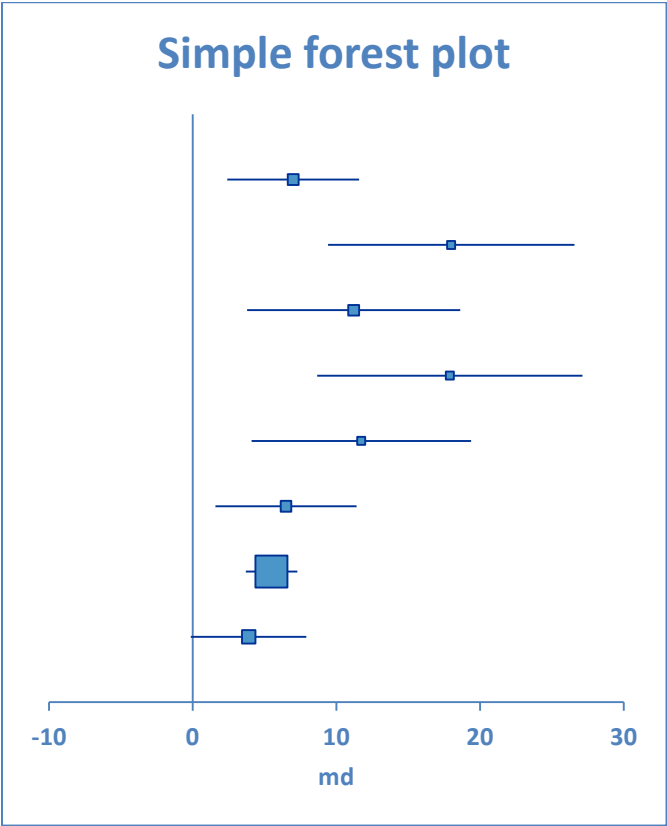


Figure 2: Forest plot of treatment effects and confidence intervals in MBCT intervention groups

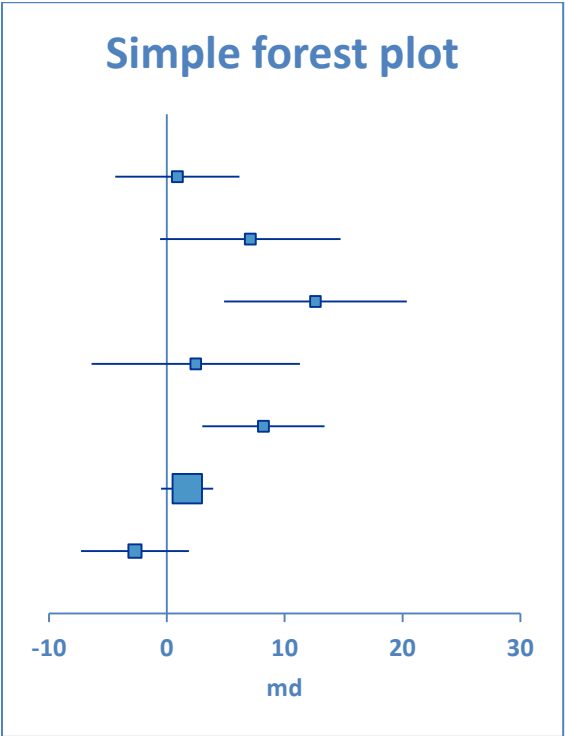


Figure 3: Forest plot of treatment effects in control groups

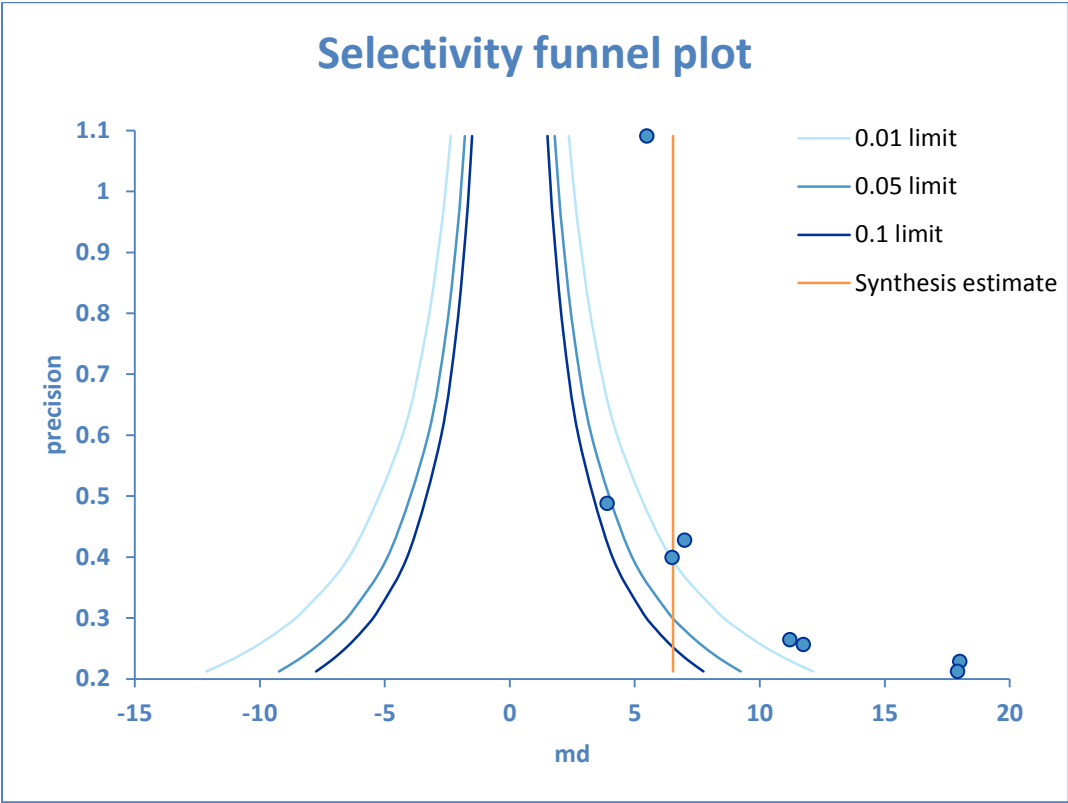


Figure 4. Funnel plot of publication bias

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report the Kentucky inventory of mindfulness skills. *Assessment*, 11(3), 191-206.
- 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.
- Beck, A.T., Brown, G.K., Steer, R.A., 1996. *BDI-II Manual*. The Psychological Corporation, San Antonio.
- Beck, A. T., & Steer, R. A. (1987). *Beck Depression Inventory manual*. San Antonio, TX: The Psychological Corporation.
- Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. West Sussex, UK: John Wiley and Sons, Ltd.
- Bowen, S., Chawla, N., Collins, S. E., Witkiewitz, K., Hsu, S., Grow, J., Clifasefi, S., Garner, M., Douglass, A., Larimer, M. E., & Marlatt, A. (2009). Mindfulness-Based Relapse Prevention for substance use disorders: A pilot efficacy trial. *Substance Abuse*, 30 (4), 295-305.
- Butler, A. C., Chapman, J. E., Forman, E. M., & Beck, A. T. (2006). The empirical status of cognitive-behavioral therapy: a review of meta-analyses. *Clinical psychology review*, 26(1), 17-31.

- Chadwick, P., Taylor, K. N., & Abba, N. (2005). Mindfulness groups for people with psychosis. *Behavioural and Cognitive Psychotherapy*, 33(03), 351-359.
- Chiesa, A., Mandelli, L., Serretti A. (2012). Mindfulness-Based Cognitive Therapy versus psycho-education for patients with major depression who did not achieve remission following antidepressant treatment: A preliminary analysis. *The Journal of Alternative and Complementary Medicine*, 18, 756-760.
- Deckersbach, T., Hölzel, B. K., Eisner, L. R., STange, J. P., Peckham, A. D., Dougherty, D. D., Rauch, S. L., Lazar S., & Nierenberg, A. A. (2012). Mindfulness-based Cognitive Therapy for non-remitted patients with bipolar disorder. *CNS Neuroscience Therapy*, 18(2), 133-141.
- Edenfield, T. M., & Saeed, S. A. (2012). An update on mindfulness meditation as a self-help treatment for anxiety and depression. *Psychology research and behavior management*, 5, 131.
- Finucane, A., & Mercer, S.W. (2006). An exploratory mixed methods study of the acceptability and effectiveness of mindfulness-based cognitive therapy for patients with active depression and anxiety in primary care. *BMC Psychiatry*, 6, 1–14.
- Ghasemian, D., Kuzehkanan, A. Z., & Hassanzadeh, R. (2014). Effectiveness of MBCT on Decreased Anxiety and Depression among Divorced Women Living in Tehran, Iran. *Journal of Novel Applied Sciences*. Retrieved from www.jnasci.org
- Gloaguen, V., Cottraux, J., Cucherat, M., & Blackburn, I. M. (1998). A meta-analysis of the effects of cognitive therapy in depressed patients. *Journal of affective disorders*, 49(1), 59-72.

- 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.
- Kabat-Zinn, J. (1994). *Wherever you go, there you are*. New York, NY: Hyperion.
- Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical psychology review, 31*(6), 1041-1056.
- Kenny, M., & Williams, J. (2007). Treatment-resistant depressed patients show a good response to mindfulness-based cognitive therapy. *Behaviour Research and Therapy, 45*, 617–625.
- Kingston, T., Dooley, B., Bates, A., Lawlor, E., Malone, K. (2007). Mindfulness-based cognitive therapy for residual depressive symptoms. *Psychology and Psychotherapy: Theory, Research, and Practice, 80*, 193-203.
- Klainin-Yobas, P., Cho, M. A. A., & Creedy, D. (2012). Efficacy of mindfulness-based interventions on depressive symptoms among people with mental disorders: A meta-analysis. *International Journal of Nursing Studies, 49*, 109-121.
- Klufpel, L., Ward, T., Yehuda, R., Dimoulas, E., Smith, A., & Daly, K. (2013). The evaluation of mindfulness-based stress reduction for veterans with mental health conditions. *Journal of Holistic Nursing, 31*, 248 - 255.
- Kristeller, J. L., Baer, R. A., & Quillian-Wolever, R. (2006). Mindfulness-based approaches to eating disorders. *Mindfulness-based treatment approaches: Clinician's guide to evidence base and applications, 75-91*.

- Kristeller, J. L., & Wolever, R. Q. (2010). Mindfulness-based eating awareness training for treating binge eating disorder: the conceptual foundation. *Eating Disorders*, 19(1), 49-61.
- Kuyken, W., Byford, S., Taylor, R. Watkins, E. Holden, E., White, K., S., Barrett, B., Byng, R., Evans, A., Mullan, E., & Teasdale, J. D. (2008). Mindfulness-Based Cognitive Therapy to prevent relapse in recurrent depression. *Journal of Consulting and Clinical Psychology*, 76(6) 966-978.
- Linehan, M. M., Armstrong, H. E., Suarez, A., Allmon, D., & Heard, H. L. (1991). Cognitive-Behavioral Treatment of chronically parasuicidal borderline patients. *Archives of general psychiatry*, 48(12), 1060-1064.
- Luppa, M., Heinrich, S., Angermeyer, M. C., König, H. H., & Riedel-Heller, S. G. (2007). Cost-of-illness studies of depression: a systematic review. *Journal of affective disorders*, 98(1), 29-43.
- Manicavasagar, V., Perich, T., & Parker, G. (2011). Cognitive predictors of change in cognitive behavior therapy and mindfulness-based cognitive therapy for depression. *Behavioral and cognitive psychotherapy*, 40, 227 – 232.
- Manicavasagar, V., Parker, G., & Perich, T. (2011). Mindfulness-based cognitive therapy vs cognitive behaviour therapy as a treatment for non-melancholic depression. *Journal of Affective Disorders*, 130(1-2), 138-144. doi:10.1016/j.jad.2010.09.027
- Marchand, W. R., (2012). Mindfulness-based stress reduction, mindfulness-based cognitive therapy, and Zen meditation for depression, anxiety, pain, and psychological distress. *Journal of Psychiatric Practice*, 18, (4), 233 – 252.

- Miller, J. J., Fletcher, K., Kabat-Zinn, J. (1995). Three-year follow up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry*, 17, 192-200.
- O'Doherty, V., Carr, A., McGrann, A., O'Neill, J.O., Dinan, S. & Graham, I. & Maher, V. (In press). A controlled evaluation of mindfulness based cognitive therapy for patients with coronary heart disease and depression. *Mindfulness*.
- Ramel, W., Goldin, P.R., Carmona, P.E., & McQuaid, J.R. (2004). The effects of mindfulness meditation on cognitive processes and affect in patients with past depression. *Cognitive Therapy and Research*, 28, 433–455.
- Scherer-Dickson, N. (2004). Current developments of metacognitive concepts and their clinical implications: mindfulness-based cognitive therapy for depression. *Counselling Psychology Quarterly*, 17(2), 223-234.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-Based Cognitive Therapy for Depression: A New Approach to Preventing Relapse*. New York: Guilford Press
- Shapiro, S. L., Bootzin, R. R., Figueredo, A. J., Lopez, A. M., Schwartz, G. E. (2003). The efficacy of mindfulness-based stressed reduction in the treatment of sleep disturbance in women with breast cancer: An exploratory study. *Journal of Pyschosomatic Research*, 54, 85-91.
- Sipe, W. E. B., & Eisendrath, S. J. (2012). Mindfulness-based cognitive therapy: Theory and practice. *Canadian Journal of Psychiatry*, 57(2) 63- 69.
- Teasdale, J. D. & Barnard, P. J. (1993). *Affect, cognition and change: re-modelling depressive thought*. Hillsdale, N.J.: Lawrence Erlbaum Associates.

- Teasdale, J. D., Segal, Z. V., Williams, J. M. G., 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.
- Telch, C. F., Agras, W. S., & Linehan, M. M. (2001). Dialectical Behavior Therapy for binge eating disorder. *Journal of Consulting and Clinical Psychology*, 69(6), 1061-1065.
- Tovote, K. A., Flier, J., Snippe, E., Peeters, A. C. T M., Emmelkamp, P. M.G., Sanderman, R., Links, T. P., & Schroevers, M. J. (2014). Individual mindfulness-based cognitive therapy and cognitive behavior therapy for treating depressive symptoms in patients with diabetes: Results of a randomized controlled trial. *Diabetes Care*, 37, 2427- 2434.
- van Aalderen, J. R., Donders, A. R. T., Gijm, F., Spinhoven, P., & Barendregt, H. P. (2011). The efficacy of mindfulness-based cognitive therapy in recurrent depressed patients with and without a current depressive episode: a randomized controlled trial. *Psychological Medicine*, 42(5):989-1001.
- Williams, J. M. G., & Swales, M. (2004). The use of mindfulness-based approaches for suicidal patients. *Archives of Suicide Research*, 8, 315–329.
- Williams, M., Teasdale, J., Segal, Z., & Kabat-Zinn, J. (2007). *The mindful way through depression: Freeing Yourself from Chronic Unhappiness*. New York, NY: The Guilford Press.
- Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, 67, 361–370.

Appendix A

CURRICULUM VITA

ANGELA L. TOSCANO**EDUCATION****Master's of Arts**

Clinical Psychology (expected) 2013 – 2015
 Towson University
 Towson, MD 21252

Bachelor of Arts

2007 – 2011

Major: Psychology Minor: Leadership Cumulative GPA: 3.35, Upper Level GPA: 3.55
 Christopher Newport University Psychology GPA: 3.51, Leadership GPA: 3.16
 Newport News, VA, 23608 Credit Hours Completed: 121.00

PROFESSIONAL PAPERS AND PRESENTATIONS

- Lents, J., Fehr, A., Brantley, J., Kaye, H., Wilson, K., **Toscano, A.**, Cartwright, K., Lee, S., & Gibbons, J. (2012). *Death and the Fading Affect Bias*. A poster presented at the annual meeting of the Southeastern Psychological Association Conference: New Orleans, LA.
- Lents, J., Fehr, A., Brantley, J., Kaye, H., Wilson, K., **Toscano, A.**, & Gibbons, J. (2011). *Death Events and the Fading of Emotions: A Proposal*. A poster presented at the annual meeting of Sigma Xi Conference: Newport News, VA.
- Toscano, A.**, Fehr, A., Lentz, J., Brantley, J., Arcieri, J. & Gibbons, J. (2011). *The Effects of Alcohol on the Fading Affect Bias*. A poster presented at the annual meeting of the Midwestern Psychological Association Conference: Chicago, IL.
- Toscano, A.**, Fehr, A., Lentz, J., Brantley, J., Arcieri, J. & Gibbons, J. (2011). *Alcohol, Religion, Spirituality, and the Fading Affect Bias*. A poster presented at the annual meeting of the Southeastern Psychological Association Conference: Jacksonville, FL.
- Toscano, A.**, Fehr, A., Lentz, J., Brantley, J., Arcieri, J. & Gibbons, J. (2011). *The Relation of Spirituality, Religiosity, and Religious Coping to the Emotions for Regular Events and Events Involving Alcohol*. A poster presented at the annual meeting of the Mid-Year Conference on Religion and Spirituality: Baltimore, MD.
- Toscano, A.**, Lentz, J., Arcieri, J., Fehr, A., Brantley, J., Gibbons, J., & Lee, S., (2010, October) *The Fading Affect Bias and Religion, Spirituality and Religious Coping*. A paper presented at the annual meeting of the MARCUS Conference: Sweetbriar, VA.
- Toscano, A.**, Fehr, A., Brantley, J., Lentz, J., Arcieri, J. & Gibbons, A. (2010, October). *Alcohol, Religiosity and the Fading of Emotions: A Proposal*. A poster presented at the annual meeting of the MARCUS Conference: Sweetbriar, VA.
- Gamble, J., Hartzler, A., **Toscano, A.**, Roseberry, B., Kofron, S., White, S., Gibbons, J., & Lee, S. (2010, April) *Religiosity, Spirituality, and Religious Coping Help Maintain Pleasant Affect*. A paper presented at the annual meeting of Paideia Conference: Newport News, VA.

- Gamble, J., **Toscano, A.**, Hartzler, A., Kofron, S., White, S., Roseberry, B., Gibbons, J., & Lee, S. (2010, April). *Spirituality and religious coping moderate the FAB*. A poster presented at the annual meeting of the Midwestern Psychological Association Conference: Chicago, IL.
- Gamble, J., Hartzler, A., **Toscano, A.**, Roseberry, B., White, S., Kofron, S., Gibbons, J., & Lee, S. (2010, March). *Positive Emotional Affect is maintained by spirituality, religiosity, and religious coping for remembered religious and non religious events*. A poster presented at the annual meeting of the Mid-Year Conference on Religion and Spirituality: Baltimore, MD.
- Kofron, S., Gamble, J., Hartzler, A., **Toscano, A.**, White, S., Roseberry, B., Gibbons, J., & Lee, S. (2010, March). *Spirituality and religious coping predicts the Fading Affect Bias*. A poster presented at the annual meeting of the Eastern Psychological Association Conference: New York, NY.
- Toscano, A.**, Roseberry, B., Gamble, J., Hartzler, A., Kofron, S., White, S., Gibbons, J., & Lee, S. (2009, November) *Spirituality and Religious Coping Moderate the FAB*. A poster presented at the annual meeting of Sigma Xi Conference: Newport News, VA.
- Kofron, S., White, S., Gamble, J., **Toscano, A.**, Hartzler, A., Roseberry, B., & Gibbons, J. (2009, October). *An examination of the Fading Affect Bias in men and women*. A paper presented at the annual meeting of the Marcus Conference: Sweet Briar, VA.
- Gamble, J., Hartzler, A., **Toscano, A.**, Kofron, S., White, S., Roseberry, B., Gibbons, J., & Lee, S. (2009, October). *An examination of religion, spirituality, emotions and coping*. A poster presented at the annual meeting of the Marcus Conference: Sweet Briar, VA.
- White, S., Gamble, J., Kofron, S., **Toscano, A.**, & Gibbons, J. (2009, April). *Alcohol and gender differences in the Fading Affect Bias*. A paper presented at the annual meeting of Paideia Conference: Newport News, VA.
- White, S., Gamble, J., Kofron, S., **Toscano, A.**, & Gibbons, J. (2009, February). *The moderating effect of alcohol on the Fading Affect Bias*. A poster presented at the annual meeting of the Southeastern Psychological Association Conference: New Orleans, LA.
- White, S., Gamble, J., Kofron, S., **Toscano, A.**, & Gibbons, J. (2008, November). *Does event typicality and audience receptivity affect the Fading Affect Bias?* A poster presented at the annual meeting of the WSSU Conference: Winston-Salem, NC.
- White, S., Gamble, J., Kofron, S., **Toscano, A.**, & Gibbons, J. (2008, November). *Does alcohol consumption affect the Fading Affect Bias?* A paper presented at the annual meeting of the WSSU Conference: Winston-Salem, NC.
- White, S., Gamble, J., Kofron, S., **Toscano, A.**, & Gibbons, J. (2008, October). *An examination of typicality and audience receptivity on the Fading Affect Bias*. A poster presented at the annual meeting of the Marcus Conference: Sweet Briar, VA.
- White, S., Gamble, J., Kofron, S., **Toscano, A.**, & Gibbons, J. (2008, October). *The moderating affect of alcohol consumption on the Fading Affect Bias*. A paper presented at the annual meeting of the Marcus Conference: Sweet Briar, VA.

PUBLICATIONS

Gibbons, J. A., **Toscano, A.**, Kofron, S., Rothwell, C., Lee, S., Ritchie, T., Walter, W. R. (2013). The Fading Affect Bias across Alcohol Consumption Frequency for Alcohol-Related and Non-Alcohol-Related Events. *Consciousness and Cognition*. 22, 1340-1361.

Mee, M., Haverback, **Toscano, A.** (2015). Middle School Principals' Perceptions and Preferences in Hiring Teachers. In press.

