

THE EFFECTS OF MINDFULNESS TRAINING AND INDIVIDUAL DIFFERENCES
IN MINDFULNESS ON SOCIAL PERCEPTION AND EMPATHY

by

JESSICA M. TIPSORD

A DISSERTATION

Presented to the Department of Psychology
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

September 2009

University of Oregon Graduate School

Confirmation of Approval and Acceptance of Dissertation prepared by:

Jessica Tipsord

Title:

"The Effects of Mindfulness Training and Individual Differences in Mindfulness on Social Perception and Empathy"

This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Psychology by:

Bertram Malle, Co-Chairperson, Psychology
Sanjay Srivastava, Co-Chairperson, Psychology
Sara Hodges, Member, Psychology
Mark Unno, Outside Member, Religious Studies

and Richard Linton, Vice President for Research and Graduate Studies/Dean of the Graduate School for the University of Oregon.

September 5, 2009

Original approval signatures are on file with the Graduate School and the University of Oregon Libraries.

An Abstract of the Dissertation of

Jessica M. Tipsord for the degree of Doctor of Philosophy
in the Department of Psychology to be taken September 2009

Title: THE EFFECTS OF MINDFULNESS TRAINING AND INDIVIDUAL
DIFFERENCES IN MINDFULNESS ON SOCIAL PERCEPTION AND
EMPATHY

Approved: _____
Dr. Bertram Malle, Co-Chair

Approved: _____
Dr. Sanjay Srivastava, Co-Chair

Both Buddhist scholars and psychological researchers have suggested that mindfulness practice may result in greater empathy, but previous research has found mixed results. In addition, Buddhist philosophy suggests that mindfulness should influence the perception of and felt connection to others. Little research, however, has examined such an influence. The present studies examined the effect of dispositional mindfulness, as well as short- and long-term mindfulness meditation practice, on trait and state empathy, social perception, and felt connection to others.

Study 1 manipulated mindfulness with a guided meditation CD and found that participants in this condition experienced more serenity and less negative emotion

relative to control conditions. Study 1 also clarified the relationship between dispositional mindfulness (measured with the Five Facet Mindfulness Questionnaire), empathy (Interpersonal Reactivity Index), and felt connection (Allo-Inclusive Identity Scale). Results showed that different facets of mindfulness had different correlates. Higher *observing* scores were related to greater empathic concern and perspective taking; higher *nonreactivity* scores were related to less personal distress; and higher *describing* scores were associated with greater felt connection to others. Mindfulness was also associated with social perception such that higher *nonreactivity* scores were associated with greater ease in making emotion inferences from short video clips and higher *describing* scores were associated with making more mental state inferences in a modified empathic accuracy task.

In Study 2, a randomized 8-week mindfulness intervention caused increases in dispositional mindfulness, especially *describing* scores, relative to a waitlist control condition. The intervention also resulted in increased serenity and joy and decreased negative affect and tension. Except for changes in serenity, these changes were fully mediated by increases in dispositional mindfulness. Those in the intervention condition decreased in personal distress to others' suffering, increased in the amount of mental state inferences they made for empathic accuracy targets, and increased in their ability to make inferences at times when the targets were actually having a thought or feeling. Thus, mindfulness training not only resulted in intrapersonal changes such as greater serenity and less tension; it also increased cognitive and emotional abilities important for empathy toward other people.

CURRICULUM VITAE

NAME OF AUTHOR: Jessica M. Tipsord

DATE OF BIRTH: May 4, 1980

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene, OR
Wake Forest University, Winston-Salem, NC
East Carolina University, Greenville, NC

DEGREES AWARDED:

Doctor of Philosophy, Psychology, 2009, University of Oregon
Master of Arts, Experimental Psychology, 2004, Wake Forest University
Bachelor of Arts, Psychology and English Literature, 2002, East Carolina
University

AREAS OF SPECIAL INTEREST:

Self-focused Attention
Mindfulness Based Stress Reduction

PROFESSIONAL EXPERIENCE:

Graduate Teaching Fellow, University of Oregon, Eugene, 2004-2009

PUBLICATION:

Leary, M. R., Tipsord, J. M., & Tate, E. (2008). Allo-inclusive identity: Incorporating the social and natural worlds into one's sense of self. In J. J. Bauer & H. A. Wayment (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 137-148). Washington, DC: American Psychological Association.

ACKNOWLEDGMENTS

I wish to thank my dissertation committee, Dr. Bertram F. Malle, Dr. Sanjay Srivastava, Dr. Sara D. Hodges, and Dr. Mark Unno for their feedback and assistance in preparing this dissertation. Special thanks are due to Dr. Bertram Malle and Dr. Sanjay Srivastava for providing invaluable advice on many aspects of this project. Thanks are due to Jeremiah Sullenger and Ray Vukceovich for their technical support. I would also like to thank Adam Kramer for creating the website for my online assessments. I wish to express my gratitude to Josh Felver-Gant who made the intervention study a reality by helping to teach mindfulness meditation to our students.

I would like to thank Kimberly Angelo and Allison Tackman for discussing my research with me and providing encouragement. I wish to express sincere appreciation to Dr. Melissa Foynes, who has been my best friend in graduate school. The hours we spent talking about life and research and the unbelievably productive and rejuvenating coast trips helped me keep working even when I felt like giving up. I also want to thank Sebrina Doyle who has helped me in so many ways including listening, editing, and being supportive.

I wish to thank Ryan Nichols for many philosophical conversations that reminded me why I began this research and Judith Kehoe for believing in me and in mindfulness research. Finally, a very special thanks is due to Wayne Pierson for his patience and support through the process of writing this dissertation as well as for reminding me of the importance of relationships, nature, and music.

To my parents, Robert and Janine Tipsord, for encouraging and supporting me through graduate school, and for teaching me the importance of both hard work and relaxation.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.....	1
Mindfulness Intervention Research.....	4
Definition, Measurement, and Manipulation of Mindfulness.....	7
Mindfulness and Empathy.....	12
Social Perception.....	17
Felt Connection.....	22
The Current Research.....	24
II. STUDY 1.....	26
Study 1 Hypotheses.....	27
Predicted Relationships Among Self-reported Dispositions.....	27
Predicted Relationships Between Dispositional Mindfulness and Social Perception.....	28
The Predicted Effects of the State Mindfulness Manipulation.....	29
Exploratory Hypotheses.....	30
Method.....	30
Participants.....	30
Procedure.....	31
Measures Completed Before the Manipulation.....	31
Demographics.....	31
Five Facet Mindfulness Questionnaire.....	32
Big 5 Inventory.....	33
Allo-Inclusive Identity Scale.....	33
Interpersonal Reactivity Index.....	34
State Mindfulness Manipulation.....	35
Tasks Completed After the Manipulation.....	36
Empathic Concern in Response to Photographs.....	37
Empathic Accuracy Task.....	39
Mental State Inference Tasks.....	41
Results.....	45
Preliminary Analyses.....	45
Relationships Among Self-reported Dispositions.....	46
Effect of the Mindfulness Manipulation on Emotions.....	50
Mindfulness and the Social Perception Tasks.....	51
Empathic Concern Picture Task.....	52
Relationships with Dispositional Measures.....	53

Chapter	Page
Effect of Condition	53
Potential Mediation.....	56
Empathic Accuracy.....	56
Relationship with Dispositional Mindfulness.....	56
Effect of Condition	57
Video Mental State Inference Task	59
Relationship with Dispositional Mindfulness.....	60
Effect of Condition	60
Sentence Mental State Inference Task.....	62
Relationship with Dispositional Mindfulness.....	63
Effect of Condition	64
Exploratory Analyses	70
Relationships Among Social Perception Tasks	70
Relationship Between Dispositional Empathy and the Social Perception Tasks.....	71
Discussion.....	74
III. STUDY 2.....	78
Study 2 Hypotheses	79
Method.....	82
Participant Recruitment	82
Procedure	82
Measures and Tasks.....	85
Empathic Concern Picture Task	85
Empathic Accuracy Task.....	86
Video Mental State Inference Task	88
Sentence Mental State Inference Task.....	91
Relationship Satisfaction	92
Interpersonal Support Evaluation Index	92
Positive Relations with Others	93
PANAS-X.....	93
Perceived Stress Questionnaire	94
Results	95
Participant Information and Attrition	95
Preliminary Analyses.....	97
The Relationship Between Dispositional Mindfulness and Self-report Measures at Time 1.....	98
The Relationship Between Dispositional Mindfulness and Task Performance at Time 1	102
Time 1 (pre) to Time 2 (post) Change.....	104

Chapter	Page
Changes in Self-reported Mindfulness	104
Changes in Self-reported Outcomes	105
Dispositional Empathy	108
Allo-Inclusive Identity	110
Emotion	111
Perceived Stress	112
Relationship Satisfaction	113
Changes in Task Performance	114
Empathic Concern Picture Task	114
Empathic Accuracy Task	115
Video Mental State Inference Task	117
Sentence Mental State Inference Task	118
Time 1 to Time 4: Trends Among Fall Intervention Group	119
Time 3 (pre) to Time 4 (post): Winter Intervention Group	125
Changes in Self-reported Variables	126
Changes in Task Performance	126
Adherence to the Intervention	129
Discussion	130
 IV. GENERAL DISCUSSION	 134
Mindfulness and the Social Perception Tasks	139
Limitations	143
Demand Characteristics	144
Control Conditions	145
Self-selection	146
Self-reported Mindfulness	146
Future Directions	149
Conclusions	151
 APPENDICES	
A. MINDFULNESS COURSE SYLLABUS	153
B. DESCRIPTION OF MINDFULNESS CLASS SESSIONS	155
C. EXAMPLE HOMEWORK SHEET FOR MINDFULNESS COURSE	160
D. ALPHAS FOR STUDY 2 SELF-REPORT MEASURES OVER TIME	161
E. TEST RE-TEST CORRELATIONS FOR SELF-REPORT MEASURES IN STUDY 2	 162
 REFERENCES	 164

LIST OF FIGURES

Figure	Page
1. Condition differences in negative affect.....	51
2. Condition differences in serenity.....	51
3. Differences in state empathic concern for each condition.....	55
4. Average hit rate by condition for those who completed the task first.....	59
5. Average ease scores for each cue in the video task.....	62
6. Average stoppage latencies for each inference type in video task.....	63
7. Average ease of inferences made for negative intentional behaviors.....	67
8. Average ease of inferences made for positive intentional behaviors.....	68
9. Average speed for inferences made for negative intentional behaviors.....	68
10. Average speed for inferences made for positive intentional behaviors.....	69
11. Changes in mindfulness by condition.....	105
12. Mediational model.....	107
13. Proportion of total effect mediated through mindfulness.....	108
14. Change in stoppage latencies from pre to post-intervention for video mental state inference task.....	118
15. Mindfulness trend over time for participants who completed all four time points.....	121
16. Trend over all four time points for IRI personal distress scores.....	121
17. Trend over all four time points for serenity.....	122
18. Trend over all four time points for tension scores.....	123

Figure	Page
19. Trend over all four time points for joy	123
20. Trend over all four time points for empathic accuracy hit rate	124

LIST OF TABLES

Table	Page
1. Mean ease scores for each cell of sentence task.....	46
2. Means and standard deviations of self-report measures.....	47
3. Correlations of self-report measures (N = 140).....	48
4. Correlations with state empathy task.....	52
5. Correlations between mindfulness and ease of inferences in video task.....	60
6. Correlations between mindfulness and ease of inferences in sentence task.....	65
7. Correlations between mindfulness and speed of inferences in sentence task.....	65
8. Correlations between ease and speed variables present in both the video and sentence task.....	72
9. Correlations between dispositional empathy and empathic accuracy variables....	74
10. Study 2 design	84
11. The number of time points for which participants completed online assessments.....	96
12. The number of time points for which participants completed lab sessions.....	96
13. Correlations of self-report measures that were in study 1 at time 1	99
14. Correlations of mindfulness and measures unique to study 2 at time 1	101
15. Regression predicting relationship satisfaction from mindfulness facets at time 1	102
16. Average change scores and effect sizes for changes in dispositional mindfulness.....	105
17. Standardized path coefficients in mediational models	109

Table	Page
18. Descriptive statistics for change over time in allo-inclusive identity.....	111
19. Change over time on self-report measures for winter intervention group.....	127
20. Change over time on performance on the state empathic concern and empathic accuracy tasks for winter intervention group	128

CHAPTER I

INTRODUCTION

Ultimately, how we act and behave in relation to our fellow humans and the world depends on how we perceive ourselves.
Dalai Lama (2002, p. 67)

The quote above comes from a chapter in *Visions of Compassion* in which the Dalai Lama describes his view of human nature. The idea that we extend the way we treat ourselves to the way we treat others is also found in the Tibetan understanding of compassion. Compassion is a “state of mind or way of being where you extend how you relate to yourself toward others as well. It’s a state of wishing that the object of your compassion be free from suffering” (Lama, 2002, p. 98). The guiding principle of this research is the concept that the way in which we attend to our own mental states influences the way in which we relate to others.

Social psychological findings paint a rather gloomy picture of human nature. Decades of research have revealed pervasive egocentrism, self-serving biases in perception of the self, distorted perception of others, aversive outcomes of self-awareness, poor perspective taking abilities and self-centeredness prevailing over empathy (Begley, 2007; Leary, 2004). This has led some to criticize social psychology for portraying humanity in an unflattering way by focusing on aggression, mindless conformity, failure to help those in need, inflated self-worth, and many other negative traits (Krueger & Funder, 2004) and for “spinning explanations of why these less-than-noble traits are natural to the point of near inevitability and universality” (Begley, 2007,

p. 181). Buddhist psychology asserts that the egotistical functioning seen in social psychological research is part of the suffering people typically experience. Within Buddhism there is a path to reduce suffering and develop compassion through the practice of mindfulness meditation. Thus far meditation research has mainly focused on reducing psychological distress, but it is just as important to examine the potential that mindfulness meditation has to increase compassion and transform relationships. In fact, according to Buddhist monks, the central goal of meditation practice is to develop compassion (Davidson & Harrington, 2002).

Even though social psychology may have overgeneralized findings of pervasive egotism and egocentrism, Begley's (2007) charge that social psychology has portrayed these negative tendencies as inevitable is an overgeneralization as well. For example, social psychologists also conduct research on positive human functioning, such as self-compassion (Neff, 2003), the astounding ability that both children and adults have to infer the mental states of others from observable behavior (Malle, 2005; Perner, 1991), and the factors that lead to empathy (Batson, Lishner, Cook, & Sawyer, 2005). The Positive Psychology movement is concerned with expanding our understanding of human nature by conducting research on human virtues, positive emotions, and growth (Seligman & Csikszentmihalyi, 2000). Similarly, the "Psychology of the Quiet Ego," an emerging field of research, focuses on ways in which people can quiet mental chatter and transcend self-interest (Bauer & Wayment, 2008). Indeed, researchers suggest that one way to quiet the ego is through mindfulness training (Kernis & Heppner, 2008), which involves attending to the present moment in a nonjudgmental manner (Kabat-Zinn,

1990). Research on mindfulness has increased dramatically in the last several years. One example of this trend is found in a PsychINFO search for the keyword *mindfulness*. In 2001 there were 26 new hits for mindfulness, in 2003 there were 77, in 2005 there were 147, and in 2007 there were 231 new hits. Mindfulness was also the subject of a target article in the highly visible journal *Psychological Inquiry*. In the article, Brown, Ryan, and Creswell (2007) related mindfulness to theories of self-awareness and offered suggestions for future research. The authors point out that the impact of mindfulness on social relationships is one of the newest topics of research. To date, however, research in this new area has been limited to research on romantic relationships.

There is no research linking mindfulness to basic social perception processes, such as the ability to infer others' mental states as well as the speed and accuracy of these inferences. Thus, the current research will examine, first, whether dispositional mindfulness is related to social perception and whether mindfulness training leads to improvements in basic social perception processes. Second, I will examine how mindfulness meditation (both short term and long term practice) affects state empathic concern, self-reported empathy, and relationship quality. Even though several studies find that dispositional mindfulness is correlated with trait empathy, emotional intelligence, and romantic relationship satisfaction (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Barnes, Brown, Krusemark, Campbell, & Rogge, 2007), virtually no research has examined causal directions and, in particular, exactly how mindfulness might enhance empathic feelings for others. Third, the current research will break mindfulness into specific components (e.g., nonjudging, describing) and examine whether they are

differentially associated with distinguishable aspects of empathy and relationship functioning. For example, which components of mindfulness are associated with empathic concern, the social-psychological construct most closely representing compassion? Fourth, I will investigate the relationship of mindfulness to felt connection to others (i.e., allo-inclusive identity), which might be increased during mindfulness training and may be important for facilitating increases in empathy.

Mindfulness Intervention Research

Most mindfulness research has been conducted with people who engage in extended mindfulness training. Eight-week courses in Mindfulness Based Stress Reduction (i.e., MBSR; Kabat-Zinn, 1990) are the most common intervention. Thus far, interventions that include mindfulness training have been successful in reducing stress, depression, anxiety, anger, rumination, trait negative affect and improving sleep quality (Carlson & Garland, 2005; Davidson et al., 2003; Ramel, Goldin, McQuaid, & Carmona, 2004; Speca, Carlson, Goodey, & Angen, 2000). In fact, a meta-analysis by Grossman and colleagues (2004) found that MBSR interventions have a medium effect size on both physical health (e.g., pain, medical symptoms) and mental health (e.g., depression, anxiety). This meta-analysis found similar effect sizes when comparing the mindfulness training to active control groups ($d = .54$ for mental and $d = .53$ for physical) and when comparing pre-to-post intervention scores ($d = .50$ for mental and $d = .42$ for physical; Grossman, Niemann, Schmidt, & Walach, 2004). In a comparison of Mindfulness Based Stress Reduction to traditional Cognitive Behavioral Stress Reduction, Smith and colleagues (2008) found that MBSR resulted in significant changes on all outcomes

(mindfulness, perceived stress, depression, neuroticism, well-being, binge eating, energy, and pain). The MBSR program also produced significantly greater increases in mindfulness and energy and greater decreases in pain when compared to Cognitive Behavioral Stress Reduction (Smith et al., 2008).

Due to the increased integration of mindfulness meditation practice into new therapies such as Mindfulness Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), it is important to measure whether these interventions actually increase mindfulness as well as reduce symptoms. Research has mainly focused on whether these therapies are effective in reducing symptoms such as depression, anxiety, and chronic pain. Only recently have researchers examined whether the actual capacity to engage in mindfulness (i.e., self-reported mindfulness) increases during a mindfulness intervention. The first published study that measured dispositional mindfulness (with the Mindful Attention Awareness Scale, or MAAS; Brown & Ryan, 2003) pre and post intervention found that mindfulness increased over eight weeks of MBSR (Shapiro, Brown, & Biegel, 2007). The increases in mindfulness were associated with decreases in rumination, anxiety, and perceived stress and increases in self-compassion. Another study found that MBSR resulted in increases in mindfulness (measured with the MAAS and the Toronto Mindfulness Scale, or TMS; Lau et al., 2006) and these increases in MAAS scores (but not TMS scores) were associated with increases in spirituality and decreases in medical symptoms and psychological distress (Carmody, Reed, Kristeller, & Merriam, 2008).

In addition to knowing whether these therapies work to improve various outcomes and increase mindfulness, it is important to examine *how* these therapies produce

psychological change. One explanation for why these therapies are so successful is that the therapists themselves are more mindful. Most mindfulness interventions require that the therapist, or mindfulness instructor, also engage in mindfulness practice (Segal et al., 2002). Indeed when Baer and colleagues' (2008) collected a sample of 213 mindfulness meditators, 63% of them were mental health providers with an average of 18.3 years of education suggesting that many therapists are also meditators. Therapists who are more mindful may be more attentive to their patients, less judgmental, and show more empathy, perhaps due to their own mindfulness training. Rogers (1957) and others have suggested that empathy on the part of the therapist is required for successful psychological change to occur in therapy. In support of this, a review of 50 years of research on therapy outcomes found that empathy is one of three therapist variables (along with unconditional positive regard and congruence) that is most often related to successful treatment (Bozarth, Zimring, & Tausch 2002).

Mental health practitioners have thus often served as participants in mindfulness interventions with the researchers' implicit assumption that this training will increase the mental health practitioners' ability to empathize with patients. For example, Shapiro, Astin, Bishop, and Cordova (2005) found that MBSR effectively reduced stress and increased self-compassion and the quality of life in health care professionals. Several studies have also found increases in empathy in those working in the mental health and medical fields. An early study with master's level therapy students found that four weeks of training in Zen meditation increased empathy, measured as the accuracy of identifying emotions displayed by a patient on a videotape (Lesh, 1970). More recently Shapiro,

Shwartz, and Bonner (1998) reported that medical students showed an increase in self-reported empathy (measured with the Empathy Construct Rating Scale; La Monica, 1981) over 8 weeks of mindfulness training (using the MBSR program). However, the intervention included empathy training and forgiveness meditations that are not typically included in MBSR and these additional components may be responsible for these results. Adding to the ambiguity of the mindfulness and empathy link, other researchers did not find an increase in empathy (measured with the Interpersonal Reactivity Index; Davis, 1980) for hospital employees who participated in an eight week stress reduction program that used material from MBSR and Cognitive Therapy (Galantino, Baime, Maguire, Szapary, & Farrar, 2005). Thus, the findings are mixed as to whether mindfulness interventions actually increase empathy. Moreover, there is also a lack of research examining whether mindfulness training increases empathy in populations other than health care professionals. The current research will test whether an eight-week mindfulness intervention will increase both state and trait empathy in a college student sample.

Definition, Measurement, and Manipulation of Mindfulness

There is a common misunderstanding that equates mindfulness with meditation. Although mindfulness can be understood as a specific type of meditation practice, mindfulness is not merely meditation. Mindfulness meditation practice helps people to develop mindful states and skills that can be experienced and used outside of meditation practice. In fact, mindfulness can be applied to all aspects of daily life, from eating to washing dishes to social perception.

Intervention research has focused on whether or not there is improvements in outcomes rather than on the mechanisms of change. When improvements have been found researchers have speculated that they are due to mindfulness, but often these speculations were not tested. This could be due to the fact that self-report measures of mindfulness are a recent development.

The Buddhist concept of mindfulness is most commonly interpreted in Western society as purposefully paying attention to the present moment in a nonjudgmental way, and this definition is also used to describe mindfulness to participants in MBSR programs (Kabat-Zinn, 1990). However, other researchers and theorists elaborate on or simplify this definition depending on their understanding of Buddhism and their methodological goals. In fact, the development of self-report measures of mindfulness has led to debate over the definition of mindfulness. Brown and Ryan (2003) argue that mindfulness involves merely attending to the present moment in an open, receptive way. However, the items in their Mindful Attention Awareness Scale (i.e., MAAS) do not reflect “open receptivity” but rather how often people behave automatically, are distracted, or fail to notice internal states. The items are all reverse-scored to indicate participants’ awareness of their own behavior, rather than assessing mindfulness directly. Indeed, critics have pointed out that the MAAS merely measures how “spaced out” people are (Rosch, 2007). Partly in reaction to this issue, other researchers have treated mindfulness as a multifaceted construct that includes attention to the present, nonjudging, and several other components such as nonreactivity and verbal labeling of mental states (Baer, Smith, & Allen, 2004; Leary & Tate, 2007).

To reduce some of the confusion generated by multiple mindfulness questionnaires that all measure slightly different concepts, Baer and colleagues (2006) conducted a factor analysis of all items from the existing five mindfulness questionnaires. The factor analysis revealed five facets: *Observing, describing, acting with awareness, nonjudging, and nonreactivity*. All the facets except acting with awareness are positively correlated with meditation experience (Baer et al., 2008).

The acting with awareness factor is comprised of five items from Brown and Ryan's (2003) MAAS scale along with three items, which all reference being distracted, from two other mindfulness scales (2 from the Kentucky Inventory of Mindful Skills; Baer et al., 2004; 1 from the Cognitive Affective Mindfulness Scale; Hayes & Feldman, 2004). No MAAS items loaded highly on any of the other four factors. Thus, the acting with awareness facet measures the extent to which people do not act automatically and are not easily distracted from what they are doing.

The describing facet involves being able to find words, or labels, to describe internal experience. The observing facet involves attending to internal and external sensations. However, observing is not necessarily associated with positive outcomes because one can be observant in a self-critical manner. Indeed, Baer and colleagues (2006, 2008) have found that for those without meditation experience, the observing facet was negatively related to the other mindfulness facets and positively associated with psychological symptoms. Consistent with research linking self-focused attention to negative affect and depression (Mor & Winquist, 2002), close observation of internal experience may be maladaptive. By contrast, for those with meditation experience, the

observing facet was positively related to the other facets of mindfulness and to well-being, and negatively related to psychological symptoms (Baer et al., 2008). Presumably, those with previous meditation training observe their experience from a nonjudgmental and nonreactive stance. These findings are also in line with theorists who argue that the critical aspect of mindfulness is the attitude of nonjudging (Kabat-Zinn, 1990; Wachs & Cordova, 2007).

The nonjudging and nonreactivity facets can be considered the attitudinal component of mindfulness. The nonjudging facet involves refraining from evaluating internal states in terms of their goodness or appropriateness. The nonreactivity facet involves allowing oneself to notice both negative and positive states without getting caught up in the emotion or engaging with the thoughts. Measuring these five elements of mindfulness separately allows researchers to investigate differential relationships with other variables and clarify the skills cultivated through mindfulness practice and their unique role in increasing individual and social well-being.

Although previous intervention work has found increases in mindfulness with Brown and Ryan's (2003) MAAS, the scale captures only the extent to which people behave automatically and are distracted from their present experience. Therefore, research is needed to examine how all five facets of mindfulness (using the Five Facet Mindfulness Questionnaire; Baer et al., 2006) change over time in response to mindfulness training. Specifically it would be important to know whether certain facets change more than others and whether change in specific facets predicts specific outcomes such as increases in empathic concern.

Although mindfulness is conceptualized as both a state and a trait, only a few researchers have conducted studies with manipulations of state mindfulness. This could be due to the fact that by definition mindfulness involves “cultivating our ability to pay attention in the present moment” (Kabat-Zinn, 1990, p.11) and this cultivation may take time, which experiments often do not allow. However, there may very well be some short-term effects associated with inductions of state mindfulness. Recently, Heppner and colleagues (2008) induced mindfulness using a “raisin eating” exercise adapted from an exercise used in the first session of MBSR (Kabat-Zinn, 1990), in which one examines a raisin mindfully (as if one has never seen it before) and then eats the raisin slowly and mindfully. The authors found that this induction of state mindfulness resulted in less aggressive behavior in response to social rejection feedback. Several studies have increased state mindfulness by adapting instructions used in interventions to teach mindfulness practice (Block-Learner, Adair, Plumb, Rhatigan, & Orsillo, 2007) or manipulating one component of mindfulness by asking participants to focus on their breathing and let go of thoughts or merely label their thoughts and feelings (Asch & Craske, 2006; Creswell, Way, Eisenberger, & Lieberman, 2007; Thompson & Waltz, 2007; Tipsord & Malle, 2007, 2008). However, the interpretation of these effects is hampered by vague instructions and the sole focus on certain aspects of mindfulness practice (e.g., breathing, verbal labeling) while ignoring other aspects (e.g., nonjudging, nonreactivity). In addition, manipulations of one component of mindfulness often do not produce the same results that are found with mindfulness interventions.

If mindfulness is best understood as a multifaceted construct, then it may not be possible to achieve a state of mindfulness without combining the facets in the present moment experience. In fact, that is exactly what is done in a guided mindfulness meditation. Thus, an authentic manipulation of mindfulness may consist of presenting guided meditation CDs similar to what is typically given to students in MBSR courses. These courses use guided meditation CDs to help ease beginning practitioners into a state of mindfulness. The guided meditations are typically 45 minutes long and narrated by Jon Kabat-Zinn, the creator of MBSR and a prominent mindfulness researcher, practitioner, and instructor. There is some debate over how long each mindfulness practice should be and how many times a week one should meditate. Kabat-Zinn (1990) suggests 45 minutes six times a week to participants in MBSR. For the present research, I will use both a short (approximately 20 minutes) guided mindfulness meditation narrated by Jon Kabat-Zinn to induce state mindfulness (study 1) and an eight-week mindfulness meditation intervention based on Mindfulness Based Stress Reduction (Kabat-Zinn, 1990) and Mindfulness Based Cognitive Therapy (Segal et al., 2002) in which participants are provided with guided meditation CDs and asked to practice for 8 weeks (study 2).

Mindfulness and Empathy

A recent psychotherapeutic model of compassion-giving claims that compassion can be increased with training that targets specific motivational, emotional, and cognitive competencies (Gilbert & Tirsch, 2009). The key component of the model is the motivation to care for oneself and others' well-being, and Gilbert and Tirsch suggest that

this motivation is related to identity. The emotional competencies include developing sensitivity to one's own and others' distress as well as a capacity to tolerate distress and aversive emotions in oneself and others. These emotional competencies are similar to the describing and nonreactivity mindfulness skills one develops towards one's own mental states in mindfulness meditation practice. Gilbert and Tirsch's cognitive competencies involve perspective taking and refraining from condemning others. The nonjudging facet of mindfulness may be related to less condemning of others. The competencies required for compassion-giving seem to overlap with some of the mindfulness skills described earlier, however, for these skills to result in compassion, one would need to extend them from the self to others.

Although compassion has not received much attention in empirical psychological research, a similar concept, empathic concern, has been the focus of considerable research. A common measure of state empathic concern is Batson and colleagues' (1987) set of adjective ratings, and "compassionate" is indeed one of the 6 adjectives. It is therefore reasonable to postulate that compassion is part of, or largely overlapping with, the construct of empathic concern.

Empathic concern is one component of the broader concept of empathy. Empathy has been the focus of much psychological research. No consensus exists for a precise definition of empathy, but there is agreement that it includes multiple components. Many researchers distinguish between cognitive and emotional empathy. Cognitive empathy involves being able to take another person's perspective and infer what is going on in their mind. However, because this process can (and often does) occur without any

empathic feelings, it is best labeled *perspective taking*. Developmental psychologists often refer to this ability as having a theory of mind, and social psychologists often call it mindreading or mental state inference (Baron-Cohen 1995; Ickes, 2003; Malle, 2005). Regardless of which term is used, representations of another's mental states will vary in ease, speed, and accuracy. Only recently has research begun to investigate the ease and speed of mental state inferences such as of intentionality, goals, and beliefs (Apperly, Riggs, Simpson, Chiavarino, & Samson, 2006; Holbrook, 2006). Research on accuracy has been more extensive (Ickes, 1997, 2003). One way researchers have assessed empathic accuracy is by creating video stimuli in which the target persons in the video provides the thoughts and feelings they had at specific time points and then participants (in the role of social perceivers) watch the video and guess the thoughts and feelings of the targets at those specific time points (Ickes, 1990). The perceivers' inferences are then compared to the actual thoughts and feelings of the target to compute an empathic accuracy score (Ickes, 1990). One drawback of this paradigm is that it is not clear that perceivers would voluntarily make a mental state inference at those specific points in which they are asked to make a guess. Thus, the accuracy of their guesses may not be generalizable to their accuracy for inferences that they spontaneously make. In addition, in the empathic accuracy paradigm, the perceiver's motivation and the amount of effort they put forth might be influential in producing more accurate inferences (Hodges & Biswas-Diener, 2007).

The second aspect of empathy featured in research has been labeled *emotional empathy*. Emotional empathy refers broadly to a social perceiver's emotional response to

a target person, whereby the perceiver's emotion to some degree matches the target person's emotion. In social psychology research, emotional empathy has been conceptualized somewhat more narrowly, divided into as one of two types of emotional responses: empathic concern and personal distress (Hodges & Biswas-Diener, 2007). Empathic concern involves feelings of compassion and warmth for a person in need. Distinct from other-oriented empathic concern is personal distress, which involves self-centered feelings of distress in response to another's plight. Empathic concern may require inhibition of one's own distress and thus, generating feelings of empathic concern for others is viewed as healthy emotion regulation (Eisenberg et al., 1996). In addition, empathic concern often motivates people to help the target of concern while personal distress can motivate the person to exit the situation instead (Batson, Fultz, & Schoenrade, 1987). Thus, overcoming personal distress may be a necessary first step to developing empathic concern.

Reflecting this diversity of components, dispositional empathy is often measured with the Interpersonal Reactivity Index (IRI), which has four components: perspective taking (PT), empathic concern (EC), personal distress (PD), and fantasy (Davis, 1980, 1983). For this research I will not examine the fantasy component. Initial evidence shows that higher levels of trait mindfulness, measured as acting with awareness (using the MAAS), are associated with more empathic concern and less personal distress (Wachs & Cordova, 2007) and in some studies more perspective taking (Beitel, Ferrer, & Cecero, 2004). What specific facets of mindfulness are related to empathy? In one study that measured four of the facets of mindfulness, the *observing* and *describing* aspects

(measured with a Dutch version of the Kentucky Inventory of Mindful Skills; Baer et al., 2004) were both positively associated with empathy (measured by combining the PT, EC, and fantasy sub-scales of the IRI, Dekeyser, Raes, Leijssen, Leysen, & Dewulf, 2008). The current research will examine the relationship of all five mindfulness facets and the three sub-types of self-reported empathy on the IRI.

Although the studies described above found correlations between mindfulness and empathy, research has neglected to examine *why* mindfulness is associated with empathy. Given that the findings above are correlational, I can only speculate about why the ability to describe one's own feelings with verbal labels would be associated with more empathy for others. Researchers have found that accurate inference of others' emotional states was highest among participants who had patterns of physiological responding similar to the target that they were trying to understand (Levenson & Ruef, 1992). This suggests that identification of one's own emotional states could play an important role in inferring others' emotions. Indeed, many researchers suggest that self-awareness of our own mental states enables us to read the mental states of others (e.g., Decety & Sommerville, 2003). It is possible that the mere ability to apply verbal labels to one's own mental states highlights the appropriate mental categories and makes it easier to apply these categories to others' mental states. If so, then we would expect the describing facet of mindfulness to be most strongly related to the ability to make mental state inferences for others.

Mindfulness might affect cognitive processes related to empathy and compassion by reducing self-preoccupation and enhancing the effortful shifting of attention that is

important for diminishing the self's perspective in order to take the perspective of another person. Some researchers suggest that taking another's perspective (i.e., inferring their mental states) is an antecedent to generating empathic concern for them (Batson, Eklund, Chermok, Hoyt, & Ortiz, 2007). Mindfulness may affect emotional processes related to empathy by increasing the tolerance of negative emotion. If we consider that negative emotions often capture attention, then the ability to better regulate personal distress may result in more available attentional resources to devote to others. These are all reasons why mindfulness may improve social perception and perspective taking.

Buddhist psychology suggests that mindfulness meditation leads to a fundamental change in perception of the self such that the self is seen from a more objective perspective, perception is less egocentric, and the practitioner feels more connected to others. This change in the sense of self, or a more inclusive sense of identity, might serve as the motivation to develop the cognitive and emotional competencies that are needed to develop more empathic concern for others. Thus, improved social perception (including better perspective taking) and/or felt connection may explain why mindfulness is related to empathy. However, social perception processes and felt connection are themselves important outcomes of mindfulness. The next few sections will explore in more detail how mindfulness might enhance both social perception and felt connection with others.

Social Perception

If mindfulness practice involves observing and labeling one's own mental processes in a nonjudgmental and nonreactive way, would it provoke any changes in attention and responses to other people, or others' minds? Mindfulness may increase the

likelihood that people make mental states inferences as well as increase the likelihood that these inferences are accurate because mindfulness reduces self-preoccupation, reduces reliance on automatic processing, and reduces evaluative processing (all of which can distort perception). Although the mindfulness questionnaire research does not address this issue, in the Buddhist tradition mindfulness is meant to be applied to everything in the present moment, not only to one's own experience but to other people as well. Mindfulness may thus improve various aspects of social perception such as the amount of mental state inferences that are made, the ease with which they are made, the speed at which they are made, the accuracy of the inferences, and the moral judgment associated with them. How might this occur?

First, mindfulness helps one become *less self-preoccupied* and thus, have more attention for others available. In fact, some forms of self-attention (e.g., rumination) may distract people from focusing on others during a social interaction. In support of this idea, research has found that the more people were focused on their own thoughts and feelings during an interaction the worse they reported understanding an experience their interaction partner told them about (Malle & Pearce, 2001). Researchers have found that mindfulness training reduces rumination, a severe form of self-attention that is linked to depression (Shapiro et al., 2007). Mindfulness allows one to note one's own thoughts or emotions during an interaction, but rather than becoming absorbed in them, as in rumination, one could re-focus attention on the present interaction and the other person (Wachs & Cordova, 2007). Researchers point out that perspective taking and compassion require shifting attention away from self-preoccupation and suspending one's own

thoughts and feelings (Long, Angera, Carter, Nakamoto, & Kalso, 1999). Highly mindful individuals may make more mental state inferences and perhaps make them with greater ease and speed because they recognize when they need to disengage their attention from their own mental states and devote more attention to the behavioral and verbal cues that will help them infer the thoughts and feelings of others.

Second, the increased tolerance of negative emotions experienced by individuals high in mindfulness may reduce the extent to which the one's own emotional experience influences social perception. Researchers have found that the mindfulness facets of describing, acting with awareness, and nonjudging are associated with less personal distress, as measured by the IRI (Dekeyser, et al., 2008). Although nonreactivity has not yet been examined in relation to empathy, it seems likely that this facet will also be related to less personal distress. The nonreactive and nonjudging components of mindfulness may help people learn to tolerate negative emotions. Situations that invoke empathic concern often involve pain experienced by another person and some researchers suggest that sympathetic responses activate one's own pain network (Tucker, Luu, & Derryberry, 2005). Based on frustration and learning research, Tucker and colleagues (2005) concluded that learning to tolerate sympathetic pain is necessary for empathic reasoning. Focused breathing has been linked to increased tolerance of negative emotions (Arch & Craske, 2006), state mindfulness has been linked to reduced anger (Heppner et al., 2008), and trait mindfulness has been linked to less anger expressed towards others (Wachs & Cordova, 2007). Thus, preliminary results suggest that

mindfulness is associated with increased tolerance of, and less reactivity to, one's own negative emotions.

Third, mindfulness may enhance the clarity of perception and reduce self-serving biases in perception. Buddhist psychology emphasizes the value of perception that is not biased by past experiences, strong emotions, or distraction. Unbiased perception of others is necessary in order to understand them, feel empathy for them, or accurately assess their mental states. Unfortunately, perceivers often lack awareness of how their perception may be biased (Leary, 2004; Van Boven & Lowenstein, 2003). Mindfulness training provides a way to decrease the hold of habitual patterns and evaluative processing that obscures perception (Kabat-Zinn, 1990). In addition, awareness of one's thinking, feeling, and acting in the present moment could interrupt the automatic activation of self-representations that filter perception such that one would gain more clarity in perception and be able to make responses with more autonomy instead of based on preconceived notions and schemas (Brown, Ryan, Creswell, & Niemiec, 2008). This clarity of perception can be achieved through practice approaching experience with a "beginner's mind" which refers to "a mind that is willing to see everything as if for the first time" (Kabat-Zinn, 1990, p. 35). Similarly, Buddhist psychology suggests that mindfulness practice results in seeing things more clearly, or seeing like a child. Accurate perception of others' feelings is especially important given that understanding and validating another's emotional experience has important implications for future disclosure and intimacy (Fruzetti & Iverson, 2004). Some researchers have argued that the ability to accurately perceive others' feelings is most fundamental to empathy because

without such accuracy it would be difficult to feel the appropriate emotion oneself and respond compassionately (Levenson & Ruef, 1992).

Fourth, mindfulness may reduce the extent to which a person judges or condemns others if the person learns to be less judgmental in general. One way in which this can occur is by overriding the automatic evaluative processes that distort perception. For people who are high in trait mindfulness, especially those high in the *nonjudging* facet, experiences such as thoughts and feelings are noticed without an evaluation of their goodness or badness. It is possible that this withholding of judgment is transferred to the perception of other people. If a person refrains from self-criticism when having a thought that would normally be considered negative, then that person may also be more likely to understand without criticism other people's negative thoughts or emotions. The idea of transferring the attitude of nonjudging from oneself to others is similar to what is done in so-called "loving-kindness meditation." During this meditation technique one begins by feeling love and compassion for oneself, then extends that to others one cares about, then to strangers, and eventually even to one's enemies (Kabat-Zinn, 1990). Though Baer's (2006) nonjudging facet of mindfulness measures only internal experience, it seems likely that the stance of nonjudging could also be applied to everything in the present moment, including other people who are present. In support of this, Carson, Carson, Gil, and Baucom (2004) found that a mindfulness intervention increased couples' self-reported acceptance of each other. These findings suggest that the individual practice of mindfulness might reduce the tendency to judge others. Less judgment may be important for empathy in everyday life, just as in the case of a therapist who refrains from judgment

(i.e., accepts the client as he or she is) in order to express empathy for the client (Rogers, 1957).

Felt Connection

The capacity to attend to others and make mental state inferences may not always be sufficient to promote empathic concern. The fact that it is possible to take another's perspective and still feel little empathy for them (e.g., a convicted murderer) suggests that more cognitive empathy does not always result in more emotional empathy. Indeed Leary (2004) explicitly stated that "compassion requires that we feel at least some connection to other people" (p. 112). Feeling connected to others (or including others in one's identity) should be associated with valuing the other's welfare in a manner similar to valuing one's own welfare. Recently Batson and colleagues (2007) suggested that valuing another person's welfare is an important antecedent of empathic concern. They theorize that valuing the other might spontaneously result in adopting the other's perspective and/or valuing might lead directly to empathic concern without active perspective taking.

Research has shown that mindfulness is associated with higher levels of self-reported relatedness to others (Brown & Ryan, 2003). In addition, a mindfulness-based intervention with couples increased their level of relatedness and closeness to each other as measured with Aron, Aron, and Smollen's (1992) Inclusion of others in the self scale (Carson et al., 2004). Thus, mindfulness training appears to be associated with increases in the inclusion of others in the self-concept (i.e., increases in felt connection to those others). Why might this be? Mindfulness may change the perception of the self such that

one begins to view the world from a broader, more objective perspective rather than a narrowly focused, self-centered perspective. This change in self-perception may be associated with the movement from feelings of separateness to feelings of connection (Kabat-Zinn, 1990). Mindfulness therapies and mindfulness practice encourage people to take a “distant” perspective on their own mental states in order to see their own thoughts as “just thoughts” (Segal et al., 2002). Often they refer to this as learning a new relationship towards one’s thoughts. Instead of allowing thoughts to define who one is, people are encouraged to recognize thoughts as mere events that will come and go (Segal et al., 2002). Thus, in a broader sense participants are learning that the self is the *context* in which these thoughts and processes take place, not the actual *content* of the thoughts and feelings. In meditation practice, taking this type of objective perspective on one’s own mental states is thought to lead to the experiential realization of interdependence (Weiss, 2004). Interdependence in this context refers to the idea of interconnection found in descriptions of mystical experiences (James, 1902/1985). Buddhist writer, Thich Nhat Hanh (1991) uses the term *interbeing* to describe the interconnectedness of all beings, which is the realization that all Buddhist teachings point to (Weiss, 2004). Some theorists suggest that meditation promotes self-directed empathy which in turn enhances interdependence (Andersen, 2005). Others suggest that interdependence and compassion are related in a bi-directional manner such that realizations of interdependence foster compassion and compassion leads to realizations of interdependence (Bauer & Wayment, 2008).

Data from my own research reveal that those who are more mindful also report more felt connection between themselves and close others (Leary & Tipsord, 2004). In addition, people who report more felt connection to other people also score higher on measures of psychological well-being, self-compassion, and prosocial orientations such as kindness, forgiveness and compassion (Leary, Tipsord, & Tate, 2008). A sense of self that is inclusive of others may motivate people to pay attention to others, try to understand them, value their welfare and thus, be more likely to feel empathic emotions for them.

The Current Research

Although the bulk of current mindfulness research focuses on individual health and well-being, the Buddhist tradition of mindfulness intended the practice to be used to increase compassion (Shapiro, Schwartz, & Santeere, 2005). Thus, research needs to investigate the way in which mindfulness affects compassion, which is one part of empathic concern. In addition, research is needed to examine the effect of mindfulness on cognitive and emotional abilities that are needed to generate empathy and on felt connection to others, which may serve as motivation to develop these abilities.

The two current studies examine whether mindfulness affects cognitive abilities associated with social perception such as the ease, speed, and accuracy of mental states inferences; whether mindfulness affects emotional experience such as increased tolerance of negative emotions; whether mindfulness is associated with allo-inclusive identity (i.e., felt connection), and whether this sense of identity is associated with empathy. The current research investigates these issues at multiple levels. Specifically, both studies

examine the relationship of dispositional mindfulness, empathy, and felt connection as well as the relationship between mindfulness and social perception abilities. In addition, Study 1 examines the impact of short term mindfulness meditation practice and Study 2 examines the effect of long term mindfulness training on social perception abilities. Study 2 also investigates whether increases in mindfulness mediate the effect of mindfulness training on changes in emotional experience, empathy, allo-inclusive identity, and social perception.

CHAPTER II

STUDY 1

Study 1 examines the impact of trait mindfulness (measured with the Five Facet Mindfulness Questionnaire, FFMQ; Baer et al., 2006) and manipulated state mindfulness (using a guided-meditation CD) on social-cognitive abilities (e.g., mental state inferences), empathy, and felt connection to others. Previous research has found trait mindfulness to be associated with more dispositional empathic concern and less personal distress (Wachs & Cordova, 2007). However, previous research has not distinguished between the five facets of mindfulness. The current study clarifies these findings by examining which facets of mindfulness predict each aspect of empathy (empathic concern, personal distress, perspective taking). In addition, this study examines both trait and state mindfulness and their ability to predict state empathic concern, personal distress, and felt connection with people in distress. To investigate whether mindfulness is associated with more accurate social perception this study uses a modified empathic accuracy paradigm to assess the amount and accuracy of mental state inferences. To further examine whether mindfulness is related to social perception ability, this study measures the ease (i.e., the proportion of trials in which participants make the inference) and speed of mental state inferences. Participants in this study watched short video clips of people performing everyday actions and stopped the tape when they inferred a goal, intention, thought, emotion, or trait. Finally, in order to assess whether mindful individuals are less judgmental of others, participants were shown sentences describing

positive and negative actions by a protagonist and they indicated whether the protagonists were to be blamed or to praised.

Study 1 Hypotheses

Each main hypothesis will be given a number. The first number represents the set of hypotheses a particular hypothesis belongs to and the second number refers to the specific hypothesis. The first set of hypotheses addresses how the dispositional measures will be related to each other. The second set of hypotheses address how dispositional mindfulness will be related to performance on the social perception tasks. The third set of hypotheses address the expected effects of the mindfulness manipulation. Exploratory hypotheses will be described at the end of this section and will not be numbered.

Predicted Relationships Among Self-reported Dispositions

Based on previous research, mindfulness should be related to dispositional empathy (1.1). Specifically, mindfulness will be positively related to empathic concern (EC) and perspective taking (PT) and negatively related to personal distress (PD). I expect the observing, describing, and acting with awareness facets to be unique predictors of EC and PT, and the nonjudging and nonreactivity facets to be uniquely related to PD (1.2).

Buddhist philosophy suggests that mindfulness promotes felt connection. Thus, mindfulness will be positively associated with individual differences in felt connection (1.3). Research on empathy suggests that felt connection will be positively associated with EC and PT (1.4).

Previous research has found that mindfulness is positively associated with openness to experience and negatively associated with neuroticism (Baer et al., 2006; Brown & Ryan, 2003). This research used the NEO-PI and NEO-FFI (Costa & McCrae, 1992) to measure personality traits. I expect to replicate these findings using the Big Five Inventory (hypothesis 1.5). Brown and Ryan (2003) found that mindfulness (measured with the MAAS) was positively related to extraversion, whereas Baer and colleagues (2006) found that the two were unrelated (on all mindfulness measures, including the MAAS). Thus, the current study will explore whether mindfulness is related to extraversion as well as whether it is related with the other two personality traits (agreeableness and conscientiousness).

Predicted Relationships Between Dispositional Mindfulness and Social Perception

Mindfulness should be associated with more felt connection to specific target persons, more state empathic concern, and less state personal distress (2.1).

Theory suggests that mindful individuals pay more attention to the present and this suggests that mindfulness will be associated with more spontaneous mental state inferences (2.2) and perhaps more accurate inferences in an empathic accuracy task (2.3). I will explore which facets are related to these outcomes as well.

Because those high in mindfulness are presumed to be more attentive to the present moment and less evaluative, I predict that mindfulness will be associated with greater ease in making inferences (2.4), faster mental state inferences (2.5), and fewer (or less extreme) blame evaluations (2.6). Specifically, the observing facet will be associated

with greater speed of mental state inferences and the nonjudging facet will be associated with less blame.

Buddhism would suggest that those who are highly mindful will also show less praise since the goal in Buddhist practice is to be less evaluative overall (2.7). However, mindful participants in this sample may not have enough experience with mindfulness meditation to reduce positive evaluations and thus, praise ratings.

The Predicted Effects of the State Mindfulness Manipulation

Previous research has shown that mindfulness meditation is associated with less negative affect and more positive affect (Brown & Ryan, 2003). Thus, I expect those in the mindfulness condition (after listening to the guided meditation) to report less negative affect and more positive affect and serenity compared to the control conditions (3.1).

Since previous research has found that dispositional mindfulness is related to dispositional empathy and felt connection, I expect state levels of these variables to be related as well (3.2). Those in the mindfulness condition will report more empathic concern and felt connection and less personal distress to the photos compared to those in the control conditions. Felt connection to the targets in the pictures may mediate the relationship between the mindfulness condition and state empathic concern (3.3).

As predicted for dispositional mindfulness, those in the mindfulness condition will make more spontaneous inferences (3.4) and be more accurate in the empathic accuracy task (3.5). In addition, those in the mindfulness condition will respond faster in the mental state inference task (3.6) and will show less extreme blame evaluations (3.7).

Exploratory Hypotheses

Are the social perception tasks (empathic concern to photographs, reaction time for mental state inferences, and empathic accuracy) positively correlated with each other suggesting that they measure similar constructs or is performance on each task essentially un-related to performance on the others?

I will also explore the relationships between self-reported empathy (measured by the IRI) and empathic accuracy, ease and speed of mental state inferences, felt connection, empathic concern, and personal distress for those in photos, and blame and praise judgments.

Method

Participants

One hundred and forty-six participants were recruited from the University of Oregon human subject pool during fall 2008 and winter 2009. They received partial course credit in exchange for their participation. Two participants were excluded from analyses because they did not read or speak English well enough (English was their second language) to comprehend the instructions or finish the tasks. Thus, $N = 144$ participants (47 men, 97 women) are included in the analyses. On average participants were 19 years old. Several participants had to leave before they completed all the tasks so the number of participants who completed each task is different. The appropriate sample sizes will be reported.

Procedure

The study was described to the participants in the consent form as a study involving self-reports of personality and several computer based tasks involving perceptions of other people. After signing informed consent participants completed a set of self-report measures. Then they were randomly assigned to either the *mindfulness condition* or one of two control conditions (*CD control* or *offset control*). Those in the *mindfulness condition* or the *CD control condition* listened to a CD for 20 minutes. The CD contained either instructions to practice mindfulness or instructions on how to reach goals and increase one's prosperity. This was followed by a short questionnaire asking participants to rate their current emotional state as well as how much attention they paid to and how well they understood the instructions they heard on the CD. Participants then completed the computer-presented social perception tasks. Those in the *offset control condition* completed the emotion questionnaire immediately after the self-report measures (without listening to any 20 minute CD) and then moved to completing the social perception tasks. The order of the social perception tasks was counterbalanced.

Measures Completed Before the Manipulation

Demographics

Participants answered questions about their gender, age, previous experience with meditation and yoga, and their perception of the benefits and difficulties of meditation.

Five Facet Mindfulness Questionnaire

The FFMQ (Baer et al., 2006) consists of 39 items that measure five mindfulness facets (i.e., observing, describing, acting with awareness, nonjudging, nonreactivity). The scale is derived from a factor analysis of the items from five different mindfulness questionnaires. The *observing* sub-scale (8 items) measures the extent to which people notice their own thoughts, feelings, and bodily sensations and it includes items such as, “I pay attention to sensations, such as the wind in my hair or sun on my face.” The *describing* sub-scale (8 items) measures how well people can describe their emotional experiences in words, for example, “I’m good at finding the words to describe my feelings”. The *acting with awareness* sub-scale (8 items) asks participants how much they complete tasks automatically such as, “When I do things, my mind wanders off and I’m easily distracted” (reverse scored). All the items on this sub-scale are reverse-scored and most come from Brown and Ryan’s (2003) Mindful Attention Awareness Scale. The *non-judging* sub-scale (8 items) measures how much people judge their own internal experiences. For example, “I make judgments about whether my thoughts are good or bad” (reverse scored). All of the non-judging items are reverse scored. The *nonreactivity* sub-scale (7 items) measures how well people can refrain from getting caught up in emotions or over-reacting and includes items such as “I perceive my feelings and emotions without getting lost in them”.

Participants indicated how true each item was for them on a five point Likert scale (1 = never or very rarely true, 5 = very often or always true). The Cronbach alpha for the total FFMQ score was .88. The sub-scales showed similar reliability (nonreactivity $\alpha =$

.78, acting with awareness $\alpha = .87$, observing $\alpha = .76$, describing $\alpha = .89$, nonjudging $\alpha = .88$).

Big 5 Inventory

The 44 item Big 5 Inventory (John & Srivastava, 1999) consists of short phrases that follow the sentence stem, “I see myself as someone who...”. Participants indicated how much they agree with each item on a 1 (disagree strongly) to 5 (agree strongly) Likert scale. There are 5 sub-scales that represent the five major facets of personality; *extraversion*, *agreeableness*, *conscientiousness*, *openness*, and *neuroticism*. The *extraversion* sub-scale contains 8 items such as, “is talkative”. The *agreeableness* sub-scales contains 9 items including, “is generally trusting”. The *conscientiousness* sub-scales has 9 items such as, “is a reliable worker”. The *openness* sub-scale has 10 items such as, “is curious about many different things”. The *neuroticism* sub-scales has 8 items such as, “worries a lot”. All five sub-scales showed good reliability in this sample: openness $\alpha = .80$, extraversion $\alpha = .88$, agreeableness $\alpha = .85$, conscientiousness $\alpha = .82$, neuroticism $\alpha = .85$.

Allo-Inclusive Identity Scale

The Allo-Inclusive Identity Scale (AIIS; Leary et al., 2008) measures the extent to which participants feel connected to various targets. Participants rated the extent to which they felt connected to 17 entities, including other people, animals, and the natural world using the Venn diagrams from the Inclusion of Other in the Self (IOS) Scale (Aron, Aron, & Smollen, 1992). The Venn diagram contains seven pairs of circles, each portraying a different degree of overlap between the “self” and “other” circles ranging

from totally separate circles (diagram 1) to almost entirely overlapping circles (diagram 7). Participants chose the pair of circles that best reflected their sense of interconnectedness with each entity. A verbal description of what each number indicated was also included in the instructions (i.e., “Diagram 1 indicates no relationship or connectedness, Diagram 4 indicates a moderate degree of connectedness, and Diagram 7 indicates complete connectedness”). Items were designed to include *close others* (“the connection between you and your best friend of the same sex”), *distant others* (“the connection between you and a stranger on a bus”), *animals* (“the connection between you and a dog”) the *natural world* (“the connection between you and universe”), and God (“the connection between you and God). However, factor analyses revealed only 2 factors: *AI people* and *AI natural world* (Leary et al., 2008). The AI total score was highly reliable with an alpha of .90. The AI natural world sub-scale also had an alpha of .90 and the AI people sub-scale had an alpha of .83.

Interpersonal Reactivity Index

The Interpersonal Reactivity Index (i.e., IRI) assesses components of empathy (Davis, 1980). Participants rated the extent to which each of 21 items described them as a person on a 1 (does not describe me very well) to 5 (describes me very well) rating scale. Although the IRI consists of four sub-scales, the current research will focus on only three of the sub-scales; *perspective taking*, *empathic concern*, and *personal distress*. Each of these sub-scales includes seven items. The *perspective taking* sub-scale measures the extent to which people report adopting the point of view of others in their daily life. It includes items such as, “Before criticizing somebody, I try to imagine how I

would feel if I were in their place.” The *empathic concern* sub-scales measures how much people experience feelings of warmth, compassion, and concern for others and includes items such as “I often have tender, concerned feelings for people less fortunate than me.” The *personal distress* sub-scale measures the tendency to experience feelings of personal discomfort in reaction to others’ emotions. It includes items such as “I sometimes feel helpless when I am in the middle of a really emotional situation.” Previous research has found that these sub-scales have adequate reliability and women tend to score higher than men (Davis, 1980, 1983). In this study the scales are also reliable (perspective taking $\alpha = .84$, empathic concern $\alpha = .77$, and personal distress $\alpha = .76$).

State Mindfulness Manipulation

Participants were randomly assigned to either the *mindfulness condition* ($n = 69$), or one of the two control conditions ($n = 75$). Participants who were assigned to be in the control conditions were either in the *CD control condition* ($n = 40$), or the *offset control condition* ($n = 35$). Assignment to condition was done in this manner in order to increase the power to detect the effect of the mindfulness condition compared to the control conditions. Participants in the *mindfulness condition* and the *CD control condition* listened to a CD for 20 minutes. In the *mindfulness condition*, participants listened to Jon Kabat-Zinn (2001) giving instructions on how to focus on breathing in the present moment. His instructions included statements such as, “simply attend to the flow of your breathing without trying to control it. And, as best as you can without any thoughts or opinions about it” (track 1). He also warned that the mind may wander and offered

instructions for how to re-focus on breathing. For example, “your mind has a life of its own...it may decide to go someplace else, maybe to the future starting to plan or worry, or the past...Every time the mind wanders, note what is on the mind and then gently bring it back to the breath” (track 1). The instructions also suggested, “Allow your field of awareness to include pleasant and unpleasant experiences and realize they are just events that will fade away. We can watch them come and go” (track 2).

In the *CD control condition*, participants listened to instructions regarding how to be successful from Jack Canfield’s (2005) audio book *The Success Principles*.

Specifically, the instructions focus on how to reach goals in one’s lives. For example, Mr. Canfield suggests reviewing goals at least twice a day and setting at least one breakthrough goal that would require you to grow. He tells listeners to, “activate the creative powers of your subconscious mind by reading your goals out loud” and “picture each goal as if it were already accomplished” and “seek out someone who has already done what you want to do and ask the person if you can interview them” (track 5).

In the *offset control condition* participants completed the emotion questionnaire described below and then immediately completed the social perception tasks. This control condition will allow us to compare the previous two conditions to what would happen without any manipulation.

Tasks Completed After the Manipulation

All participants rated their current emotional state using 23 adjectives from the PANAS-X (Watson & Clark, 1994). The adjectives included the 10-item positive affect (PA) and negative affect (NA) scales, and the serenity sub-scale (*calm, relaxed, at ease*).

These emotion scales were reliable (serenity $\alpha = .88$, NA $\alpha = .86$, PA $\alpha = .89$). Ratings were made on a 1 to 5 scale (1 = very slightly, or not at all, 5 = extremely).

Those in the mindfulness and CD control conditions also provided ratings of the extent to which they paid attention to and understood the instructions given on the CD (using a 1 to 7 scale). In addition, they were asked to describe three things that the speaker on the CD talked about. Then participants completed the three social perception tasks described below. The order of these three tasks was counterbalanced.

Empathic Concern in Response to Photographs

Participants were shown a set of five photographs--a picture of a person crying, a homeless person, a person in a negative emotional state, a person mourning, and a victorious person (presented in this order). The first four pictures (i.e., crying, homeless, negative emotion, and mourning) were chosen to represent situations in which people might feel empathic concern and/or personal distress for others. The victorious picture served to elevate participants' mood at the end of the picture task.

We created two parallel forms of this task. Some of the pictures are from the International Affective Pictures System (i.e., IAPS; Lang, Bradley, & Cuthbert, 2008) and some were selected from the internet. We used pictures from the internet in order to have similar pictures in both versions because the IAPS did not have two of each type of picture. Of the ten total photographs used in the two versions of this task, four of the photographs came from the IAPS and six came from the internet.

Participants were randomly assigned to a version of the task. Each photo was shown on the computer screen for ten seconds. After they saw each photo, participants

indicated the extent to which they felt connected to the target in the photo using the Inclusion of Others in Self scale (Aron et al., 1992). Then they rated how much they felt each of 12 emotions in response to each picture (0 = not at all, 6 = extremely). The following adjectives were used to measure empathic concern: *sympathetic, softhearted, warm, compassionate, tender, and moved*. The following adjectives were used to measure personal distress: *alarmed, upset, worried, disturbed, distressed, and troubled*. These adjectives were taken from Batson and colleagues (1987) research on distinguishing personal distress (PD) from empathic concern (EC). Across the five pictures, the scales showed good reliability: EC alphas ranged from .76 to .88; PD alphas ranged from = .89 to .93.

For analyses, EC, PD, and felt connection (FC) composites were formed by averaging scores across the four negative pictures. These composites showed adequate reliability (EC $\alpha = .71$; PD and FC α s = .81). The emotional responses to the victory picture were not included in the negative picture composites because the ratings for this picture were not as highly correlated with the other pictures and including the victory picture ratings in the composites reduced the alphas. There were no significant differences between the two versions of this task on empathic concern, personal distress, or felt connection to the negative pictures, t s < 1. The three outcome variables were related such that state empathic concern (EC) was positively related to state personal distress (PD), $r = .59, p < .001$, and state felt connection (FC), $r = .41, p < .001$. State personal distress and state felt connection were also positively correlated, $r = .33, p < .001$.

Empathic Accuracy Task

Two digital videos featuring a female target (the target was different in the two videos) were created for the empathic accuracy task. The targets in the videos gave their consent to be recorded and have the video be shown to subjects in the experiments. In the video the target described a negative interpersonal event (an argument with a sibling) for about six minutes. During the recording, a trained expert perceiver watched the target and pressed a button each time she inferred a mental state that the target person may be experiencing. The button was connected to a small LED that lit up behind the target and was recorded on the video to mark the exact time of the mental state inference.

After the video recording, the targets watched the video of themselves and stopped the video and told the experimenter every time they remembered what was going on in their minds (e.g., thinking, or feeling, seeing, etc.). During this first showing of the video, the LED was covered and the target thus marked time points of identifiable mental states entirely determined by their own experience and memory. During a second viewing, the experimenter stopped the video each time the LED was illuminated and asked the target what was on her mind at that point (i.e., when the expert perceiver had made an inference). Between the target's own and the expert perceiver's marking process, there are many moments for which the target's actual mental state is known. The content of these mental states was linked to their corresponding video time points for later comparison with participants' inferences.

In the actual experiment, participants saw one of the two videos. They watched the video clip in two 3-minute sections. In the first, spontaneous inferences were

assessed; in the second, the traditional empathic accuracy procedure (Ickes, 1997) was used for comparison. During the first 3-minute section, participants were asked to stop the video anytime they “notice or suspect or wonder about a thought or feeling or some other mental state that the person in the video is experiencing.” At each stoppage point they also indicated the specific content of that inference (e.g., “She was a little nervous”). The total number of times a given participant stopped the video will serve as a measure of spontaneous attention to another’s mind. In addition, an inference was considered a “match” and assessed for accuracy if it was within an asymmetric window of -1 second to +3 seconds of a thought or feeling from the target. Anticipation on the part of the perceiver should be pretty rare; but a slight delay would be natural. The number of matches participants made was divided by the number of inferences the target provided during those first 3 minutes in order to calculate a hit rate. This procedure yielded three variables: overall number of spontaneous inferences, hit rate of matches (i.e., the total number of matches divided by the total number of matches possible for the target they were watching), and accuracy for those inferences that did show a time match (or fell within the window described above).

After watching the video clip and stopping it on their own, participants watched the second 3 minutes and provided inferences whenever the experimenter stopped the tape — namely, at every point for which the target person’s mental state content was known. In the instances when both the target and the expert perceiver stopped the tape within four seconds of each other, the one that occurred later was used as the stoppage point. These inferences constitute a more traditional measure of empathic accuracy and

yielded only one variable, namely empathic accuracy. During this phase of the task the experimenter stopped the video 13 times for Target 1 and 16 times for Target 2.

Following standard procedures (Ickes, 1997), seven trained coders examined participants' inferred mental state contents and compared them to the target's self-reported mental state contents. Coders rated the similarity between corresponding inferences on the following scale: not similar at all (0), somewhat similar (1), very similar (2). The coders had high reliability. The alpha for the 287 matches in section 1 that were coded for accuracy was .93. The alpha for the 1894 inferences coded in section 2 was .94. The coders' ratings were averaged across coders and inferences to yield two empathic accuracy scores (one for each 3 minute video section) for each participant.

On average participants stopped the video 4.26 times (range = 0 to 11) in section 1, and the average number of matches was 2.05 (range = 0 to 7). The number of matches depends on how many times the video is stopped. Thus, a hit rate was calculated for section 1 in which the number of matches was divided by the number of times participants stopped the tape. The average hit rate was 49%.

The two target videos differed such that participants who saw target 2 ($M = 56\%$) had a higher hit rate than target 1 ($M = 43\%$), $t(138) = -3.19$, $p = .002$. In addition, participants who saw target 2 were more accurate during section 2 ($M = .67$, $SD = .19$) than those who saw target 1 ($M = .57$, $SD = .22$), $t(140) = -3.04$, $p = .003$.

Mental State Inference Tasks

Participants watched 20 short video clips (range 4-12 seconds) on the computer. Before each clip they were asked to make one of five possible inferences and stop the

video as soon as they were moderately sure they could make the inference. The inferences included whether the behavior of the actor in the video was *intentional*, whether they detected the actor's *goal*, whether they detected what the actor was *thinking*, whether they detected an *emotion*, or whether they detected a *personality* trait the actor has. There was also a reference question that asked participants whether they detected the *gender* of the actor. After training prior to seeing any videos, participants understood that each instruction to make an inference was represented by a short phrase, such as, "STOP when you notice INTENTIONAL," and they had learned that this represented the instruction "STOP the video when you see whether the behavior is intentional." Similarly, "STOP when you notice PERSONALITY" represented the instruction "STOP the video when you detect a personality trait the actor has." When watching each stimulus video, participants pressed the space bar to stop the video when they were ready to make the inference. Reaction times were measured from the beginning of the video to the stoppage point. There were also several reference questions that asked what the gender of the actor was ("STOP when you notice GENDER"). If they stopped the video before it ended, participants were asked a follow-up question regarding the content of that particular inference (e.g., "What was the person's goal?"). Participants spoke their answer aloud and the session was recorded with the program Audacity. If the participant did not stop the video by the end of the clip, they received a prompt asking if they had noticed the cue they were looking for and they responded by saying "yes" or "no" aloud.

The video stimuli were originally designed by Holbrook (2006) to depict a variety of everyday behavior, and they are available in the public domain at www.psychweb.uoregon.edu/vcarbs. Ten of the video clips were made from sentences originally designed by Hassin and used in previous research (Hassin, Aarts, & Ferguson, 2005) to be likely to elicit a goal inference (“goal-tailored” videos). The other 10 videos were designed to elicit no particular inference but to be likely to elicit any of the examined inferences (“untailored” videos). Holbrook (2006) showed that the untailored videos are indeed capable of eliciting any of the inferences, but he also showed that the goal-tailored videos show essentially the same pattern. Hence, the two sets of 10 videos together form a relatively homogenous group of videos depicting everyday behaviors.

There were five different forms of this task. Within each form, each cue was paired with two goal-tailored and two untailored videos. Across the five forms each video was paired with each cue. Participants were randomly assigned to a form. The measure of ease was simply whether the participant stopped the video to make an inference before it ended (coded as 1) or not (coded as 0). Speed was assessed as the amount of time in milliseconds that it took participants to stop the video clip and make an inference. Aggregates were formed for ease and speed variables for each of the five cues across the goal-tailored and untailored videos in order to reduce the number of variables.

Participants also worked on a second set of stimuli, 20 sentences that were between seven and eighteen words long. Ten of these sentences were positive, ten were negative, and half of each set was intentional, the other half unintentional. Participants read the sentences and immediately afterward responded to one of six questions. Four of

these questions were the same as those used with the videos (intentional, goal, personality, gender), and two constituted evaluative judgments: participants indicated whether the main character was to BLAME (if it was negative) or to PRAISE (if it was positive) for the behavior described in the sentence. Participants responded by pressing yes or no to these questions and reaction times were assessed. If the participant answered yes, they received a follow-up question asking the specific content of the inference they made. The follow-up questions for the four familiar inferences were the same as before (e.g., “What was the goal?”). However, in this task participants typed their response to the follow-up question. They were instructed to keep their answers to short. If the participant did not answer yes or no within three seconds of seeing the question cue, then they were not asked a follow-up question. For the blame and praise trials the follow-up questions asked participants to indicate on a 0 to 5 scale (0 = none and 5 = a lot) the amount of blame or praise they believed the character deserved. If participants did not answer yes or no within three seconds to the blame or praise cues, they were prompted with the question, “You didn’t indicate whether the character is to blame/praise. If you had to assign blame/praise, what number would you choose?” If participants answered no to a given question cue, they did not receive a follow-up question. There were also several “catch” trials in which participants were instructed with a DONOT cue not to respond at all.

There were five different forms of this task and participants were randomly assigned to a form. Within each form, each cue was paired with each type of sentence (positive intentional, positive unintentional, negative intentional, negative unintentional)

once, except for blame and praise cues. Blame cues were paired with two negative intentional and two negative unintentional behaviors while praise cues were paired with two positive intentional and two positive unintentional behaviors. Across the five forms each sentence was paired with each cue at least once. However, gender was always paired with control sentences.

This task produced 16 ease and 16 speed outcome variables (one for each inference type and behavior type pairing). The measure of ease was simply whether participants responded with a “yes” (coded as 1) or “no” (coded as 0) to the question cue (e.g., INTENTIONAL?). Speed was assessed as the amount of time (in milliseconds) that it took participants to say yes after they saw the question cue. Combining scores for unintentional and intentional behaviors (the different sentence types) often did not make sense. In particular, examination of the average ease of inference variables (i.e., the proportion of the participants who responded yes) revealed that participants rarely responded ‘yes’ to inferences when they read sentences about unintentional behaviors (see Table 1). Thus, analyses for this task are limited to the 8 cells involving intentional behavior types.

Results

Preliminary Analyses

To determine whether there were any differences between the two conditions in which participants listened to a CD, I conducted independent samples t-tests. There were no significant difference between the CD control condition and the mindful condition on how much attention participants paid to the CD, $t(102) = -.179, p > .85$, or on their

Table 1.
Mean ease scores for each cell of sentence task

Variable	Average ease of inference score	N
INTENTION_NI	.93	135
INTENTION_PI	.97	136
GOAL_NI	.75	126
GOAL_PI	.96	122
PERSONALITY_NI	.94	129
PERSONALITY_PI	.98	131
BLAME_NI	.77	137
PRAISE_PI	.90	139
INTENTION_NU	.12	131
INTENTION_PU	.14	127
GOAL_NU	.44	124
GOAL_PU	.48	124
PERSONALITY_NU	.46	124
PERSONALITY_PU	.29	115
BLAME_NU	.51	137
PRAISE_PU	.23	138

perceived understanding of the CD, $t(102) = 1.278, p > .20$. Means and standard deviations for all self-report variables are in Table 2.

Relationships Among Self-reported Dispositions

Previous research has shown that the five mindfulness facets load on one common factor but each also has unique variance (Baer et al., 2006, 2008). Thus, I will first examine relationships with the total mindfulness score and if those correlations are significant, then I will conduct multiple regression analyses in which all five facets are entered simultaneously to determine which facets make a unique contribution in predicting the outcomes. The full set of correlations can be found in Table 3.

Table 2.
Means and standard deviations of self-report measures

Variable	Mean	Standard deviation
Total FFMQ	3.32	.39
Nonjudging	3.46	.72
Nonreactivity	3.12	.58
Observing	3.44	.60
Describing	3.46	.67
Acting aware	3.15	.64
AIIIS total	3.50	.92
AI people	4.26	.86
AI natural	2.69	1.14
Perspective taking	3.67	.74
Empathic concern	3.95	.60
Personal distress	2.60	.65
Openness	3.61	.66
Extraversion	3.38	.87
Agreeableness	3.92	.66
Conscientiousness	3.60	.69
Neuroticism	2.91	.82

As expected in hypothesis 1.1, self-reported total mindfulness scores were related to empathy. Specifically, mindfulness was positively related to empathic concern, $r = .19$, and perspective taking, $r = .36$, and negatively related to personal distress, $r = -.35$, $ps < .05$. A regression entering all facets simultaneously found that the observing facet was the only significant predictor of empathic concern, $\beta = .31$, $p = .001$, all other betas $< .10$. A regression predicting perspective taking also found that the observing facet, $\beta = .35$, $p < .001$, and the describing facet made unique contributions, $\beta = .15$, $p = .079$ (all other β s $< .08$). A regression predicting personal distress found that the nonreactivity facet made a unique contribution to the prediction, $\beta = -.213$, $p = .027$ (all other β s $< .10$). These regressions support hypothesis 1.2 that the facets of observing and describing

Table 3.

Correlations of self-report measures (N = 140)

Variable	NJ	NR	OB	DE	AA	AI	AIP	AIN	PT	EC	PD	E	A	O	N	C
Total FFMQ	.67**	.65**	.45**	.64**	.64**	.20*	.21*	.20*	.36**	.19*	-.35**	.21*	.37**	.41**	-.59**	.50**
Nonjudging (NJ)	-	.40**	-.02	.20*	.36*	.07	.10	.08	.13	.07	-.26**	.06	.29**	.21*	-.52**	.21*
Nonreactivity (NR)		-	.34**	.13	.19*	.13	.10	.17*	.29**	.07	-.30**	-.00	.29**	.15	-.57**	.21*
Observing (OB)			-	.18*	-.03	.22*	.06	.33**	.42**	.29**	-.12	.07	.17*	.51**	-.11	.12
Describing (DE)				-	.39**	.18*	.25*	.10	.23**	.12	-.17*	.35**	.16	.31**	-.21*	.38**
Acting aware (AA)					-	.03	.13	-.03	.05	.04	-.21**	.15	.24**	.08	-.37**	.60**
AI total						-	.85**	.91**	.23**	.44**	-.07	.20*	.10	.15	.01	.14
AI people (AIP)							-	.55**	.25*	.46**	-.05	.20*	.22**	-.02	-.08	.21*
AI natural (AIN)								-	.20*	.34**	-.02	.14	.03	.26**	.06	.07
IRIPT									-	.46**	-.12	-.03	.41**	.23**	-.15	.20*
IRIEC										-	.20*	.09	.45**	.08	-.07	.18*
IRIPD											-	-.14	-.03	-.18*	.43**	-.15
Extraversion												-	.01	.21*	-.09	.17*
Agreeableness													-	.07	-.37**	.36**
Openness														-	-.14	.17*
Neuroticism															-	-.23*

Note. FFMQ = Five Facet Mindfulness Questionnaire, Nonjudging, nonreactivity, observing, describing, and acting with awareness are the 5 sub-scales (i.e., facets). AI total = average level of felt connection to others and nature. AI people = felt connection to close and distant other people. AI natural = felt connection to the natural world. IRIPT = perspective taking sub-scale from the Interpersonal Reactivity Index. IRIEC = empathic concern sub-scale from the Interpersonal Reactivity Index. IRIPD = personal distress sub-scale of the Interpersonal Reactivity Index. E = extraversion, A = agreeableness, O = openness, N = neuroticism, C = conscientiousness (from Big 5 Inventory).

* $p < .05$

** $p < .01$

are uniquely related to EC and PT and the nonreactivity facet is uniquely related to personal distress. Although I predicted that the acting with awareness facet would uniquely predict EC and PT, and the nonjudging facet would uniquely predicting personal distress, this was not supported.

In support of hypothesis 1.3 mindfulness scores were positively associated with the total score on the Allo-Inclusive Identity Scale (i.e., felt connection), $r = .20$, as well as both the people, $r = .21$, and natural world, $r = .20$, sub-scales, $ps < .05$. A regression predicting felt connection to other people from all mindfulness facets simultaneously found that describing was a unique predictor, $\beta = .24$, $p = .013$, all other $\beta s < .053$, while a regression predicting felt connection to the natural world found that the observing facet was a unique predictor, $\beta = .31$, $p = .001$, all other $\beta s < .10$. As expected in hypothesis 1.4, felt connection was also related to empathy. Specifically, total AI scores and both AI facets (people and natural world) were positively correlated with perspective taking and empathic concern and unrelated to personal distress.

In support of hypothesis 1.5, higher dispositional mindfulness scores were significantly associated with greater openness and lower neuroticism. Consistent with Brown & Ryan's (2003) finding, higher mindfulness scores were associated with greater extraversion. In addition, the current study found that higher dispositional mindfulness was associated with greater agreeableness and conscientiousness. Regression analyses were conducted entering all five mindfulness facets simultaneously to examine which facets uniquely contributed to the prediction of each of the big five traits. The facet uniquely predicting extraversion was the describing facet, $\beta = .35$, $p < .001$ (βs for all

other facets $< .07$). The nonjudging facet made a unique contribution to the prediction of agreeableness, $\beta = .18, p = .06$, but the nonreactivity, observing, and acting with awareness facets all had very similar standardized betas, (β s ranged from .119 to .144). Several facets made unique contributions to the prediction of openness to experience. Specifically, observing, $\beta = .53, p < .001$, followed by nonjudging, $\beta = .26, p = .002$, and describing, $\beta = .19, p = .011$. The only significant predictor of conscientiousness was the acting with awareness facet, $\beta = .54, p < .001$. The two facets that uniquely predicted neuroticism were nonreactivity, $\beta = -.44$, and nonjudging, $\beta = -.28, ps < .001$.

Effect of the Mindfulness Manipulation on Emotions

ANOVAs were conducted for each of the emotion scales (NA, PA, and serenity) to examine the effect of condition on emotions. As Figure 1 shows, condition influenced negative affect, $F(2, 137) = 5.39, p = .006$, such that those in the mindfulness condition ($M = 1.15, SD = .28$) experienced less negative affect than participants in the offset control ($M = 1.39, SD = .56$) and the CD control condition ($M = 1.39, SD = .482$). Condition also influenced serenity, $F(2, 137) = 5.93, p = .003$, such that those in the mindfulness condition ($M = 4.15, SD = .096$) reported more serenity after the manipulation than participants in both the CD control ($M = 3.74, SD = .12$) and the offset control condition ($M = 3.68, SD = .13$). See Figure 2. There was no significant effect of condition on positive affect, $F(2, 137) = 2.37, ps > .05$. Thus, hypothesis 3.1 was partially supported. Participants in the mindfulness condition experienced less negative emotion and more serenity, but they did not experience significantly more positive emotion.

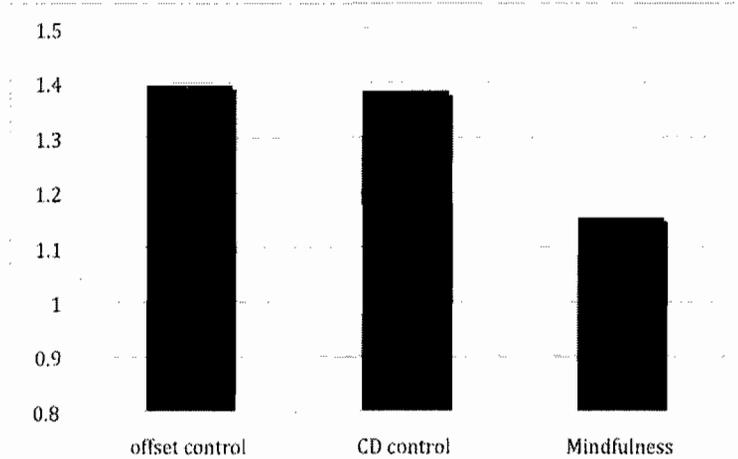


Figure 1. Condition differences in negative affect

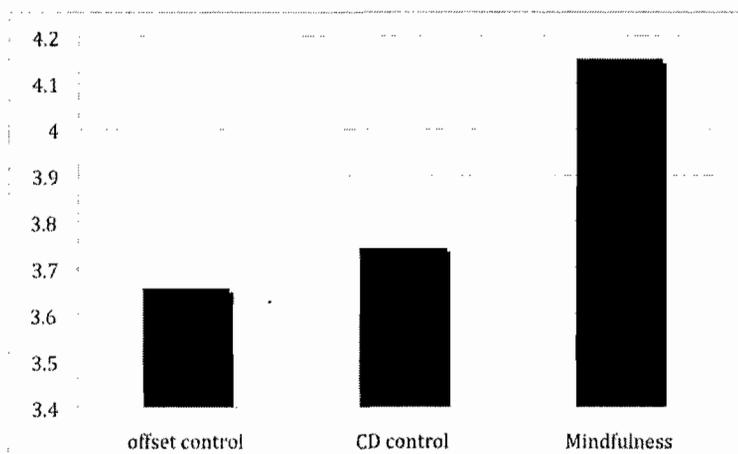


Figure 2. Condition differences in serenity

Mindfulness and the Social Perception Tasks

In the following sections I will describe how mindfulness is related to the social perception tasks. For each task I will report the correlations between dispositional mindfulness and task performance as well as the effects of the experimental mindfulness manipulation on task performance. In addition, I will report whether there was an effect

of task order (i.e., whether the task was completed first, second, or third) on task outcomes.

Empathic Concern Picture Task

There are three outcome variables for this task (state empathic concern, state personal distress, and state felt connection) that were created by averaging across the participants' scores on the four negative pictures. The correlations between these outcome variables and the dispositional measures are shown in Table 4.

Table 4.
Correlations with state empathy task (n = 133)

Dispositional variable	ECpic	PDpic	FCpic
FFMQ	.14	.01	.04
Nonjudging	.09	-.11	-.03
Nonreactivity	.02	.02	.02
Observing	.10	.04	.10
Describing	.15	.06	.09
Acting aware	.04	.03	-.03
IRIEC	.46**	.28**	.32**
IRIPD	.21*	.24**	.12
IRIPT	.26**	.13	.15
AI	.28**	.26**	.38**
AI people	.39**	.28**	.42**
AI natural	.13	.20*	.30**

Note. ECpic = empathic concern to negative pictures. PDpic = personal distress to negative pictures. FCpic = felt connection to negative pictures. FFMQ = Five Facet Mindfulness Questionnaire. AI total = average level of felt connection to others and nature. AI people = felt connection to close and distant other people. AI natural = felt connection to the natural world. IRIPT = perspective taking sub-scale from the Interpersonal Reactivity Index. IRIEC = empathic concern sub-scale from the Interpersonal Reactivity Index. IRIPD = personal distress sub-scale of the Interpersonal Reactivity Index.

* $p < .05$

** $p < .01$

Relationship with dispositional measures. The hypothesis (2.1) that dispositional mindfulness would be related to state empathic concern, personal distress, and felt connection in the picture task was not supported. As shown in Table 4, mindfulness was unrelated to the emotional response and felt connection to the negative photographs, $ps > .05$. However, dispositional levels of empathy and felt connection should be related to state levels and if so it would be important to control for these dispositional levels in subsequent analyses. Indeed, those with high dispositional empathic concern scores (from the IRI) reported more state empathic concern towards the negative photographs, $r = .46, p < .001$, and those with high dispositional personal distress scores (from the IRI) reported more personal distress in response to the negative photographs, $r = .24, p = .005$. Dispositional perspective taking was positively related to state empathic concern in response to the negative pictures, $r = .26, p = .003$, but was not significantly related to state personal distress or felt connection, $ps > .05$. More dispositional felt connection (i.e., a higher score on the Allo-Inclusive Identity Scale) was associated with greater felt connection to the people in the photos, $r = .38, p < .001$.

Effect of condition. In general the order in which participants did the picture task after the manipulation (i.e., first, second, or third) did not affect performance on the task. Specifically, there was not a significant effect of order on empathic concern, $F(2, 134) = 2.16, p = .12$, or personal distress, $F(2, 134) = .168, p > .84$. There was a marginal effect of order on felt connection, $F(2, 134) = 2.75, p = .068$, such that participants who completed the task first (i.e., immediately after the manipulation) reported higher levels of felt connection ($M = 3.52$) than those who completed the task later ($M = 3.0$), $p = .021$.

Since there was an order effect, I tested whether there was an interaction between order and condition and it was not significant, $F(4, 128) = .951, p > .40$. The following analyses control for order.

To examine the effect of the mindfulness manipulation on the emotional response to the photographs, I conducted several multiple regression analyses with controls entered in step 1 and two orthogonal contrasts to test for the effect of condition entered at step 2. The first contrast tests whether the mindfulness condition differs from the combination of both control conditions. The second contrast tests the two control conditions against each other. I also conducted follow-up nonorthogonal contrasts to determine whether the mindfulness condition differed from the offset control and whether the mindfulness condition differed from the CD control. To test these nonorthogonal contrasts using the correct error term I followed the procedure outlined by Judd, McClelland, & Ryan (2009) and ran the same regression analysis with a different set of orthogonal contrasts, namely a set that included the comparison I wanted to make (mindfulness vs. CD control or mindfulness vs. offset control). In these analyses I controlled for gender because women ($M = 3.44, SD = .97$) scored higher than men ($M = 2.86, SD = .76$) on empathic concern to the pictures, $t(135) = -3.55, p = .001$. This gender effect is also found for personal distress in response to the pictures such that women ($M = 3.14, SD = 1.08$) report more distress than men ($M = 2.74, SD = .86$), $t(135) = -2.15, p = .033$. Women also report more felt connection to the people in the negative pictures ($M = 3.34, SD = 1.21$) than men ($M = 2.86, SD = 1.06$), $t(135) = -2.26, p = .026$. I also controlled for participants'

dispositional level of these variables (empathic concern, personal distress, or felt connection) because, as described above, the dispositional and state levels are correlated.

As predicted in hypothesis 3.2, condition significantly added to the prediction of state empathic concern, over and above the effects of order, gender, and dispositional empathic concern, $R^2_{\text{change}} = .04$, $F_{\text{change}}(2, 126) = 3.39$, $p = .037$. Those in the mindfulness condition reported more empathic concern (EC) than the combination of the two control conditions, $b = .089$, $p = .068$. The follow up contrasts revealed that people in the mindfulness condition reported significantly more state EC than the CD control condition, $b = .22$, $p = .012$. However, the mindful condition did not report more state EC than the offset control condition, $b = .044$, $p > .60$. See Figure 3.

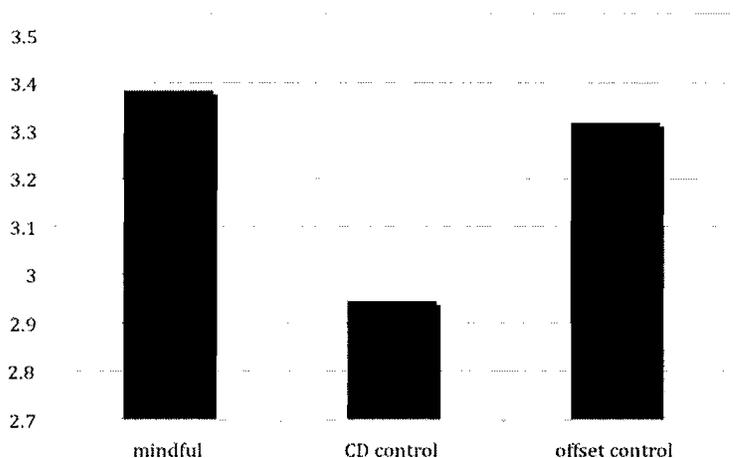


Figure 3. Differences in state empathic concern for each condition (adjusted for gender and dispositional EC)

In contrast to the prediction in hypothesis 3.2, there was no significant effect of condition on state personal distress, $R^2_{\text{change}} = .02$, $F_{\text{change}}(2, 126) = 1.469$, $p > .23$, or state felt connection (controlling for task order), $R^2_{\text{change}} = .02$, $F_{\text{change}}(2, 126) = 1.18$, $p > .31$.

Potential mediation. Since state level felt connection was hypothesized (3.3) as a mediator of the relationship between the mindful condition and state empathic concern, it was added to the model in a third step. State felt connection significantly added to the model, $R^2_{\text{change}} = .06$, $F_{\text{change}}(1, 125) = 10.75$, $p = .001$. Those who felt more connected to the people in the pictures, felt more empathic concern, $b = .21$, $p = .001$. However, the effect of condition on state empathic concern remained when controlling for felt connection to the people in the pictures. The contrast comparing the mindful condition to the average of both control conditions was still significant, $b = .10$, $p = .036$ as was the contrast comparing the mindful condition to the CD control condition, $b = .22$, $p = .01$. Thus, there is not support for the hypothesis that the effect of condition on empathic concern to the photographs is mediated by felt connection to those in the photographs.

Empathic Accuracy

There were four empathic accuracy variables: number of stops (i.e., the number of mental state inferences made) during section 1, hit rate during section 1, empathic accuracy during section 1, and empathic accuracy during section 2.

Relationship with dispositional mindfulness. Participants' total mindfulness score was not correlated with the outcome variables for this task. However, several mindfulness facets were. The describing facet was positively related to the number of inferences participants made during section 1, $r(135) = .18$, $p = .036$, suggesting that those who are better at finding words to describe their own mental states also stopped the video to make inferences of the target's thoughts and feelings more often. This supports hypothesis 2.2. In addition, high describing scores were also associated with a higher hit

rate in section 1, $r(136) = .18, p = .03$. In contrast to the prediction that mindfulness would be associated with greater empathic accuracy (hypothesis 2.3), the observing facet was negatively related to empathic accuracy during section 2, $r(136) = -.21, p = .014$, indicating that those who often observe their own experience are less accurate in their inferences of others' mental states.

Effect of condition. Before examining the effect of condition, I examined whether the order of the tasks affected task performance. There was an effect of order on the number of inferences participants made during section 1, $F(2, 139) = 3.01, p = .052$. Tukey's post hoc tests revealed that participants who completed the task last (i.e., after the other two tasks) stopped the video more ($M = 4.7$) than those who completed the task first ($M = 3.69$), $p = .04$. There was no significant difference between those who completed the task first or third and those who completed the task second ($M = 4.23$), $ps > .39$. There was no significant interaction between order and condition on the number of stops, $F(4, 133) = .314, p > .84$. Similarly, order also affected hit rate, $F(2, 139) = 2.68, p = .07$, such that those who completed the task last had a higher hit rate ($M = .15$) than those who completed the task first ($M = .11$), $p = .057$. In addition, there was an interaction between order and condition for hit rate, $F(4, 133) = 2.40, p = .053$, partial eta squared = .07. Order did not significantly affect empathic accuracy during section 1, $F(2, 126) = 1.70, p > .18$, or section 2, $F(2, 139) = .07, p > .93$. The following analyses controlled for order except for the analysis for hit rate which examines the effect of condition for those who completed the task first.

To test the effect of condition on empathic accuracy variables I conducted regressions as I did for the empathic concern task (see description above). In these analyses I controlled for which video (target) participants watched because there were differences between the two targets (see method section). I also controlled for gender because previous research has found gender differences in empathic accuracy when gender role is primed (Ickes, Gesn, & Graham, 2000; Klien & Hodges, 2001). In the current study, the empathic concern picture task may have primed gender roles for those who completed it prior to the empathic accuracy task. In fact, there was a gender difference on inferences made during section 2 of the empathic accuracy task, such that women ($M = .65$, $SD = .19$) were significantly more accurate than men ($M = .55$, $SD = .21$), $t(140) = -2.909$, $p = .004$.

Contrary to hypothesis 3.4, there was no significant effect of condition on the number of inferences participants made during section 1, $R^2_{\text{change}} = .007$, $F_{\text{change}}(2, 135) = .52$, $p > .50$. Due to the interaction between order and condition on hit rate, I examined the effect of condition for those who completed the empathic accuracy task immediately after the manipulation ($n = 45$). If the mindfulness manipulation affected hit rate, then we should see the results for those who completed the task first. The contrast comparing the mindful condition to the combination of the other two conditions was marginally significant, $b = .016$, $p = .08$, such that those in the mindfulness condition had a higher hit rate ($M = .13$) than those in the two control conditions ($M = .09$). Follow-up contrasts did not find a significant difference between the mindful condition and each of the other conditions, but the sample size was reduced in those contrasts resulting in lower power.

In fact, the two control conditions had the same average hit rate, $M = .09$ (see Figure 4).

The analysis was not conducted for those who completed the task second or third because their results may have been affected by the tasks they completed prior to the empathic accuracy task.

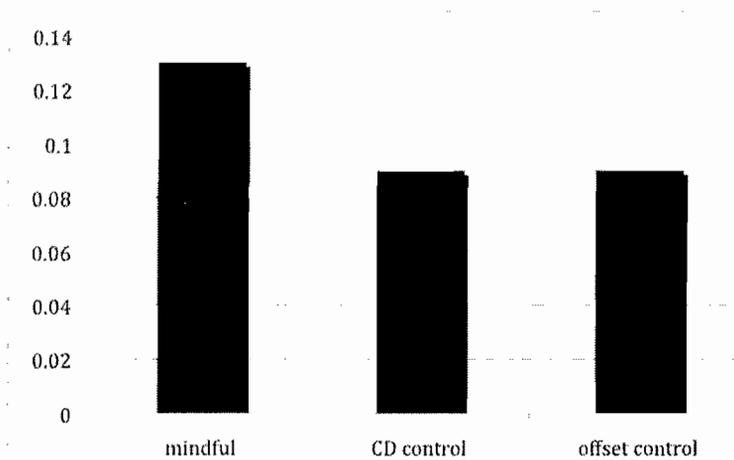


Figure 4. Average hit rate by condition for those who completed the task first

Contrary to hypothesis 3.5, those in the mindfulness condition were not more accurate than those in the other conditions. There was no significant effect of condition on empathic accuracy scores for section 1, $R^2_{\text{change}} = .002$, $F_{\text{change}}(2, 122) = .16$, $p > .80$, nor was there a significant effect on empathic accuracy scores for section 2, $R^2_{\text{change}} = .00$, $F_{\text{change}}(2, 135) = .015$, $p > .90$.

Video Mental State Inference Task

In this section I explore how mindfulness and empathy are related to the ease and speed of mental state inferences made about characters in short video clips. There are ease and speed variables for each of the five different mental state cues

(PERSONALITY, GOAL, INTENTIONAL, EMOTION, THINKING) and for the gender inferences.

Relationship with dispositional mindfulness. Dispositional mindfulness was positively related to ease of inference for emotion inferences, $r(138) = .22, p = .01$, such that those who were more mindful spotted emotions in the videos more frequently. An examination of the correlations with the mindfulness facets revealed that the ease of emotion inferences was positively related to nonreactivity, $r = .18, p = .037$, nonjudging, $r = .15, p = .07$, and acting with awareness, $r = .14, p = .096$, but not significantly related to describing or observing, $ps > .21$. Total mindfulness was not related to the ease of any other inferences. However, those who scored higher on the describing facet made personality inferences with greater ease, $r = .17, p = .046$. Correlations between ease of inference scores and mindfulness are in Table 5. Total mindfulness was not related to stoppage times for any of the inferences, $ps > .05$.

Table 5.

Correlations between mindfulness and ease of inferences in video task

Variable	Intentional	Goal	Personality	Emotion	Thinking
Total mindfulness	.11	.10	.11	.22*	.01
Nonjudging	.06	.16	.05	.15	.08
Nonreactivity	.14	.09	.04	.18*	.09
Observing	.04	-.01	.02	.09	-.04
Describing	.07	.13	.17*	.11	-.02
Acting aware	.02	-.11	.05	.14	-.07

* $p < .05$

Effect of condition. Examination of the data for outliers and missing values showed that 14 participants had no more than two valid scores on the five aggregate

stoppage variables (personality, emotion, thinking, goal, intention). They were excluded from the analyses examining stoppage latencies and ease of inference, and for the 130 participants remaining, any missing value was replaced with the sample mean. In total, 91 missing values were replaced and this was 14% of the total values.

Before testing the effect of condition, the effect of task order was examined.

There was not a significant order effect on the five ease scores, Wilks' lambda = .912, $F(10, 248) = 1.16, p > .31$, partial eta-squared = .05. There was a significant order effect on the five reaction time scores, Wilks' lambda = .817, $F(10, 234) = 2.28, p = .008$, partial eta-squared = .096, such that those who completed the task third (i.e., last) had faster reaction times for intentional and thinking inferences. Specifically, Tukey's post hoc tests revealed that those who did the task third ($M = 3491.65$) were faster making intentional inferences than those who did the task first ($M = 4444.86$), $p = .021$, and those who did the task second ($M = 4472.86$), $p = .015$. Those who did the task third also made faster thinking inferences ($M = 3666.53$) than those who did the task first ($M = 4775.64$), $p = .005$. There was not a significant interaction between condition and order on these reaction time scores, Wilks' lambda = .791, $F(20, 480) = 1.43, p > .10$, partial eta-squared = .056.

In order to test the effect of condition on the ease of mental state inferences a 5 (inference type; intentional, goal, thinking, personality, emotion) X 3 (condition) mixed MANOVA was conducted. There was neither a condition effect nor a condition by inference type interaction, Pillai's $V = .059, F(8, 250) = .959, p > .05$. However, there was an effect of inference type, Pillai's $V = .255, F(4, 124) = 10.59, p < .001$. As Figure

5 shows, the ease of responding was greater for intentional, goal, and thinking inferences than for personality and emotion cues, which did not differ from each other.

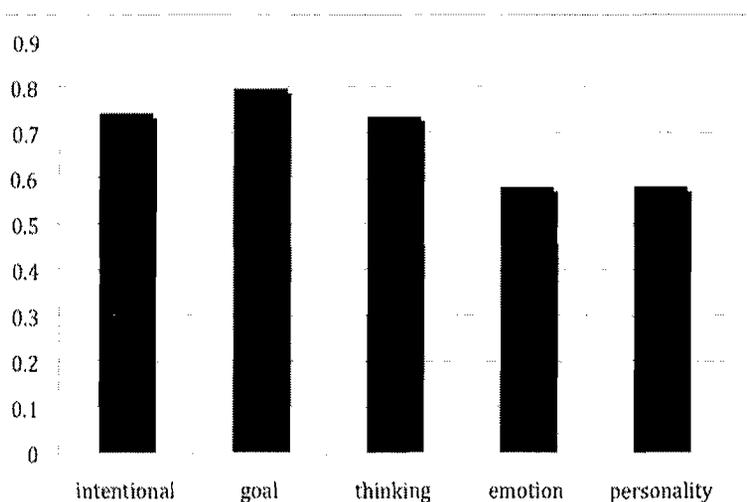


Figure 5. Average ease scores for each cue in the video task

In order to test the effect of condition on the speed of mental state inferences a 5 (inference type) X 3 (condition) mixed MANOVA was conducted. The results did not support hypothesis 3.6 that those in the mindfulness condition would make inferences more quickly. There was also no condition by inference type interaction, Pillai's $V = .02$, $F(8, 250) = .947$, $p > .90$. However, there was an effect of inference type, Pillai's $V = .08$, $F(4, 124) = 2.54$, $p = .043$, such that participants were quicker to make intentional, goal, and thinking inferences compared to emotion and personality inferences. See Figure 6.

Sentence Mental State Inference Task

As in the last section, the outcome variables for this task included the ease and speed of mental state inferences. The number of subjects is different for many of these inferences because not all participants answered yes or no for each inference

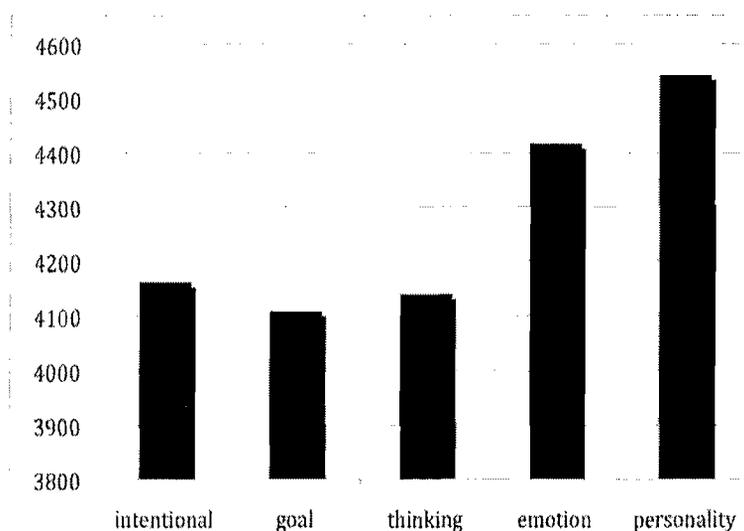


Figure 6. Average stoppage latencies for each inference type in video task

type/sentence type pairing. There were five inference types (intentional, goal, personality, blame, praise) and two sentence types (negative intentional behavior, positive intentional behavior) that are examined in this section. There were a total of eight pairings. Intentional, goal, and personality inferences were paired with both sentence types while blame was only paired with negative and praise was only paired with positive behaviors.

Relationship with dispositional mindfulness. Participants' total mindfulness score was not related to the ease or speed of making any of the mental state inferences, $ps > .05$. There were however, several mindfulness facets that related to these variables. These correlations should be considered cautiously given the number of correlations conducted (96). See Tables 6 and 7 for all the correlations between mindfulness and ease and speed scores. In line with hypothesis about blame and praise inferences, several correlations indicate that mindful participants were less likely to blame or praise a

character for their behavior. Specifically, high scores on the acting with awareness subscale was associated with less ease of making blame inferences for negative intentional behaviors, $r(132) = -.175, p = .043$, and high scores on the nonjudging facet was associated with less ease in making praise judgments for positive intentional behaviors, $r(135) = -.204, p = .017$. In contrast to the hypothesis that highly mindful participants would make mental state inferences more quickly (hypothesis 2.5), several correlations suggested that they make them more slowly. Specifically, the higher people's scores on the observing facet, the slower they were in making intentional inferences for negative intentional behaviors, $r(119) = .193, p = .034$, and the higher people's score on the acting with awareness facet, the slower they were in making goal inferences for negative intentional behaviors, $r(89) = .21, p = .045$.

When participants responded 'yes' to a blame or praise cue they were asked to make ratings indicating *how much* blame the character in the sentence deserved. Total mindfulness scores were not related to the extremity of blame or praise ratings. However, those who scored higher on the describing facet gave lower blame ratings, $r(137) = -.195, p = .021$. This is consistent with hypothesis 2.6 that highly mindful individuals would assign less blame to characters for their behavior. However, I predicted that this finding would be with the nonjudging facet, not the describing facet.

Effect of condition. To test the effect of the mindfulness manipulation on the ease and speed variables several MANOVAs were conducted. Before conducting the analyses the data were examined for outliers and for participants who had a lot of missing data. Four participants were excluded from these analyses because they had no valid response

Table 6.

Correlations between mindfulness and ease of inferences in sentence task

Variable	INT_PI	INT_NI	GOA_PI	GOA_NI	PER_PI	PER_NI	BLA_NI	PRA_PI
Total mindfulness	.00	.04	.11	-.05	.10	.07	-.05	-.11
Nonjudging	-.00	-.03	.04	-.16	.17	.02	.05	-.20*
Nonreactivity	.02	.07	.08	-.07	.11	.07	.09	-.06
Observing	-.01	.03	.06	.11	.12	.16	-.00	.14
Describing	-.04	.15	.05	-.03	-.02	.05	-.10	-.10
Acting aware	.04	-.10	.13	.02	-.07	-.06	-.18*	-.08

Note. INT = intentional inference. GOA = goal inference. PER = personality inference. BLA = blame judgment. PRA = praise judgment. PI = positive intentional behavior type. NI = negative intentional behavior type.

* $p < .05$

Table 7.

Correlations between mindfulness and speed of inferences in sentence task

Variable	INT_PI	INT_NI	GOA_PI	GOA_NI	PER_PI	PER_NI	BLA_NI	PRA_PI
Total mindfulness	.02	.11	-.09	.01	.07	-.13	.01	.04
Nonjudging	-.09	-.10	-.08	-.16	.01	-.12	-.11	.04
Nonreactivity	.06	.10	-.11	-.16	-.00	-.08	-.01	.04
Observing	-.02	.20*	-.01	.09	.05	.01	.06	-.00
Describing	.03	.11	-.06	.04	.02	-.17	.01	-.07
Acting aware	.09	.06	-.02	.21*	.13	-.04	.09	.10

Note. INT = intentional inference. GOA = goal inference. PER = personality inference. BLA = blame judgment. PRA = praise judgment. PI = positive intentional behavior type. NI = negative intentional behavior type.

* $p < .05$

latencies in five or more of the eight cells. To make the ease of inference analyses comparable, these same participants were also excluded from those analyses. Thus, the following analyses examine only intentional behaviors. Mean replacement was done in order to fill in missing reaction time data for the 139 participants who completed this task. Mean replacement was not done for low base rate variables such as unintentional behaviors. Overall, 136 missing values (12% of all values for the task) were replaced with the sample mean. The number replaced in each cell ranged from 6 for praise/positive intentional to 45 for goal/negative intentional.

Before testing the effect of condition, the effect of task order was examined. There was not a significant effect of order on the 16 ease of inference scores, Wilks' lambda = .612, $F(32, 86) = .75, p > .80$, or on the eight reaction time scores for intentional behaviors, Wilks' lambda = .895, $F(16, 258) = .92, p > .54$. The effect of task order was also not significant for blame ratings, $F(2, 140) = 1.035, p > .35$, or praise ratings, $F(2, 139) = 1.58, p > .20$. Thus, the following analyses collapse across order.

In order to examine the effect of condition on the ease of making blame judgments for negative intentional behaviors compared to other inferences, a 4 (cue; intentional, goal, personality, blame) X 3 (condition) mixed MANOVA was conducted. There was not a significant effect of condition, $F(2, 109) = 1.84, p = .16$, nor a significant condition by cue interaction, Pillai's $V = .06, F(6, 216) = 1.04, p = .40$. However, there was a significant effect of cue, Pillai's $V = .24, F(3, 107) = 11.14, p < .001$ such that intentional ($M = .92$) and personality ($M = .94$) inferences were made with more ease than goal inferences ($M = .72$), $ps < .001$. In addition, intentional and personality

inferences were made with more ease than blame inferences ($M = .78$), $ps < .001$. The ease of making goal and blame inferences did not differ, $t = -.72$, $p = .47$. See Figure 7.

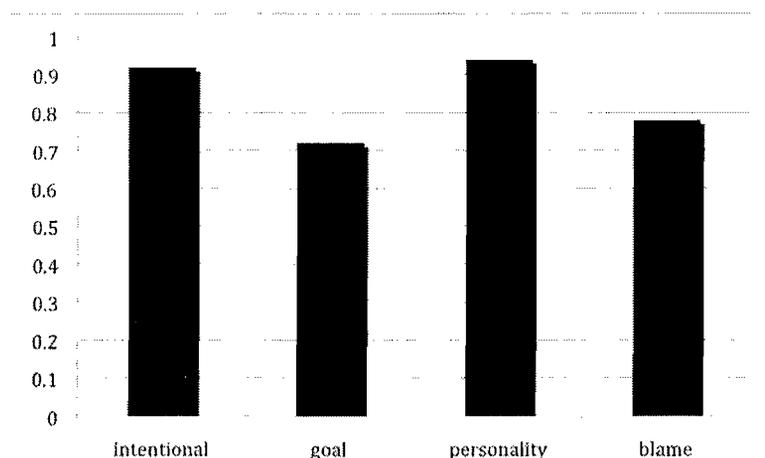


Figure 7. Average ease of inferences made for negative intentional behaviors

To examine the effect of condition on the ease of praise judgments compared to the other inferences a 4 (cue; intentional, goal, personality, praise) X 3(condition) MANOVA was conducted on the positive intentional behaviors. There was no effect of condition, $F(2, 111) = .59$, $p = .54$, and no condition by cue interaction, Pillai's $V = .06$, $F(6, 220) = 1.18$, $p = .32$. There was a marginal effect of cue, Pillai's $V = .07$, $F(3, 109) = 2.58$, $p = .057$, such that praise inferences were made with less ease ($M = .89$) than all the other inferences combined, $t = -2.65$, $p = .009$. See Figure 8.

In order to examine the effect of condition on the speed of making blame judgments compared to other inferences, a 4 (cue; intentional, goal, personality, blame) X 3 (condition) mixed MANOVA was conducted on response latencies for negative intentional behaviors. There was no effect of condition, $F(2, 136) = .34$, $p > .70$ and no cue by condition interaction, Pillai's $V = .04$, $F(6, 270) = .99$, $p > .43$. However, there

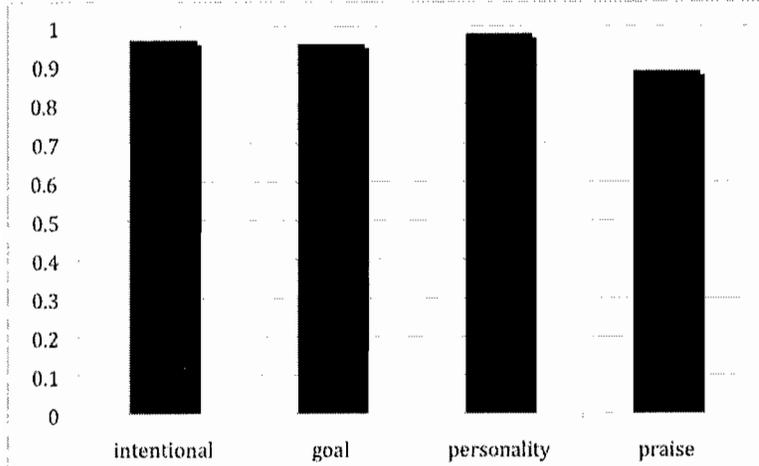


Figure 8. Average ease of inferences made for positive intentional behaviors.

was an effect of cue, Pillai's $V = .18$, $F(3, 134) = 9.74$, $p < .001$, such that goal inferences took longer to make ($M = 1765.32$) than intentionality judgments ($M = 1552.19$), $t = 4.86$, $p < .001$ (see Figure 9).

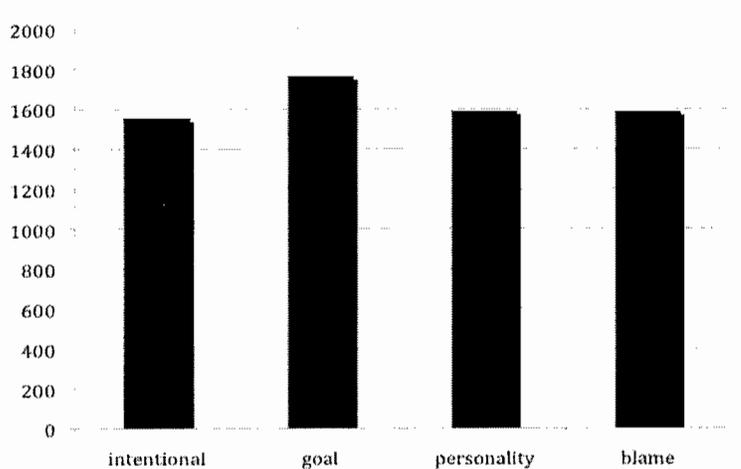


Figure 9. Average speed for inferences made for negative intentional behaviors

To examine the effect of condition on the speed of praise judgments a 4 (cue; intentional, goal, personality, praise) X 3(condition) MANOVA was conducted on the

positive intentional behaviors. There was a marginally significant effect of condition, $F(2, 136) = 2.74, p = .068$. However, difference contrasts revealed that while there was a significant difference between the two control conditions, $t = 2.34, p = .021$, the mindfulness condition was not significantly different from the control conditions, $t = -.01, p = .99$. Follow-up contrasts revealed that the mindful condition was also not significantly different from the offset control condition, $t = -1.31, p = .19$, or the CD control condition, $t = 1.37, p = .17$. There was also a significant effect of cue, Pillai's $V = .45, F(3, 134) = 37.2, p < .001$, such that goal inferences were made more slowly ($M = 1732.8$) than intentional inferences ($M = 1376.44$), $t = 7.75, p < .001$, and personality inferences ($M = 1416.32$), $t = 8.34, p < .001$. Intentional and personality inferences did not differ significantly from each other, $t < 1$. Praise inferences ($M = 1293.26$) were made faster than all other inferences, $ps < .05$. See Figure 10. There was not a significant condition by cue interaction, Pillai's $V = .05, F(6, 270) = 1.25, p = .28$.

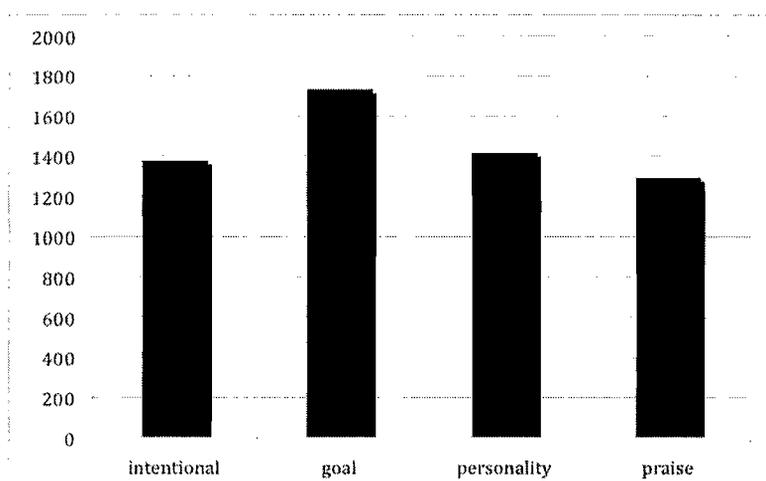


Figure 10. Average speed for inferences made for positive intentional behaviors

Contrary to hypothesis 3.7, those in the mindfulness condition did not assign significantly less blame. There was no significant effect of condition on blame, $F(2, 140) = .865, p > .42$, or praise ratings, $F(2, 139) = .544, p > .58$.

Exploratory Analyses

Relationships Among Social Perception Tasks

One of the exploratory questions was whether the performance on the social perception tasks would be related. In general performance on the tasks were unrelated. The following correlations must be interpreted cautiously because many correlations were examined.

The outcomes from the picture task were associated with outcomes from the empathic accuracy and social inference tasks. State felt connection (to those in the picture task) was positively correlated with ease of emotion inferences in the video task, $r(135) = .22, p = .01$. Thus, feeling more connected to the people in the pictures was associated with greater ease in making emotion inferences in the video inference task. State personal distress in the picture task was negatively related to the speed of praise inferences for positive intentional behaviors, $r(127) = -.25, p = .005$, indicating that those who experienced more personal distress in the picture task were quicker to make to say 'yes' for a praise cue when they read about a positive intentional behavior in the sentence social perception task. State personal distress was also negatively associated with the speed of personality inferences in the video social perception task, $r(93) = -.25, p = .015$. In addition, state empathic concern was also negatively related to the speed of personality inferences, $r(95) = -.27, p = .007$. Those who experienced more state personal distress

and empathic concern in the picture task were quicker to make personality inferences in the video social perception task.

Interestingly, empathic accuracy during section 2 of the task was positively associated with the ease of intentionality inferences in the social perception video task, $r(140) = .18, p = .037$, suggesting that people who find it easier to recognize the intentionality of behaviors in video clips are also more accurate in guessing others' thoughts and feelings.

Given the similarity of the sentence and video social inference tasks, it seems likely that ease and speed variables should correlate across the tasks. Intentional, personality, and goal inferences were made in both tasks, and there are ease and speed variables associated with each inference type. In the sentence task these inferences were made for both positive and negative behavior types. These were averaged to create a composite ease and speed scores for these three inference types in order to examine the relationship among the two tasks. Correlations between these variables can be found in Table 8.

Relationship Between Dispositional Empathy and the Social Perception Tasks

Another exploratory hypothesis was that dispositional empathy (personal distress, empathic concern, and perspective taking) would be related to the social perception tasks (i.e., pictures, empathic accuracy, social inference tasks). This is important because researchers often discuss the concept of empathy as including the perception of others' mental states, the accuracy of mental state inferences, and emotional experience in response to others.

Table 8.

Correlations between ease and speed variables present in both the video and sentence task

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. INT ease V	-	.18*	.23**	-.08	.05	-.03	-.28**	-.16	-.09	-.07	-.11	-.06
2. GOA ease V		-	.37**	-.12	-.01	-.07	.06	-.24**	-.22*	-.09	-.16	-.14
3. PER ease V			-	-.12	.08	-.09	-.10	-.32**	-.00	-.06	-.08	-.05
4. INT ease S				-	-.10	-.02	.02	-.01	.14	-.05	-.02	-.04
5. GOA ease S					-	.17*	-.12	-.04	-.04	-.07	.07	.12
6. PER ease S						-	-.07	.12	.15	-.05	-.02	-.04
7. INT speed V							-	.07	-.10	.14	.04	-.04
8. GOA speed V								-	.29**	-.06	.06	.01
9. PER speed V									-	-.05	.15	.05
10. INT speed S										-	.45**	.33**
11. GOA speed S											-	.54**
12. PER speed S												-

Note. V = video task; S = sentence task. INT = intentional inferences, GOA = goal inferences, PER = personality inferences.

* $p < .05$

** $p < .01$

As described in the section on the relationship of dispositional measures and outcomes in the picture task, dispositional empathy (i.e., the IRI scores-which are of course only self-report) was related to state empathy (empathic concern in response to pictures of people in need-also self-report). This information is in Table 4.

Consistent with other research examining the relationship between dispositional empathy and empathic accuracy (Klein & Hodges, 2001), the current study found that empathic concern was unrelated to empathic accuracy for inferences made in section 1, $r(123) = -.01, p = .94$, and for inferences made in section 2, $r(136) = .06, p = .50$.

Empathic concern was also unrelated to the number of mental state inferences participants made and their hit rate. See Table 9 for correlations involving empathic accuracy outcomes. Personal distress was also unrelated to all four empathic accuracy outcome variables. Perspective taking was not significantly related to accuracy or hit rate, but was marginally, and negatively, correlated with the number of mental state inferences participants made in section 1, $r(136) = -.16, p = .056$. The finding that higher perspective taking scores are related to making less mental state inferences for the empathic accuracy targets is similar to previous research that has found a negative correlation between perspective taking and empathic accuracy (Laurent & Hodges, 2009).

Dispositional empathy (i.e., IRI scores) was unrelated to the ease and speed of mental state inferences in the video mental state inference task, all $ps > .05$. However, dispositional empathy was associated with the speed of some inferences in the sentence task. Specifically, higher dispositional empathic concern was associated with making slower goal inferences, $r(89) = .208, p = .048$, and intentionality inferences, $r(119) =$

Table 9.
Correlations between dispositional empathy and empathic accuracy variables

Outcome	EC	PT	PD
Number of inferences	-.09	-.16*	-.07
Hit rate	.03	-.02	.04
Empathic accuracy 1	-.07	-.08	-.01
Empathic accuracy 2	-.01	-.12	.06

Note. EC, PT, and PD are sub-scales of the Interpersonal Reactivity Index. EC = empathic concern, PT = perspective taking, PD = personal distress.

* $p < .10$

.188, $p = .039$, based on negative intentional behaviors. Personal distress and perspective taking were not related to the speed of any mental state inferences, $ps > .05$. Participants self-reported empathic concern, personal distress, and perspective taking were also unrelated to blame and praise ratings, $ps > .05$.

Discussion

As predicted, mindfulness was associated with more empathy at the dispositional level. More specifically, this study found evidence that the five facets of mindfulness differentially predict different aspects of empathy. The observing facet was the strongest predictor of empathic concern and perspective taking, and the nonreactivity facet was the strongest predictor of lower levels of personal distress. Although I expected the nonreactivity facet to be related to less personal distress, I did not expect that the observing facet would be related to EC and PT because previous research has found that it predicted maladaptive outcomes (e.g., psychological symptoms, thought suppression) and related to the other facets negatively (Baer et al., 2006). In this sample, however, the observing facet was positively related to the nonreactivity and describing facets.

Consistent with theory linking mindfulness with a more inclusive self-concept, those who were more mindful tended to report greater felt connection to others and to the natural world. The describing facet was uniquely related to greater connection to other people perhaps because those who are good with finding words to describe their thoughts and feelings are better communicators and have closer relationships. Positive correlations between the describing facet and extraversion support this idea. The observing facet was uniquely related to greater connection to the natural world. Three of the items in the observing facet scale included an explicit reference to nature (i.e., feeling the physical sensations of wind and sun, hearing the sound of birds, and seeing visual elements of light in nature). I computed an observing facet score without these three items to determine whether they were driving the relationship between the observing facet and felt connection to nature. Even with the revised observing facet the relationship remained significant and positive, indicating that the correlation was not driven by the three nature related items. This suggests that a greater ability to notice bodily sensations as well as how emotions affect thoughts and behaviors (i.e., what the other items measure) is related to greater felt connection to nature.

At the state level, the manipulation of mindfulness was generally unrelated to empathy. However, this may be due to the specific manipulation used. Although the manipulation did affect emotions such that participants in the mindful condition reported more serenity and less negative affect, we cannot be certain that the manipulation actually increased mindfulness. Although several measures of state mindfulness are available,

this study did not use them because of the concern that asking about participants levels of awareness would create demand characteristics.

Despite the lack of state mindfulness effects, there were some interesting associations between dispositional mindfulness and task performance. Specifically, high scores on the nonreactivity and nonjudging facets were associated with greater ease in making emotion inferences from short video clips. This indicates that the ability to refrain from judging and reacting to one's own emotional experience may free up attention to detect emotions in others. Perhaps nonjudging and nonreactivity allow people to avoid getting caught up in their own minds and perspectives.

The describing facet of the mindfulness questionnaire was related to performance on several different tasks. High describing scores were associated with more spontaneous inferences during section 1 of the empathic accuracy task (but not greater accuracy) and greater ease in making personality inferences in the video inference task. This suggests that the ability to label one's own internal experience is linked to the amount of mental state inferences people make for others as well as the ease with which they make personality inferences. Those who scored higher on the describing facet also gave lower blame ratings in the sentence task suggesting that they may be less likely to blame others for negative behaviors.

Many researchers and contemplative teachers suggest that mindfulness practice produces short term emotional benefits, but takes time to change the way a person perceives the world. In order for mindfulness to change social perception long-term

meditation practice may be necessary. Thus, in Study 2 participants will learn and practice mindfulness meditation over the course of eight weeks.

CHAPTER III

STUDY 2

The purpose of this study is to investigate whether a mindfulness intervention increases mindfulness (on the FFMQ) and to what extent those changes lead to changes in empathy, allo-inclusive identity, and performance on various social perception tasks. Previous research has found that mindfulness increases after engaging in an eight-week mindfulness-based stress reduction course, but research has not yet shown how the five facets of mindfulness respond to mindfulness training.

Participants in the current study were college students who wanted to join a mindfulness meditation class. They were randomly assigned to take the course in either the fall academic term (i.e., the fall intervention group) or the winter academic term (i.e., the wait list control). Those in the wait list control group received the intervention during the following academic term (i.e., winter). All participants completed measures at four time points (at the beginning and end of fall term and at the beginning and end of winter term). Participants in the fall intervention group completed measures before and after taking an eight-week mindfulness training course, as well as at a 4 week follow-up and a 12 week follow-up. Participants in the wait list control group (i.e., the winter intervention group) completed time 1 and 2 measures as the control group and then completed measures before (time 3) and after (time 4) participating in the winter intervention course.

Study 2 Hypotheses

I expect to replicate the relationships between dispositional mindfulness, empathy, and allo-inclusive identity that were found in study 1 in the current study at time 1 (hypothesis 1). I will also try to replicate findings regarding the relationship among dispositional mindfulness and the social perception tasks found in study 1.

Dispositional mindfulness will be related to less perceived stress, and trait negative affect, and greater relationship satisfaction and positive affect (hypothesis 2). These relationships have been found in previous research using the MAAS to measure mindfulness (Brown & Ryan, 2003, Barnes et al., 2007). I expect that the FFMQ will relate to these variables in a similar manner.

Recent research has found that MBSR interventions increase dispositional mindfulness (Carmondy et al., 2008; Shapiro et al., 2007). Again, even though the current study uses a different measure of dispositional mindfulness (FFMQ rather than the MAAS), I expect that mindfulness will increase more for those in the intervention group than for those in the wait-list control (hypothesis 3). I will explore which facets show significant increases.

The findings are mixed as to whether mindfulness training increases empathy, but based on the correlations between dispositional mindfulness and empathy, I predict that increases in mindfulness will be associated with increases in self-reported EC and PT, and decreases in self-reported PD (hypothesis 4).

Previous research has found that mindfulness is associated with greater relatedness to others (Brown & Ryan, 2003) and a mindfulness intervention for couples

was increased their felt connection to each other (Carson et al., 2004). Meditation teachers and Buddhist scholars often describe how mindfulness meditation results in the experiential realization of interdependence, which is similar to felt connection. Thus, those who practice mindfulness and who increase in mindfulness may also increase their felt connection to others and to the world around them (hypothesis 5).

I expect the current mindfulness intervention to replicate the results found in previous research. Much previous research has found that mindfulness interventions reduce stress and negative affect and increase positive affect (Shapiro et al., 2007; Smith et al., 2007). I expect this study to replicate these effects such that the mindfulness intervention group decreases in stress and negative affect and increases in positive affect (hypothesis 6). Previous research has found that mindfulness interventions increase relationship satisfaction (Carson et al., 2004) and thus, I predict that people in the mindfulness intervention group will show significant increases in relationship satisfaction (hypothesis 7).

Researchers have claimed that mindfulness is the mechanism of change in MBSR that is responsible for the outcomes, but most studies have not examined mediational models. Several recent studies have shown that changes in mindfulness mediate changes in self-reported outcomes such as rumination (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008) and perceived stress (Nyklicek & Kuijpers, 2008). I expect changes in mindfulness to mediate the effects of the intervention (hypothesis 8). I will also examine the mediated paths from condition to changes in mindfulness to changes in empathy and felt connection.

Theory regarding how mindfulness is related to social perception suggests that the receptive attentiveness inherent in mindfulness should result in increased willingness to take interest in others' thoughts and feelings as well as an enhanced ability to attend to others' affective tone and nonverbal behavior (Brown et al., 2007). Thus, I predict that people in the mindfulness intervention group will show significant increases in their performance on the social perception tasks from pre- to post-intervention (hypothesis 9). I will examine whether changes in mindfulness mediate these increases in performance (hypothesis 10).

Those in the fall intervention group complete measures at two follow-ups during winter term. I will explore the fall intervention groups' change over time from time 1 through time 4. This will allow an examination of whether changes that result from the intervention continue 4 weeks and 12 weeks after the end of the intervention. I expect that positive changes will continue (hypothesis 11) because previous research has found continued increases after the completion of the intervention (Shapiro et al., 2008).

Previous research has found mixed results regarding whether the amount of meditation practice is associated with intervention outcomes. Some researchers find that more practice (in number of minutes) is associated with outcomes (Carson et al., 2004), while others find that the amount of practice is unrelated to outcomes (Carmondy et al., 2008; Shapiro et al., 2007). I will examine whether the number of minutes reported or the number of class sessions attended predicts changes in mindfulness and changes in the other variables (hypothesis 12).

Method

Participant Recruitment

Participants were recruited in several ways. First, flyers were posted in the dormitories prior to freshmen moving in during the fall term. Second, an announcement was posted on the University's web-based site for course activities (i.e., Blackboard). The announcement was posted on a site for Psychology majors to find out about research opportunities and degree requirements. Third, an email was sent to psychology majors. The researcher also gave a short speech about the course during her summer Motivation and Emotion course. Students were asked to email the researcher if they were interested in participating in the study in exchange for upper division psychology credits. Those who emailed and wanted to join after the deadline to add fall classes were allowed to enter the study during winter term.

Procedure

At an orientation session (Wednesday Oct. 1, 2008) during week 1 of fall term, participants were asked to complete the informed consent and time 1 measures online. After they were done with time 1 measures, participants were randomly assigned to the intervention group or wait-list control group. The intervention group attended the class sessions during fall term and the wait-list control group attended the class sessions during winter term. Participants received one credit for the term in which they did NOT attend the class sessions and two credits for the term in which they did attend them. If participants made special requests to attend the class sessions in fall or winter term these requests were granted. Thus, not every participant was randomly assigned. Whether

participants were randomly assigned or not was recorded in order to test whether there were any differences between the groups.

During the orientation session students also signed up to attend the first lab session (which included the social perception and empathy tasks) sometime during the first two weeks of fall term. Participants who are unable to attend the orientation were asked by email to come to the lab to complete the informed consent and sign up for a time 1 lab session. Then they were emailed a link to the time 1 online questionnaires. Participants came to the lab during the first two weeks and last two weeks of the fall term (before and after the eight week mindfulness training) regardless of which group they were in. All students created an anonymous ID number (either at the orientation session or when they came to sign the consent) to use for lab sign-up, keeping track of attendance and minutes practiced, and in order to match their data across computers and time.

At the end of the fall term, participants in both groups were emailed a link to a website where they completed the time 2 self-report measures. Participants in the fall intervention group signed up for time 2 lab sessions during class and participants in the wait-list control were emailed a link to an online schedule where they signed up for time 2 lab sessions. Participants were reminded to register for winter term at registration time. Participants completed the same self-report measures and lab tasks during the first 2 weeks and last two weeks of winter term in order to assess their change over time. For participants who attended the class sessions in the fall term the two winter term time points served as follow-ups and these participants were also asked additional questions

regarding whether they continued their mindfulness meditation practice after the fall class sessions ended. See Table 10.

Table 10.
Study 2 design

Group	FALL TERM		WINTER TERM	
	<i>Time 1</i>	<i>Time 2</i>	<i>Time 3</i>	<i>Time 4</i>
Fall intervention group <i>N</i> = 26	Pre-MBSR	Post-MBSR	Follow-up 1	Follow-up 2
Winter wait-list control <i>N</i> = 27	Pre-control	Post-control	Pre-MBSR	Post-MBSR
Winter only group <i>N</i> = 13	N/A	N/A	Pre-MBSR	Post-MBSR

During both terms, class sessions met once a week on Wednesday evenings for 2 and ½ hours (from 6:30 to 9pm) and students participated in the body scan meditation, mindfulness meditation practice, mindfulness exercises, and discussions about practice and mindfulness as outlined in Jon Kabat-Zinn's (1990) *Full Catastrophe Living* and *Mindfulness-Based Cognitive Therapy for Depression* (Segal, Williams, & Teasdale, 2002). The syllabus for the class is in Appendix A. A description of the class session topics and activities is in Appendix B. Due to time and space limitations the intervention did not include any yoga, nor did it include a day--long mindfulness retreat typically included in Mindfulness Based Stress Reduction programs. Participants were encouraged to practice mindfulness meditation everyday and they were provided with a CD that contained a 45-minute body scan meditation and a 20-minute guided mindfulness meditation (also called sitting meditation). Participants kept a daily log in which they recorded the amount of time (in minutes) they practiced meditation each day and any

notes about their experience (see Appendix C for an example). Class session attendance was tracked by having participants sign in on a paper with their 4 digit personal identification code. During fall term there was 1 less class session (8 instead of 9) due to Thanksgiving break. The average number of class sessions participants attended was 7 for fall term and 6.67 for winter term. The median and mode for class session attendance in both terms was 7. A newspaper article was written about the study in the University paper on the day of the 7th class session during winter term. If participants read the article, then statements about the study in the article may have created stronger demand characteristics for the time 4 measures (time 1, 2, and 3 data collections were complete before the article was printed).

Measures and Tasks

Participants completed the same self-report measures (online instead of on the computer in the lab) and social perception tasks used in study 1 at all four time points. However, the Big 5 Inventory was only assessed once (at time 3) and thus, will not be included in analyses for this study. In addition, some of the tasks were modified and several self-report measures were added. A description of each additional questionnaire and information about each task (including changes from Study 1) are presented below.

Empathic Concern Picture Task

We used four versions of the empathic concern task because there were four time points and we did not want to show participants the same stimuli at different time points. Two of the versions were the same as those in Study 1 and two of the versions were

added for use in Study 2. Each participant saw each version once, and the order of the versions was counterbalanced across the four time points.

Each of the four versions of the empathic concern task included a picture of a homeless person, a person crying, a person suffering from negative emotion, a person mourning, and a victorious person. There were 20 total pictures (5 person categories and 4 versions). As in Study 1, some of these pictures were from the International Affective Pictures System (i.e., IAPS; Lang et al., 2008) and some were found on the internet (7 from the IAPS and 13 from the internet).

Empathic Accuracy Task

For the same reasons described in the previous section, there were four targets used in the empathic accuracy task in this study (the two from Study 1 and two new target videos) and the order of the versions was counterbalanced across the four time points.

As in Study 1, during the first phase of the empathic accuracy task (the first 3 minutes of the video) participants stopped the video whenever they had a guess of the target's thought or feeling. If this inference was made within 1 second before to 3 seconds after an actual thought or feeling the target had given it was considered a "match". During the second phase (the second 3 minutes of the video) the experimenter stopped the video and asked for an inference 7 times for both the additional target videos. Occasionally (in 3.7% of the cases) participants did not provide an inference (because they 'didn't know') and these became missing data points. For each time point participants had four scores: the number of stops during section 1, the hit rate of their

matches (i.e., their total number of matches divided by the total number of matches possible for the target they were watching), accuracy on their matches from section 1, and accuracy on their inferences from section 2. On average (across targets) participants stopped the video 5.52 times at time 1, 6.2 times at time 2, 6.53 times at time 3, and 7.66 times at time 4 during section 1.

To test for differences in the readability of the targets, four coders watched the videos with a list of each target's thoughts and feelings and stoppage times. At each stoppage time they paused the video and rated how difficult the inference was to make on a 1 (not difficult/easy) to 7 (very difficult) scale. The coders rated 103 inferences for difficulty and were reliable with an alpha of .74. An ANOVA revealed that some targets were rated as more difficult than others, $F(3, 99) = 5.52, p = .002$, partial eta squared = .14. Tukey's post hoc analyses revealed that target 3 (one of the new targets in this study) was significantly more difficult to read ($M = 4.16$) than the two targets used in the previous study ($M_s = 3.14$ and 2.77), $ps < .05$.

The same trained coders ($n = 7$) that coded the empathic accuracy data from Study 1 also coded the inferences for accuracy in Study 2. Across the 4 time points in this study they rated 641 inferences from section 1 for accuracy and 2039 inferences from section 2. Their coding was highly reliable, $\alpha = .92$ and $\alpha = .93$, respectively.

Because Study 1 found gender effects on the empathic accuracy variables, I conducted independent samples t-tests on the four outcome variables. There were no significant gender effects on the number of stops participants made at any of the time points, $ps > .15$. However, women tended to stop the video more than men. Similarly,

women tended to have a higher hit rate than men, but the gender difference was only significant at time 1, $t(47) = 2.47, p = .017$ (men $M = .07$, women $M = .18$). There were some very interesting gender effects on empathic accuracy. For section 1 (when participants stopped the video when they wanted to make an inference) men tended to be more accurate than women at all four time points. Men were significantly more accurate ($M = .96$) than women ($M = .61$) on section 1 accuracy at time 1, $t(41) = -1.88, p = .068$, and at time 4, $t(44) = -1.99, p = .052$ (men $M = .76$; women $M = .52$). It is important to keep in mind that the number of men is very small (range 6 to 12). In addition, women tended to make more inferences and that could explain why their accuracy scores are lower in section 1. In section 2 (in which the experimenter stops the video at pre-determined points), women tended to be more accurate than men. Only at time 3 were women ($M = .64$) significantly more accurate than men ($M = .47$), $t(50) = 2.29, p = .026$.

Video Mental State Inference Task

At time 1, participants completed a short version (10 videos instead of 20) of the video portion of the social inference task. At time 2, they completed the full version of the video inference task (all 20 videos). Participants received the same form at both time points such that during time 2 they saw ten video and cue pairings that were identical to what they saw in the short version at time 1 and ten new video and cue pairings. This procedure was repeated during winter term. However, participants received a different form (out of the four possible ones) of the short version at time 3 and the long version at time 4 resulting in different cue-video pairing than at time 1 and 2. To make up for the smaller number of videos per inference cue in the short forms, data from time 1 and 3

were averaged across the goal-tailored and untailored stimulus videos to result in one ease and one speed composite score for each of the five inference types (intentional, goal, personality, thinking, emotion). This was justified by the similar ease and speed patterns that goal-tailored and untailored behaviors had shown in the past (Holbrook, 2006). For time 2 and time 4 composites were formed separately for the set of “old” trials (already presented in the short forms at time 1 and 3) and the set of “new” trials (not presented at time 1 and 3).

Data were examined at each time point for outliers and missing data. At time 1, seven participants were excluded from analyses because they offered so few Yes responses that they had no more than 2 valid composite latency scores (out of the 5 possible ones). The remaining 41 participants’ missing data points (27; 13% of the total sample) were replaced with the sample mean. At time 2, four participants were excluded from analyses because they had no more than four valid composite scores out of 10 (5 old and 5 new). The remaining 42 participants’ missing data points (20 old, 21 new; 9.7% of the total sample) were replaced with the sample mean. At time 3, seven participants were excluded from analyses because they had no more than two valid stoppage latencies (out of the 5 possible). The remaining 48 participants’ missing data points (23; 9.6% of the total sample) were replaced with the sample mean. At time 4, two participants were excluded from analyses because they had no more than four valid stoppage points out of ten (5 old and 5 new). The remaining 45 participants’ missing data points (23 old, 25 new; 10.7% of the total sample) were replaced with the sample mean.

For time 2, paired *t*-tests between old and new trial sets were conducted for each inference type (e.g., INTENTIONAL? in old set vs. INTENTIONAL? in new set). There were no significant differences in any ease of inference scores between the old and new trials, $ps > .10$. There was a significant difference in stoppage latencies for goal inferences such that participants were faster in responding to the new video trials ($M = 2438.41$, $SD = 1190.79$) than to the old video trials ($M = 3841.35$, $SD = 2284.63$), $t(41) = 4.98$, $p < .001$. There were no significant differences between old and new trials for any of the other inference types, $ps > .10$. Because of the similarity of data patterns, and to reduce the number of variables, old and new trials stoppage latencies were averaged together to form five composites (one for each inference type). Similarly, old and new trial ease scores were averaged to form five composites.

For time 4, paired *t* tests between old and new sets were again conducted for each inference type. No ease variables showed significant differences between old and new trials. There was a significant difference in stoppage latencies for old and new goal inference trials such that participants made goal inferences more quickly for new trials ($M = 2711.35$) than for old trials ($M = 3490.58$), $t(44) = 2.53$, $p = .015$. Participants also tended to make personality inferences more quickly for new trials ($M = 3865.69$) than for old trials ($M = 4566.7$), $t(44) = 1.98$, $p = .054$. No other differences were found for speed variables. Despite these differences, ease and speed composites for each inference type were formed by averaging across old and new trials in order to reduce the amount of data.

Sentence Mental State Inference Task

At each time point participants received a different form of the sentence task than they received at the previous time point(s). Thus, the stimuli in the sentence portion of the social inference task were presented in a different order and matched with a different cue across time points. Composites for the blame and praise extremity ratings were formed by averaging across trials and across intentional and unintentional behavior types. As in Study 1, reaction times and ease of inference scores were examined for intentional stimulus behaviors only. Thus, there were eight scores of inference type/behavior combinations: intentional/negative, intentional/positive, goal/negative, goal/positive, personality/negative, personality/positive, blame/negative, and praise/positive.

Data were examined at each time point for outliers and missing values. At time 1, three participants were excluded from analyses because they had no more than three valid stoppage latencies (out of the 8 possible). The remaining 45 participants' missing data points (42; 11.7% of the total sample) were replaced with the sample mean. At time 2, one participant was excluded from analyses because they had no more than three valid stoppage latencies (out of the 8 possible). The remaining 44 participants' missing data points (50; 14.2% of the total sample) were replaced with the sample mean. At time 3 and time 4, no participants were excluded from analyses because all participants had more than three valid stoppage latencies (out of the 8 possible). For the remaining 54 participants at time 3, missing data points (60; 13.8% of the total sample) were replaced with the sample mean; for the remaining 47 participants at time 4, missing data points (43; 11.4% of the total sample) were replaced with the sample mean.

Relationship Satisfaction

At each time point, participants rated two items of overall relationship satisfaction (in social interactions and in close relationships) on a 0 (not at all satisfied) to 7 (extremely satisfied) scale. Then they indicated their satisfaction in specific relationships: with their relationship with their mother, father, brother, sister, romantic partner, and best friend. They were able to choose a “not applicable” response for those relationships that they did not have. These ratings for specific relationships were made on an 11-point scale in which the neutral point was 0 and negative numbers below 0 indicated less satisfaction and positive numbers above 0 represented more satisfaction. Within each of the sibling items, participants were asked to average their satisfaction ratings across multiple brothers or sisters, if applicable. For example, the brother item had a note under it that said, “If you have more than one brother, try to rate how satisfied you are with them on average.”

The two overall relationship satisfaction questions were positively correlated at each time point (correlations ranged from .47 at time 1 to .71 at time 4). Thus, a composite score was calculated (alphas ranged from .64 at time 1 to .82 at time 4). The satisfaction ratings for the six specific relationships were positively correlated and thus a composite was formed as well. Appendix D shows the alphas for each self-report scale used in Study 2 at each of the four time points.

Interpersonal Support Evaluation Index

This 12 item questionnaire measures three dimensions (emotional support, belonging, and practical help) of perceived social support (Cohen, Mermelstein,

Kamarck, & Hoberman, 1985). Items include, “There is someone I can turn to for advice about handling problems with my family” and “If I was stranded 10 miles from home, there is someone I could call who could come and get me.” Participants responded on a 1 to 4 scale in which 1 was labeled “definitely false” and 4 was labeled “definitely true”. The alphas for this scale ranged from .82 (at time 4) to .88 (at time 1).

Positive Relations with Others

This seven-item questionnaire is a short version of the original 20 item sub-scale from the Psychological Well-Being Scale (Ryff, 1989). It measures the quality of an individual’s relationships in general. Specifically, it measures the extent to which people have warm and trusting relationships, have concern for others, and are capable of empathy and intimacy. The scale includes items such as “I enjoy personal and mutual conversations with family members or friends” and “Most people see me as loving and affectionate”. Participants respond on a 1 to 6 scale in which 1 is labeled “disagree strongly” and 6 is labeled “agree strongly”. Although there is disagreement over the validity of the overall 6-factor model of well-being inherent in Ryff’s Psychological Well Being Scale (see Springer, Hauser, & Freese, 2006), the seven-item sub-scale has adequate internal consistency (Abbot et al., 2006). In the current study, the alphas ranged from .75 (at time 3) to .81 (at time 4).

PANAS-X

This emotion questionnaire includes 60 adjectives that can be used to create PA (positive affect) and NA (negative affect) scales (10 items each) as well as 11 sub-scales for specific emotional states (fear, hostility, guilt, sadness, joviality, self-assurance,

attentiveness, fatigue, serenity, surprise, shyness; Watson & Clark, 1994). As in Study 1, the current study will focus on the PA, and NA, and the serenity scales. The instructions asked participants to “indicate to what extent you have felt this way during the past few weeks.” These instructions were chosen in order to capture change in emotional experience. Ratings were made on a 1 to 5 scale (1 = very slightly, or not at all, 5 = extremely). The PA and NA scales showed high internal consistency at all 4 time points with alphas ranging from .86 (PA at time 4) to .92 (NA at time 3 and 4). Alphas on the serenity scale ranged from .75 (for serenity at time 2) to .89 (for serenity at time 3). See Appendix D for all alphas.

Perceived Stress Questionnaire

Fliege and colleagues (2005) examined the factor structure of the original 30-item Perceived Stress Questionnaire (Levenstien et al., 1993) and reduced the number of factors from seven to four. This shortened version contains only 20 items. Although this scale is moderately correlated with Cohen’s Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), it is an alternative way to measure perceived stress without the emphasis on perceived control (Fliege et al., 2005). This scale also has the advantage of measuring several facets of perceived stress. The *worries*, *tension*, and *joy* sub-scales capture reactions to stress while the *demands* sub-scale captures perceived stress in the environment. Participants indicated how often each statement applied to them on a 1 (almost never) to 4 (usually) Likert scale. These items represent four sub-scales, each with five items. The *worries* sub-scale included items such as, “Your problems seem to be piling up.” The *tension* sub-scale included items such as, “You have trouble

relaxing.” The *joy* sub-scale included items such as, “You enjoy yourself.” The *demands* sub-scale included items such as, “You feel under pressure from deadlines.” The sub-scales had adequate internal consistency with alphas ranging from .77 to .91.

Results

Participant Information and Attrition

Initially 53 participants (Women = 43; Men = 10) registered to attend the class sessions (i.e., to learn mindfulness meditation) either in the fall term of 2008 ($n = 26$) or winter term of 2009 ($n = 27$). The winter-term participants served as the wait-list control condition for the fall-term intervention condition. Of the 53 registered participants, 40 were randomly assigned to one or the other condition and 13 participants made special requests, due to their class schedules, to attend the classes in fall term ($n = 3$) or winter term ($n = 10$), and these requests were granted. Participants who made these requests were different from those who were randomly assigned. Specifically, they were older and reported greater dispositional mindfulness, less stress, more positive affect, and more felt connection to nature. These differences may be due to the fact that most of these participants (9 out of 13) had done yoga and practiced meditation before.

Of the original 53 participants, two completed only the pre-test lab session or online questionnaires and then dropped the course, and one did not complete the pre-test. These three participants (two from the intervention group and one from the control group) were excluded from the analyses, leaving 50 participants (24 in the intervention group; 26 in the wait-list control group). Despite the differences between those who were randomly assigned and those who were not (as mentioned above), there were no

significant differences between the intervention and wait list control groups on any of the time 1 measures, $ps > .05$. There was also no significant difference between the intervention and control group on how willing participants were to meditate on a daily basis, $t(48) = -.58, p = .56$, suggesting that both the fall intervention ($M = 4.88$) and the wait list control group ($M = 4.65$) were willing to meditate at the beginning of the study.

For the online questionnaires 35 participants (70%) completed all four measurements (16 fall intervention, 19 wait-list control). For the lab sessions 33 participants (66%) completed all four time points (15 fall intervention, 18 wait-list control). Tables 11 (for online assessments) and 12 (for lab sessions) show the number of participants in each condition who provided data at one, two, three, or all four time points.

Table 11.

The number of time points for which participants completed online assessments

Group	All 4	3	2	1	N
Fall intervention group	16	5	2	3	26
Wait list control	19	4	3	1	27
New winter only	N/A	N/A	9	4	13

Table 12.

The number of time points for which participants completed lab sessions

Group	All 4	3	2	1	N
Fall intervention group	15	6	3	2	26
Wait list control	18	5	3	1	27
New winter only	N/A	N/A	10	1	11

Several participants ($n = 13$) joined the study during winter term. Three of these dropped the course after completing the time 3 measures (their pre-intervention measure) and were excluded from the analyses. Ten of original 13 (77%) completed both lab sessions (time 3 and 4) and nine of them (69%) completed the online questionnaires at both time points.

Preliminary Analyses

Before addressing the main hypotheses regarding whether there are mean level changes in dispositional mindfulness and the outcomes as a result of the mindfulness intervention, I examined the rank order stability. Specifically, I examined the relationship of each variable with itself over time (i.e., test re-test reliability, or stability). Appendix E shows the test re-test correlations of each measure. The two conditions are separated in the table because the correlations may be lower when correlating pre (time 1) and post (time 2) scores for the fall intervention group given that the intervention occurred during that time and targeted some of these variables. For example, correlations between mindfulness scores at time 1 and time 2 are lower for the intervention group ($r = .51$) than the control group ($r = .82$). Similarly, the correlations between time 3 and 4 are lower for the winter group (who received the intervention between time 3 and 4) than the fall group (who were completing follow-ups). The low test re-test correlations found for pre and post intervention measurements suggest that these individual differences are destabilized and thus, the rank ordering of participants in the intervention group is changing over time.

Given the small sample size in this study and the directional hypotheses (e.g., mindfulness and empathy will increase, stress will decrease), I considered all effects with p-values < .10 significant and interpreted them accordingly.

The Relationship Between Dispositional Mindfulness and Self-report Measures at Time 1

The relationships at time 1 among variables that were also in Study 1 are shown in Table 13. As was done in Study 1, I conducted a follow-up regression entering all five facets simultaneously to examine which facets uniquely predict each outcome. In general, the variables showed similar patterns to what was found in Study 1. In support of hypothesis 1, dispositional mindfulness was positively correlated with empathic concern, perspective taking, and allo-inclusive identity and negatively related to personal distress. A regression predicting perspective taking from all five mindfulness facets found that describing was the only unique predictor, $\beta = .31, p = .06$ (all other ps > .23). Personal distress was uniquely predicted by the mindfulness facets of describing, $\beta = -.33, p = .05$, and nonreactivity, $\beta = -.25, p = .09$. Empathic concern was uniquely predicted by observing, $\beta = .44, p = .004$, and describing, $\beta = .29, p = .06$. Surprisingly, nonreactivity was a negative predictor of empathic concern in this sample, $\beta = -.36, p = .01$. As found in Study 1, felt connection to the natural world was uniquely predicted by the observing facet, $\beta = .34, p = .038$ (all other facets have ps > .30). In contrast to Study 1, none of the facets predicted felt connection to other people.

The relationships between mindfulness and trait levels of positive affect and negative affect were similar to the effects of the mindfulness manipulation on emotions in Study 1. Specifically, higher mindfulness scores were related to greater positive affect

Table 13.

Correlations of self-report measures that were in Study 1 at time 1 (n = 50)

Variable	NJ	NR	OB	DE	AA	AI	AIP	AIN	PT	EC	PD
Total FFMQ	.66**	.53**	.37*	.77**	.73**	.36*	.26	.29*	.39**	.21	-.36**
Nonjudging (NJ)	-	.11	-.24	.27	.62**	.05	.21	-.07	.08	-.05	-.19
Nonreactivity (NR)		-	.22	.37**	.10	.22	.17	.18	.23	-.16	-.34*
Observing (OB)			-	.33*	.09	.36*	.03	.44**	.27	.45**	.02
Describing (DE)				-	.37*	.32*	.17	.30*	.42**	.30*	-.38**
Acting aware (AA)					-	.23	.22	.15	.27	.12	-.18
AI total						-	.65**	.87**	.21	.36*	-.07
AI people (AIP)							-	.19	.19	.20	.13
AI natural (AIN)								-	.25	.34*	-.17
IRIPT									-	.42**	-.18
IRIEC										-	-.06

Note. FFMQ = Five Facet Mindfulness Questionnaire, Nonjudging, nonreactivity, observing, describing, and acting with awareness are the 5 sub-scales (i.e., facets). AI total = average level of felt connection to others and nature. AI people = felt connection to close and distant other people. AI natural = felt connection to the natural world. IRIPT = perspective taking sub-scale from the Interpersonal Reactivity Index. IRIEC = empathic concern sub-scale from the Interpersonal Reactivity Index. IRIPD = personal distress sub-scale of the Interpersonal Reactivity Index.

* $p < .05$ ** $p < .01$

and serenity, and less negative affect (this supports hypothesis 2). The current study allows an examination of how the five facets of mindfulness might differentially predict trait emotions. A regression predicting positive affect from the five facets found that observing was the strongest unique predictor, $\beta = .43, p = .009$ (all other facets have $ps > .13$). Three facets made unique contributions to the prediction of serenity: nonjudging, $\beta = .36, p = .056$, nonreactivity, $\beta = .25, p = .09$, and observing, $\beta = .25, p = .10$. None of the mindfulness facets were significant unique predictors of negative affect ($ps > .11$), but together they explained a significant amount of the variance in negative affect (31%), $F(5, 44) = 3.89, p = .005$.

At time 1, dispositional mindfulness was also related to variables unique to study 2 such as perceived stress (see Table 14). As predicted in hypothesis 2, mindfulness was negatively related to the worries, demands, and tension sub-scales of the perceived stress questionnaire. None of the five mindfulness facets was a significant unique predictor of worries ($ps > .18$) or demands ($ps > .32$). However, the shared variance among the five facets accounted for a significant amount of variance in worries, $R^2 = .22, F(5, 44) = 2.52, p = .043$. Perceived tension was most strongly predicted by nonjudging, $\beta = -.40, p = .03$, and nonreactivity, $\beta = -.28, p = .046$ (all other facets ns, $ps > .13$). Perceived joy was also most strongly predicted by nonjudging, $\beta = .47, p = .013$, and nonreactivity, $\beta = .32, p = .028$, followed by observing, $\beta = .26, p = .096$.

As predicted in hypothesis 2, mindfulness was positively related to relationship satisfaction (both overall and relationship specific satisfaction) and positive relations with others. Table 15 shows the regression analysis predicting specific relationship

Table 14.
Correlations of mindfulness and measures unique to Study 2 at time 1 (n = 50)

Variable	Total FFMQ	NJ	NR	OB	DE	AA
Positive Affect	.29*	.05	.28*	.40**	.13	.15
Serenity	.41**	.23	.37**	.24	.32*	.12
Negative Affect	-.47**	-.46**	-.15	.11	-.35*	-.44**
PSQ worries	-.44**	-.38**	-.18	-.02	-.34*	-.36**
PSQ demands	-.38**	-.33*	-.21	-.02	-.24	-.34*
PSQ joy	.38**	.33*	.37**	.17	.16	.17
PSQ tension	-.50**	-.37**	-.39**	-.20	-.32*	-.28
ISEL	.14	.19	-.01	-.09	.08	.19
RWB-PRO	.32*	.27	.13	.07	.31*	.15
Specific rel. sat.	.28*	.16	.25	.26	.02	.27
Overall rel. sat.	.25	.30*	.16	.08	.04	.19

Note. Positive affect, Negative affect, Serenity = scales from PANAS-X. PSQ = perceived stress questionnaire. ISEL = Interpersonal Support Evaluation Index. RWB-PRO = Ryff's well-being positive relationships with others sub-scale. Specific rel. sat. = average of satisfaction ratings for all specific relationships. Overall rel. sat. = average of satisfaction with social interactions and close relationships. FFMQ = Five Facet Mindfulness Questionnaire. NJ = nonjudging. NR = nonreactivity. OB = observing. DE = describing. AA = acting with awareness.

* $p < .05$

** $p < .01$

satisfaction from all five facets of mindfulness simultaneously. Results revealed that the observing and nonreactivity facets were both strong positive predictors ($ps < .10$).

Surprisingly describing scores were negatively related to satisfaction, $\beta = -.29, p = .075$.

The only facet that was a significant unique predictor of overall relationship satisfaction was nonjudging, $\beta = .39, p = .048$ (all other facets $ps > .21$). None of the facets was a significant unique predictor of positive relations with others (all $ps > .13$). However, the shared variance among the mindfulness facets predicted this sub-scale from the Ryff well-being questionnaire.

Table 15.
Regression predicting relationship satisfaction from mindfulness facets at time 1

Variable	b	SE	β	t	p-value
Nonjudging	.24	.366	.13	.667	.508
Nonreactivity	.79	.450	.25	1.75	.086
Observing	.95	.489	.31	1.94	.058
Describing	-.61	.335	-.29	-1.82	.075
Acting aware	.67	.498	.25	1.35	.184

Note. R^2 for model = .22.

The Relationship Between Dispositional Mindfulness and Task Performance at Time 1

It is important to determine whether relationships that were found in Study 1 are replicated in the current study. Thus, correlations between dispositional mindfulness and task performance outcome variables were examined at time 1 before the fall intervention began.

In Study 1 none of the facets of mindfulness were associated with the empathic concern picture task outcomes. In the current study higher observing scores were associated with greater state empathic concern, $r(43) = .34, p = .02$, and felt connection to those in the pictures, $r(43) = .33, p = .03$. Unexpectedly, higher nonjudging scores were associated with less empathic concern, $r(43) = -.34$, and felt connection, $r(43) = -.30, ps < .05$.

There was a replication of the relationship between the describing facet and the number of inferences participants made in the empathic accuracy task. As was found in Study 1, people scoring high on the describing facet of mindfulness tended to make more spontaneous mental state inferences in section 1 of the empathic accuracy task, $r(47) = .26, p = .068$.

Also as in Study 1, higher mindfulness scores were related to greater ease in making emotion inferences in the video mental state inference task, $r(45) = .34, p = .02$. However, in this sample, it was the nonjudging facet that was significantly associated with the greater ease of emotion inferences, $r(45) = .37, p = .011$. Again replicating the results of Study 1, higher describing scores were associated with greater ease of making personality inferences, $r(45) = .41, p = .005$. Although Study 1 did not find significant associations between these facets and the speed of inferences, the current study did. Specifically, higher scores on the describing facet were associated with greater speed in making emotion inferences, $r(30) = -.50, p = .004$, and greater speed in making personality inferences, $r(33) = -.38, p = .026$. Thus, the current study found some support for hypothesis 2.5 from Study 1.

Examination of the sentence mental state inference task variables revealed that although the same outcomes were related to mindfulness, different facets of mindfulness were significant. While Study 1 found that higher nonjudging scores were associated with less ease making praise inferences, the current study found that higher observing scores were associated with less ease if making praise inferences, $r(46) = -.42, p = .003$, (nonjudging and ease of praising were unrelated, $r = .07$). In contrast to Study 1, acting with awareness scores were unrelated to the ease of blame judgments, $r = .06$. In Study 1 higher acting with awareness scores were related to slower goal inferences for negative intentional behaviors. Similarly, in this study, higher acting with awareness scores were associated with slower personality inferences for positive intentional behaviors, $r(40) = .37, p = .015$. While Study 1 found that describing scores were associated with less

extremity of blame ratings, the current study found that they were unrelated, $r = .03$. However, the current study found that higher nonjudging scores were associated with less extremity of praise ratings, $r(44) = -.30, p = .04$.

Time 1 (pre) to Time 2 (post) Change

Difference scores were created for each dependent variable (i.e., $t_2 - t_1$) in order to examine the change from pre to post intervention. Positive difference scores indicate increases over time and negative difference scores indicate decreases over time. To examine the effect of condition, I conducted regression analyses in which the condition variable was coded 0 = wait-list control and 1 = intervention. As a result, the unstandardized regression coefficients (i.e., bs) for the condition variable in each analysis below equals the intervention-caused difference in change scores for the relevant dependent variable.

Changes in Self-reported Mindfulness

The first change to examine is the change in dispositional mindfulness which represents both a manipulation check and a test of a hypothesis 3. The intervention taught mindfulness and thus, those in the intervention group should show increases in mindfulness. In fact, there was a significant effect of condition on dispositional mindfulness scores, $R^2 = .11, b = .256, p = .022, d = .69$, indicating that the intervention group reported increases in mindfulness that were greater than those in the control group (See Figure 11).

To further explore which facets of mindfulness also showed this effect, I conducted follow-up analyses (see Table 16). The describing facet was the only facet

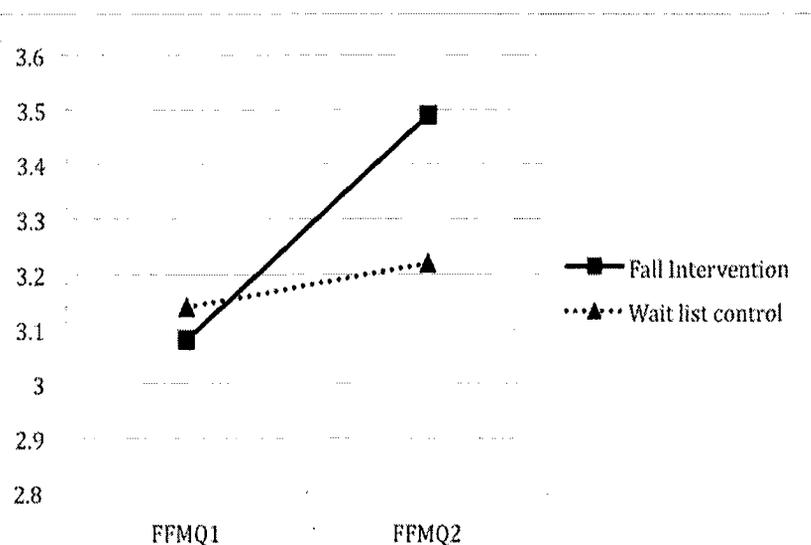


Figure 11. Changes in mindfulness by condition. FFMQ1 = Total mindfulness scores at time 1. FFMQ2 = Total mindfulness scores at time 2.

that increased significantly more for the intervention group than the wait list control. The effects of the intervention on facet change scores had a range of effect sizes (from $d = .69$ for describing to $d = .06$ for nonreactivity).

Table 16.

Average change scores and effect sizes for changes in dispositional mindfulness

	Intervention ($n = 23$)		Wait-list control ($n = 26$)	
	M(SD)	M(SD)	t	d
Total FFMQ	.355(.47)	.099(.26)	2.376*	.69
Nonjudging	.556(.91)	.261(.63)	-1.332	.39
Nonreactivity	.205(.73)	.172(.53)	-.183	.06
Observing	.327(.72)	-.001(.62)	-1.714	.49
Describing	.359(.45)	.003(.56)	-2.432*	.69
Acting aware	.329(.61)	.061(.60)	-1.544	.45

* $p < .05$

Changes in Self-reported Outcomes

Knowing that the intervention worked to increase mindfulness the next step is to determine whether the intervention worked to increase other outcomes and if so whether

the increases in mindfulness are responsible for changes in the outcomes. In the sections below I will first test the effect of condition on change scores ($t_2 - t_1$) for each outcome variable by conducting regression analyses in which condition is the predictor and the change score is the outcome. As in the previous section, unstandardized regression coefficients (bs) for condition are presented for each outcome and they equal the intervention-caused difference between the two groups' change scores on the dependent variable. For outcomes in which there is a significant effect of condition, bootstrap methods will be used to assess mediation.

Bootstrapping is a powerful technique and has been recommended for use with small sample sizes (Shrout & Bolger, 2002). Bootstrapping is a sampling procedure in which an empirical sampling distribution is formed by taking many samples from the available data. In this manner a point estimate and confidence interval are estimated. The total effect of the IV (in this case condition) on the DV is composed of the direct effect (c) and the indirect effect ($a * b$). The indirect effect is a product of two weights: the effect of the IV on M (the mediator--mindfulness) and the effect of M on the DV controlling for the effect of the IV. The indirect effect, or mediated effect, is the proportion of the total effect of condition on the outcome that can be attributed to mindfulness. Figure 12 shows the path model used to test the direct effect of condition and the indirect effect of condition on the outcome through mindfulness. Note that the effects of mindfulness and the outcome at time 1 on the time 2 measures are controlled for in this model.

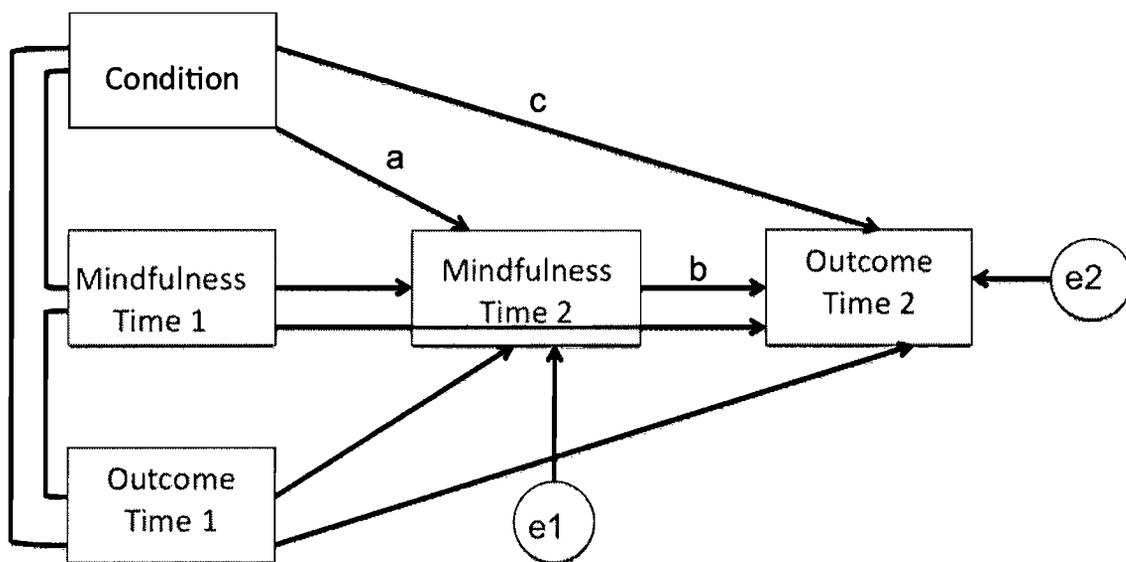


Figure 12. Path model used to test mediational models

In the current study there may not be a direct effect of the intervention on some outcomes but rather an initial effect of the intervention on mindfulness, which then led to changes in the outcomes. Shrout and Bolger (2002) suggest that in some cases researchers do not need to show that the effect of the IV on the DV is significant to test for indirect effects. Specifically, they recommend that this requirement be dropped when the effect size is expected to be small to medium, the cause is distal, and there is theoretical reason to believe that the effect is mediated. These suggestions are in contrast to more traditional mediational approaches which require the IV to be associated with the DV before a test of mediation (Baron & Kenny, 1986). The current research meets Shrout and Bolger's (2002) criteria and, thus, indirect effects are tested for hypothesized effects even when condition is initially not a significant predictor of the outcome. Table 17 shows the results of all bootstrap mediation analyses. The standardized path

coefficients are presented in both the table and in the text below. A graphic display of the proportion of the total effect of condition on the outcome that is mediated through dispositional mindfulness is shown in Figure 13 (only outcomes that showed an initial condition effect are included).

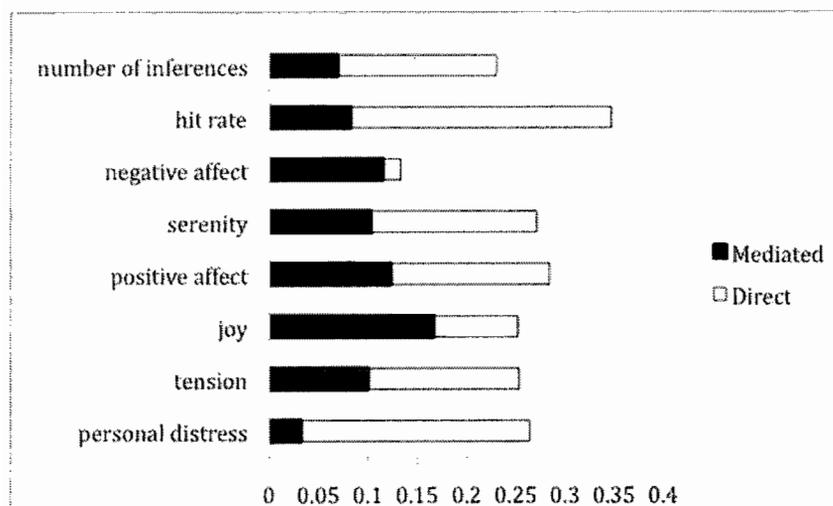


Figure 13. The proportion of the total effect that is mediated through mindfulness

Dispositional empathy. As predicted, condition significantly predicted changes in IRI personal distress scores, $b = -.36, p = .005$, such that those in the intervention group reported greater decreases in personal distress. Mediation analyses revealed that the indirect effect was not significant, $a*b = -.032, p = .13$. The direct path from condition to personal distress was significant and larger, $c = -.232, p = .075$, indicating that the effect of the intervention on decreases in personal distress was not mediated by increases in mindfulness. This does not support the mediational hypothesis (8).

Table 17.

Standardized path coefficients in mediation models

DV	IV on M a	M on DV b	Direct c	Indirect a*b	Indirect 95% CI	Total Effect
Positive Affect	.276*	.446*	.161	.123*	.019, .288	.285
Serenity	.258*	.399	.168	.103	-.030, .357	.271
Negative Affect	.292*	-.395*	-.018	-.115*	-.275, .005	-.133
PSQ tension	.250*	-.401*	-.153	-.100*	-.266, -.009	-.250
PSQ joy	.272*	.611*	.086	.166*	.037, .381	.252
IRI personal distress	.297*	-.107	-.232*	-.032	-.181, .014	-.264
IRI empathic concern	.296*	.365*	-.069	.098*	.000, .313	.029
IRI perspective taking	.248*	.301*	-.205	.075*	.000, .245	-.130
AI people	.275*	.494*	-.031	.136*	.030, .268	.105
AI natural	.289*	.304*	.060	.088*	.013, .219	.149
EA number of inferences	.268*	.256	.161	.069*	-.010, .266	.231
EA hit rate	.269*	.307	.265*	.082	-.023, .244	.347

Note. IV = Condition. M = mindfulness. Direct = the effect of condition on the DV. 95% CI = bias-corrected confidence interval. PSQ = Perceived Stress Questionnaire. IRI = Interpersonal Reactivity Index. AI people = Allo-Inclusive Identity people sub-scale. AI natural = Allo-Inclusive Identity natural world sub-scale. EA = empathic accuracy task. N = 42 for EA variables and N = 49 for all other variables.

* $p < .10$

There were no significant differences between the intervention and control groups on changes in IRI empathic concern, $b = .03$, $p = .83$, $d = .06$, or perspective taking $b = -.20$, $p = .19$, $d = .38$. The medium sized effect of condition on perspective taking may have been significant if the sample size were bigger. Interestingly, the control group showed an increase in perspective taking from time 1 ($M = 3.64$, $SD = .58$) to time 2 ($M = 3.84$, $SD = .71$) while the intervention group showed virtually no change from time 1 ($M = 3.81$, $SD = .56$) to time 2 ($M = 3.81$, $SD = .71$). Because changes in perspective taking were predicted to occur as a result of increased mindfulness (hypothesis 4), a test of the indirect effect was conducted. The indirect path from condition through mindfulness to perspective taking was significant, $a*b = .075$, $p = .052$, and the direct effect was still marginally significant and negative, $c = -.21$, $p = .102$. As seen in Table 17, the effect of mindfulness on perspective taking was positive and significant. Taken together these findings suggest that the control group showed unexpected increases in perspective taking (the direct effect) and those in the intervention condition showed increases in mindfulness and these increases in mindfulness were associated with increases in perspective taking (the indirect effect). Changes in empathic concern were also expected to result from changes in mindfulness and thus, the indirect effect was tested. Results indicated that the indirect path from condition through mindfulness to empathic concern was significant, $a*b = .098$, $p = .053$.

Allo-inclusive identity. There were no significant differences between the intervention and control groups on changes in either the people sub-scale, $b = .18$, $p = .49$, $d = .20$, or the natural world sub-scale, $b = .37$, $p = .22$, $d = .36$, of the Allo-Inclusive

Identity Scale. Although not significant, the effect was in the predicted direction (see Table 18 for means and standard deviation for each group). Examination of the means revealed that the intervention group showed increases in felt connection to other people and the natural world while the control group showed little change. These changes were predicted to occur as a result of increased mindfulness (hypothesis 5), tests of the indirect effect were conducted. The indirect effect was significant for both the people subscale, $a*b = .136, p = .009$, and the natural environment subscale, $a*b = .088, p = .03$, indicating that the effect of mindfulness training on increased felt connection is mediated through increases in dispositional mindfulness.

Table 18.

Descriptive statistics for change over time in allo-inclusive identity

	Intervention		Control	
	T1	T2	T1	T2
AI people	3.92(.88)	4.23(1.1)	3.84(.75)	4.02(.89)
AI natural world	3.18(1.2)	3.49(1.5)	2.86(1.2)	2.80(1.4)

Note. AI people = felt connection to other people, AI natural world = felt connection to natural world. T1 = time 1, T2 = time 2.

Emotion. There was a significant effect of condition on positive affect, $b = .34, p < .10, d = .49$. However, the control group reported decreases in positive affect while the intervention group reported a small increase. Mediation analyses revealed that the indirect effect of condition on positive affect through mindfulness was significant, $a*b = .123, p = .022$, while the direct effect of condition on positive affect was not, $c = .161, p = .25$. Thus, although the effect of condition in the regression may be driven by reduced positive affect in the control condition, the indirect effect suggests that increases in

mindfulness that resulted from the intervention are associated with increases in positive affect.

Examination of the PANAS serenity sub-scale revealed that the intervention group reported greater increases in serenity, $b = .49, p = .041, d = .60$, compared to the control group. The indirect effect of condition on serenity did not reach significance, $a*b = .103, p = .16$, and the direct effect of condition on serenity was no longer significant, $c = .168, p = .24$. Given that the direct effect was reduced, it is possible that there was not enough power to detect the indirect effect of condition on serenity through mindfulness. The mediational results for serenity are inconclusive.

There was also an effect of condition on negative affect, $b = -.29, p = .099, d = .48$, such that the intervention condition reported greater decreases in negative affect. This supports hypothesis 6. Mediation analyses revealed that the indirect path was significant, $a*b = -.115, p = .064$, while the direct effect of condition on negative affect was no longer significant, $c = -.018, p = .73$. These results are consistent with full mediation. Given that the regression analyses for negative affect found a direct effect of condition and this direct effect was no longer significant when taking into account the indirect effects, the conclusion that mindfulness mediates the effect of the intervention (hypothesis 8) is supported for negative affect.

Perceived stress. There was a significant effect of condition on the joy sub-scale of the Perceived Stress Questionnaire, $b = .30, p = .063, d = .54$. The intervention group increased in joy while the control group decreased. The indirect effect of condition on increased joy was also significant, $a*b = .166, p = .012$, and the remaining direct effect of

condition on joy was not significant, $c = .086, p = .51$. These results are consistent with full mediation.

There was also an effect of condition on the tension sub-scale of the PSQ such that those in the intervention condition decreased in tension, $b = -.40, p = .007, d = .81$, from time 1 ($M = 2.70, SD = .54$) to time 2 ($M = 2.32, SD = .48$) compared to the control group which showed similar levels of tension at time 1 ($M = 2.47, SD = .68$) and time 2 ($M = 2.50, SD = .62$). Mediation analyses revealed that the indirect effect of condition on decreased tension through mindfulness was significant, $a*b = -.100, p = .023$, and the remaining direct effect was not significant, $c = -.153, p = .16$.

The decreases in tension and increases in joy support hypothesis 6 and the mediation of these effects by increased mindfulness support hypothesis 8. These results are interesting given that participants completed the time 2 measures during final exams (a period of time known for high tension). There was not a significant difference between the two groups on the PSQ sub-scales for worries $b = -.13, p = .42, d = .23$. There was also not a significant difference between the groups on the PSQ demands sub-scale, $b = -.12, p = .48, d = .21$. Thus, those in the intervention group did not have fewer demands or worries than those in the control group, but they did report less tension and more joy suggesting that they handled the stress of final exams better. The results of the mediational analyses indicate that increases in mindfulness fully mediated the effect of condition on decreased tension and increased joy.

Relationship satisfaction. There was no significant effect of condition on the overall relationship satisfaction composite, $b = .26, p = .47, d = .21$, but the effect was in

the hypothesized direction. Those in the mindfulness intervention group had increases in overall relationship satisfaction, but those in the control group did as well. There was also no significant effect of condition on the specific relationship satisfaction composite, $b = -.19, p = .57, d = .17$. This effect is in the opposite direction than what was predicted. Thus, hypothesis 7 was not supported.

Changes in Task Performance

As in the previous section if there are significant effects of condition on changes in task performance, I will conduct bootstrap mediational analyses to determine whether increases in mindfulness explain the relationship.

Empathic concern picture task. There was no significant difference between the intervention and control group on changes in the state empathic concern, $b = .24, p = .38, d = .28$, but the effect was in the predicted direction such that the intervention group increased in empathic concern and the control group remained about the same. The effect of condition on changes in state personal distress did not reach significance, $b = -.47, p = .15, d = .46$, but the effect was in the predicted direction. Those in the intervention condition decreased in state personal distress from time 1 ($M = 3.36, SD = 1.25$) to time 2 ($M = 3.12, SD = 1.12$) while those in the control condition increased in state personal distress in the picture task from time 1 ($M = 2.62, SD = 1.16$) to time 2 ($M = 2.85, SD = 1.19$). There was not a significant effect of condition on changes in state felt connection, $b = -.07, p = .79, d = .08$. In conclusion, hypothesis 9 was not supported with the results from the picture task.

Empathic accuracy task. There was an effect of condition on the change in the number of mental state inferences participants made during section 1 of the empathic accuracy task (when participants were allowed to stop whenever they had a guess of the target's thoughts or feelings), $b = 2.18$, $p = .064$, $d = .55$, such that those in the intervention group had a greater increase in the number of mental state inferences they made during section 1 compared to the control group. This analysis controlled for gender and the empathic accuracy target participants saw at both time points. Neither of these control variables were significant predictors of the change in number of stops and thus, they were not included in the mediational analysis. The mediational analysis revealed a marginally significant indirect effect, $a*b = .069$, $p = .10$, and the remaining direct effect of condition on the number of inferences was not significant, $c = .161$, $p = .27$. Thus, the reason that participants in the intervention made more mental state inferences is due to their increased mindfulness.

There was also a significant effect of condition on the change in hit rate (i.e., the proportion of inferences made at times when the target had reported a thought or feeling out of the total number of thoughts and feelings the target reported), $b = .13$, $p = .007$, $d = .80$, such that those in the intervention group showed an increase in their hit rate compared to the wait-list control group. These analyses controlled for gender and for the particular target persons whom participants saw on the video at both time points. In addition, because hit rate was highly correlated with the number of mental state inferences participants made ($r = .88$ at time 1 and $r = .76$ at time 2), I conducted another regression controlling for the change in the number of mental state inferences participants

made. Condition was still a significant predictor of the change in hit rate, $b = .073$, $p = .053$, indicating that the increased hit rate for those in the intervention condition could not be explained by the increase in the number of mental state inferences they made. Next, mediational analyses examined whether the change in hit rate was due to increases in dispositional mindfulness. Neither of the original control variables (target and gender) were significant predictors of the change in hit rate, so they were not included in the mediational analysis. The indirect effect did not reach traditional significance levels (i.e., $p < .05$), $a*b = .082$, $p = .14$, but the direct effect of condition on hit rate also just missed traditional significance, $c = .27$, $p = .08$. Thus, the results of this mediational analysis were inconclusive. There may not have been enough power to decompose the effects here and it therefore remains possible that the effect of condition on hit rate is partially mediated by dispositional mindfulness. There were no significant condition effects on the changes in empathic accuracy for section 1, $b = .05$, $p = .78$, $d = .09$ or section 2, $b = -.09$, $p = .27$, $d = .35$.

In conclusion, participants in the intervention group seemed to be more attentive to the target person after the intervention in that they made more mental state inferences and a higher proportion of their inferences were made at times when the target actually had reported a thought or feeling. These findings cannot be due to general practice because the increases were greater than the increases in the wait-list control group. These findings also cannot be due to practice with a specific target because participants saw different targets at time 1 and 2, the order of the targets was randomized, and target was controlled for in the analyses. However, the intervention groups' increase in the number

of inferences and their hit rate did not translate into more accurate mental state inferences.

Video mental state inference task. To determine whether the intervention affected the ease of mental state inferences, a 5 (inference type) X 2(time) X 2 (condition) mixed MANOVA was conducted. There was an effect of time, $F(1, 36) = 16.08, p < .001$, such that inferences were made with more ease at time 2 compared to time 1. There was not a significant condition by time effect, $F(1, 36) = 1.31, p = .26$, nor a significant 3 way interaction, Pillai's $V = .14, F(4, 33) = 1.38, p = .26$. Follow-up analyses were conducted in which each inference type was examined separately. Results indicated that intentional and goal inferences were made with more ease at time 2. However, there was no effect of time on emotion and thinking inferences. There was an interaction between condition and time for personality inferences, $F(1, 36) = 4.23, p = .047$, such that the control group made the inferences with more ease at time 2 whereas the intervention group made these inferences with less ease at time 2.

To test the effect of the intervention on changes in stoppage times for mental state inferences, a 5 (inference type) X 2(time) X 2 (condition) mixed MANOVA was conducted. There was a significant effect of time, $F(1, 32) = 19.06, p < .001$ such that on average participants were faster at time 2 compared to time 1. There was also significant condition by time interaction, $F(1, 32) = 8.6, p = .006$. As shown in Figure 14, the control group showed a greater decrease in reaction time than the intervention group. However, the control group was also slower at time 1 than the intervention group. There was not an interaction between condition, time, and inference type. When each

inference type was examined individually there were condition by time interactions for emotion inferences, $F(1, 32) = 5.93, p = .021$, goal inferences, $F(1, 36) = 6.69, p = .014$, and personality inferences, $F(1, 32) = 5.82, p = .022$. All of these interactions showed greater decreases in reaction time for the control group than the intervention group. There was not a condition by time interaction for intentional or thinking inferences, indicating that participants in both groups showed similar increases in speed for these inferences.

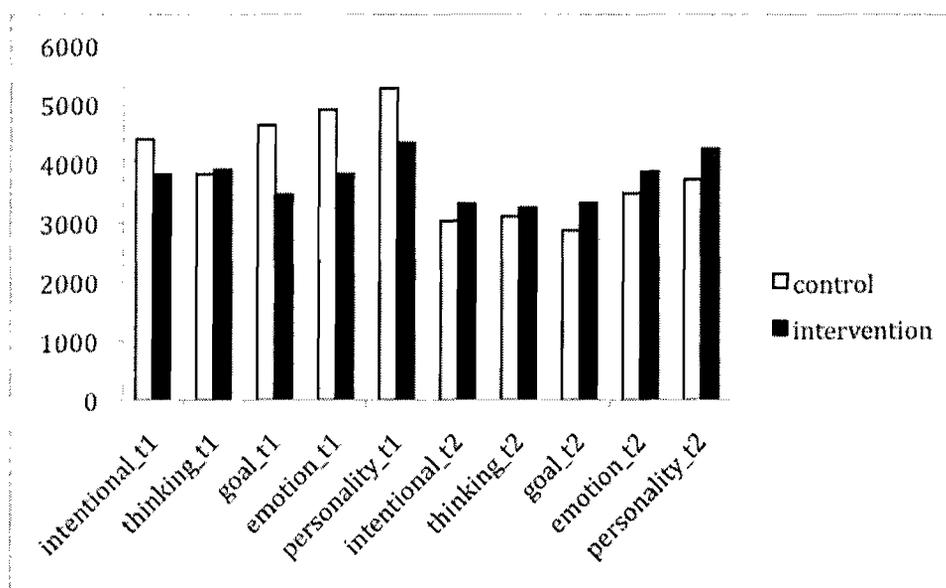


Figure 14. Change in stoppage latencies from pre to post-intervention for video mental state inference task

Sentence mental state inference task. To examine the change in ease of inferences for negative intentional behaviors, I conducted a 4 (inference type: intentionality, goal, personality, blame) X 2 (time) X 2 (condition) mixed Manova. There was no significant effect of time, $F(1, 22) = .49, p = .49$, nor a condition by time interaction, $F(1, 22) = .04$,

$p = .83$, nor a 3-way interaction, Pillai's $V = .03$, $F(3, 20) = .18$, $p = .90$. To examine the change in the speed of inferences for negative intentional behaviors, I conducted a 4 (inference type) X 2 (time) X 2 (condition) MANOVA. There was not a significant effect of time, $F(1, 39) = .35$, $p = .55$, nor a condition by time interaction, $F(1, 39) = .00$, $p = .98$, nor a 3 way interaction, Pillai's $V = .04$, $F(3, 37) = .49$, $p = .69$. However, there was an interaction between inference type and time, Pillai's $V = .18$, $F(3, 37) = 2.73$, $p = .057$. Participants took longer to make personality inferences for negative intentional behaviors and were faster to make goal and intentionality inferences.

There was no significant effect of time nor a condition by time interaction on the ease of inferences for positive intentional behaviors, $F_s(1, 33) = .36$, $p_s = .55$. There was also no significant 3--way interaction, Pillai's $V = .09$, $F(3, 31) = 1.04$, $p = .39$. There was also no significant effect of time, $F(1, 39) = .98$, $p = .33$, nor a condition by time interaction, $F(1, 39) = 1.86$, $p = .18$, on the speed of inferences made for positive intentional behaviors.

On average blame and praise ratings decreased significantly from time 1 to time 2. However, there was no significant difference in this decrease between the two groups. Condition was not a significant predictor of the change in blame, $b = -.30$, $p > .50$, or praise, $b = -.13$, $p > .76$, ratings.

Time 1 to Time 4: Trends Among Fall Intervention Group

In order to examine whether the changes that occurred within the intervention group from time 1 to time 2 continued and/or leveled off (hypothesis 11), a trend analysis was conducted with data from all four time points (pre, post, 4 week follow up, 12 week

follow up). Only participants who were in the fall intervention and completed all four time points were included ($N = 16$). To be conservative only variables that had significant condition effects were examined for linear and quadratic trends. I expected continued linear change, but it is likely that in some cases the linear change will be accompanied by a quadratic trend indicating that the change levels off. I did not expect any cubic trends, nor were any of them significant in the analyses described below.

There was a significant linear trend for dispositional mindfulness such that mindfulness increased over time, $t = 3.03, p = .008$. In addition, the quadratic contrast revealed that increases in mindfulness leveled off, $t = -2.95, p = .009$. Examination of the means (see Figure 15) reveals that there is a slight decrease in mindfulness from time 3 to time 4. The multivariate effect of time on total mindfulness scores, Pillai's $V = .52, F(3, 13) = 4.78, p = .019$, was also significant, and examination of the discriminant function coefficients revealed that the quadratic component ($dfc = -.767$) contributed slightly more to the effect of time than the linear component ($dfc = .597$). The nonreactivity, nonjudging, describing, and acting with awareness mindfulness facets showed the same pattern of results in that they had both significant linear and quadratic effects indicating that the linear increases leveled off.

The linear contrast for IRI personal distress scores indicated that personal distress decreased over time, $t = -2.53, p = .023$, and the quadratic contrast indicated that this decrease leveled off, $t = 2.93, p = .01$ (see Figure 16). In Figure 16 it is clear that the control group also decreased in personal distress during the first several time points. The multivariate time effect was also significant, Pillai's $V = .59, F(3, 13) = 6.3, p = .007$, and

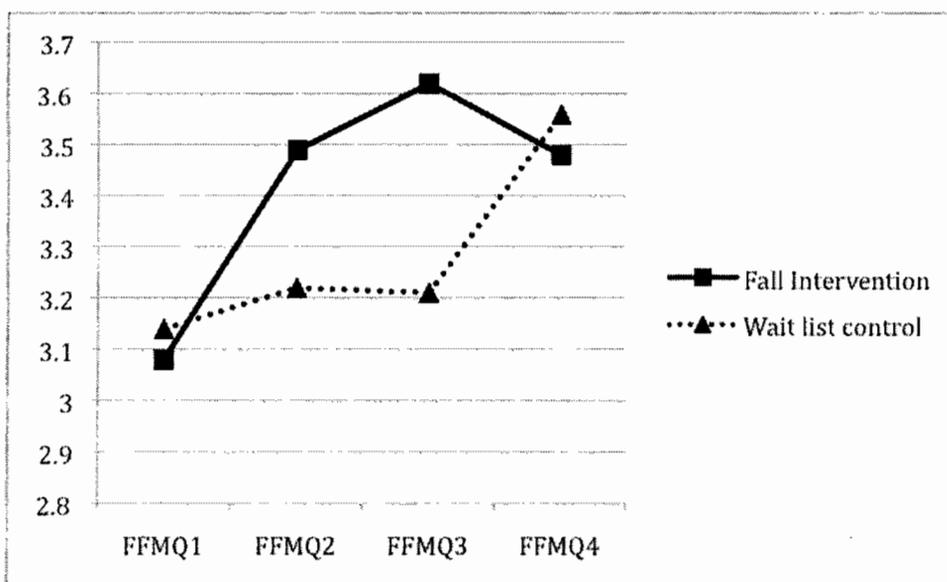


Figure 15. Mindfulness trend over time for participants who completed all four time points. $N = 16$ for fall intervention group and $N = 19$ for wait list control. The waitlist control line is in the graph for comparison purposes.

the discriminant function coefficients revealed that the linear component ($dfc = .750$) the quadratic component ($dfc = -.844$) contributed similarly to the effect of time.

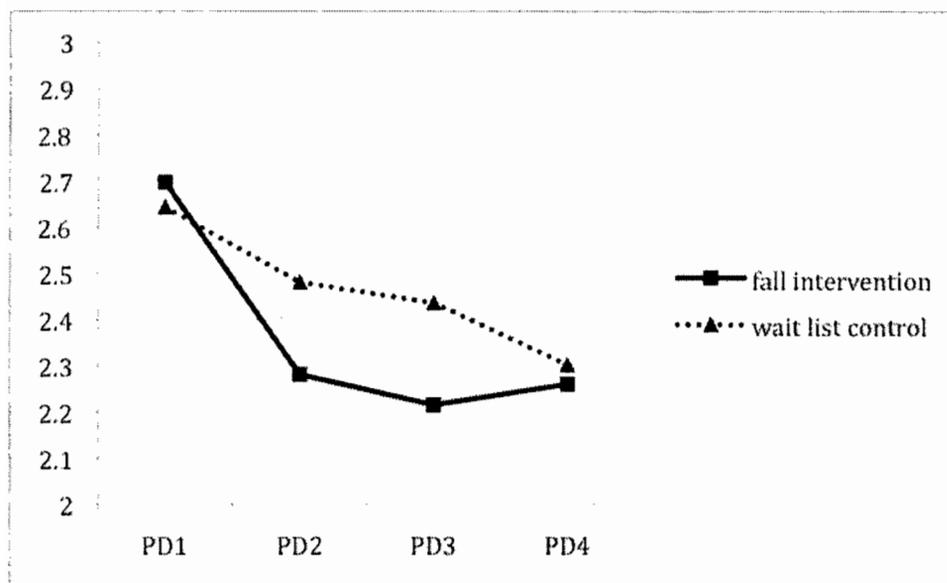


Figure 16. Trend over all four times for IRI personal distress scores

There were no significant linear or quadratic trends for positive affect or negative affect. However, participants in the fall intervention group experienced increases in serenity over time, $t = 2.35, p = .033$. The quadratic trend was not significant, $t = -1.56, p = .14$, but examination of the means suggests that the increases level off after time 3. See Figure 17.

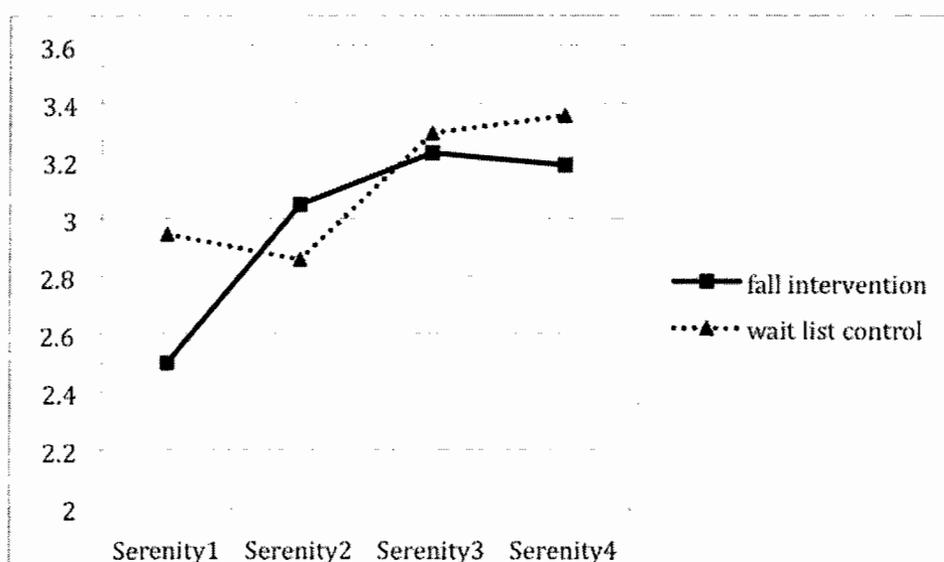


Figure 17. Trend over all four time points for serenity.

There was a significant linear trend for tension (from the Perceived Stress Questionnaire), $t = -3.23, p = .006$, such that tension decreased over time. However, there was also a significant quadratic trend, $t = 2.75, p = .015$, suggesting that the decrease in tension leveled off. Figure 18 shows that tension continues to decrease for those in the intervention group from time 2 to 3, but there is no additional decrease from time 3 to 4. The multivariate effect of time was significant, Pillai's $V = .45, F(3, 13) = 3.59, p = .044$, and examination of the discriminant function coefficients revealed that the

linear component ($dfc = .824$) contributed more to the effect of time than the quadratic ($dfc = -.358$).

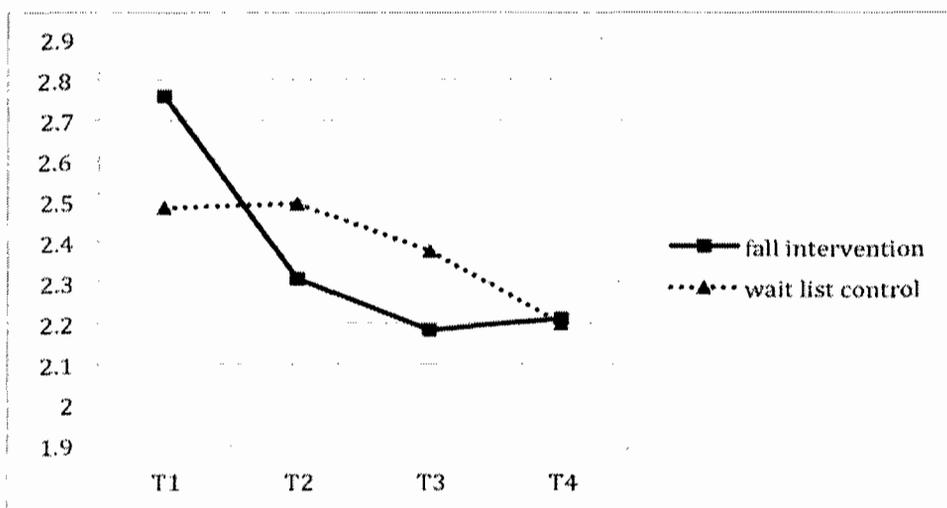


Figure 18. Trend over all four time points for tension scores.

The joy sub-scale of the Perceived Stress Questionnaire also showed a significant linear trend, $t = 2.88$, $p = .012$, such that joy increased over time for the intervention group. The quadratic trend was not significant, $p > .10$. See Figure 19.

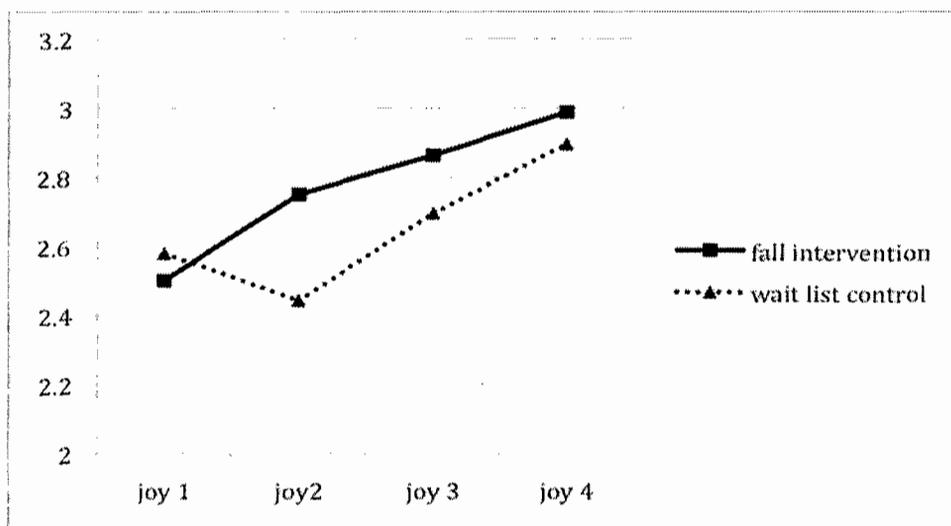


Figure 19. Trend over all four time points for joy

There were no significant linear or quadratic trends for the number of mental state inferences made in the empathic accuracy task, $t_s < 1$. However, the linear contrast for hit rate was significant, $t = 1.79, p = .09$, suggesting that hit rate increases over time. Examination of Figure 20 shows that hit rate increased from time 1 to time 2, but did not increase much after that. The quadratic effect for hit rate was not significant, $t = -1.03, p = .32$. The sample size is small (fall intervention $n = 13$, wait list control $n = 17$) for this analysis because participants had to make an inference during section 1 in order to have a hit rate and participants were only included if they had a hit rate score at all four time points.

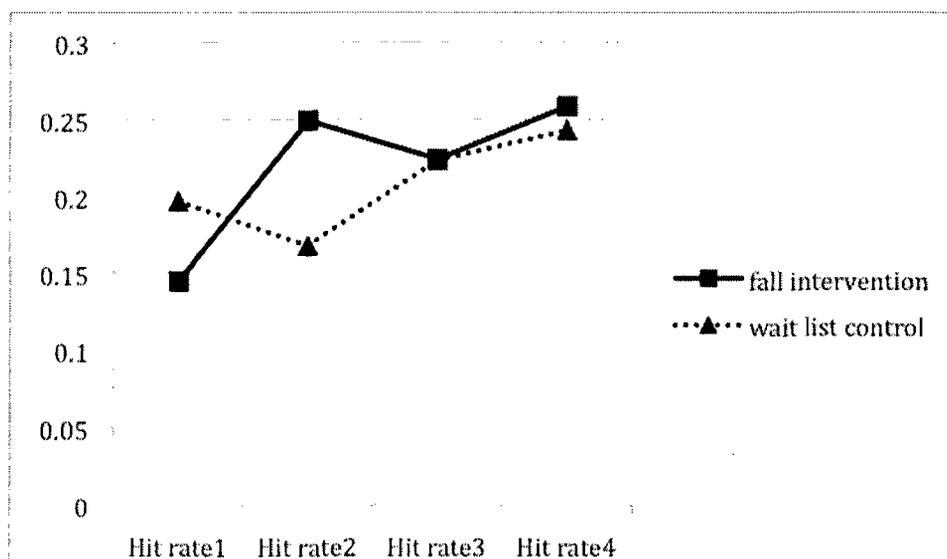


Figure 20. Trend over all four time points for empathic accuracy hit rate

In conclusion, these analyses revealed that there was continued increases in serenity and joy after the end of the intervention (time 2) for the fall intervention group.

This supports hypothesis 11. There was also continued increases in mindfulness combined with a leveling off of mindfulness after time 3. Personal distress and tension continued to decrease after the intervention, but these decreases leveled off after time 3.

The figures in this section included a line for the wait list control group even though the control group was not involved in the statistical analyses. The line for the wait list control group serves as a visual comparison. Only participants who completed measures at all four time points ($n = 19$) were included in the means that were displayed (the winter only participants are not included). I will now examine the pre to post-intervention change for all winter term intervention participants.

Time 3 (pre) to Time 4 (post): Winter Intervention Group

The wait-list control group received the intervention between time 3 and time 4 and the following analyses examine whether the intervention produced changes in mindfulness and the outcomes for this group. Even though it is important to examine whether this group changed in a manner similar to the fall term intervention group, it is also important to remember that there is no control group to which this intervention group can be compared and thus we cannot conclude that the intervention caused any of the changes.

A series of independent sample t-tests were conducted to investigate whether those who entered the study only for the winter term differed from those already in the study since the fall (but who had not yet received the intervention). There were no significant differences between the two groups on self-report measures or performance on the empathic concern and empathic accuracy task, $ps > .05$. Thus, the following

analyses combine the wait-list control and winter only groups into the winter intervention group. In the absence of a control group, I conducted within-subject analyses to examine the pre-to post-intervention changes for all variables.

Changes in Self-reported Variables

Table 19 depicts the descriptive statistics and tests of change for all self-reported variables. As expected, total mindfulness increased significantly over time as did the nonreactivity, nonjudging, describing, and observing facets, $ps < .10$. Both sub-scales of the Allo-Inclusive Identity scale increased from pre to post intervention, indicating that participants expressed more felt connection both to other people and to nature after the intervention. In contrast to what was found for dispositional empathy in the fall intervention group, participants in the winter intervention group showed increases in empathic concern but did not show significant decreases in personal distress. The perceived stress variables also showed a different pattern of change from that in the fall intervention group. Specifically, winter term participants showed significant decreases in demands, but no significant decreases in tension or increases in joy. Unlike the fall intervention group, participants in this group did not experience increases in serenity or decreases in negative affect.

Changes in Task Performance

Table 20 shows the descriptive statistics and statistical tests for the state empathic concern task and the empathic accuracy task. In the empathic accuracy task, participants increased in the number of mental state inferences they made in section 1 of the task, $p = .006$, as well as the hit rate for those inferences, $p = .035$. In the picture task participants

Table 19.
Change over time on self-report measures for winter intervention group (N = 28)

Outcome	Time 3 (pre)	Time 4 (post)	Paired <i>t</i>	<i>d</i>
Total FFMQ	3.23(.55)	3.54(.61)	-3.84**	.53
Nonreactivity	3.10(.66)	3.43(.68)	-2.85**	.49
Nonjudging	3.45(1.06)	3.81(1.08)	-2.54*	.34
Observing	3.32(.70)	3.75(.64)	-3.78**	.64
Describing	3.36(.94)	3.54(.72)	-1.78	.22
Actingaware	2.92(.83)	3.16(.83)	-1.52	.29
AIIS total	3.42(1.0)	3.77(.96)	-2.55*	.36
AI people	4.03(.82)	4.31(.92)	-1.98	.32
AI natural world	2.80(1.45)	3.23(1.25)	-2.63*	.32
IRI EC	3.82(.67)	3.95(.59)	-2.28*	.21
IRI PT	3.98(.71)	4.11(.57)	-1.38	.20
IRI PD	2.43(.67)	2.34(.68)	.981	.13
Positive affect	3.11(.57)	3.15(.66)	-.352	.06
Negative affect	2.01(.57)	2.08(.84)	-.567	.10
Serenity	3.17(.77)	3.28(.82)	-.752	.14
PSQ worries	2.26(.69)	2.14(.68)	1.19	.18
PSQ demands	2.57(.62)	2.42(.64)	2.25*	.24
PSQ tension	2.43(.71)	2.24(.59)	1.72	.29
PSQ joy	2.74(.59)	2.88(.67)	-1.60	.22
ISEL	3.41(.43)	3.48(.34)	-1.20	.18
RWB-PRO	4.42(.47)	4.35(.52)	.661	.14
Rel. Satisfaction	2.83(1.34)	2.85(1.45)	-.148	.01
Overall rel. Sat	5.07(1.18)	5.00(1.59)	.268	.05

Note. FFMQ = Five Facet Mindfulness Questionnaire, Nonjudging, nonreactivity, observing, describing, and acting with awareness are the 5 sub-scales (i.e., facets). AIIS total = average level of felt connection to others and nature. AI people = felt connection to other people. AI natural = felt connection to the natural world. IRIPT = perspective taking sub-scale from the Interpersonal Reactivity Index. IRIEC = empathic concern sub-scale from the Interpersonal Reactivity Index. IRIPD = personal distress sub-scale of the Interpersonal Reactivity Index.

* $p < .05$, ** $p < .01$

increased in state empathic concern in response to the pictures of those in need, $p = .023$.

None of the other performance variables on these two tasks (e.g., accuracy, felt connection to people in pictures) showed significant changes from pre to post intervention.

Table 20.

Change over time on performance on the state empathic concern and empathic accuracy tasks for the winter intervention group

Outcome	Time 3(pre)	Time 4 (post)	Paired t	d
EA num of inferences	5.93(3.8)	7.83(4.2)	-2.99**	.47
EA hit rate	.21(.12)	.27(.16)	-2.22*	.42
EA section 1	.71(.50)	.57(.38)	1.55	.32
EA section 2	.59(.26)	.49(.18)	1.83	.45
EC picture task	2.92(.99)	3.23(1.06)	-2.41*	.30
PD picture task	2.99(1.0)	3.06(1.06)	-.535	.07
FC picture task	3.36(1.3)	3.62(1.42)	-1.44	.19

Note. EA = empathic accuracy task. EC = state empathic concern. PD = state personal distress. FC = state felt connection. N = 29.

* $p < .05$, ** $p < .01$

To assess change over time for the video mental state inference task, two 5 (inference type) X 2(time) within--subject MANOVAs were conducted (one for ease variables and one for speed variables). For the ease of inferences, there was no significant effect of time, $F(1, 24) = .09, p = .76$, nor an inference type by time interaction, Pillai's $V = .06, F(4, 21) = .35, p = .84$. For the speed of inferences, there was also no significant effect of time, $F(1, 24) = 1.38, p = .25$, nor a significant time by inference type interaction, Pillai's $V = .23, F(4, 21) = 1.61, p = .21$.

To assess change over time for the ease and speed variables in the sentence mental state inference task, several 4(inference type) X 2(time) MANOVAs were conducted. For the ease of inferences from positive behaviors, there was no significant effect of time, $F(1, 24) = .09, p = .77$. However, there was an inference type by time interaction, Pillai's $V = .29, F(3, 22) = 3.01, p = .052$ such that ease scores increased for intentional, goal, and praise inferences, but decreased for personality inferences. For the

speed of inferences from positive behaviors, there was no significant effect of time, $F(1, 28) = 1.90, p = .18$, nor a time by inference type interaction, Pillai's $V = .12, F(3, 26) = 1.21, p = .33$.

For the ease of inferences from negative behaviors, the effect of time was non-significant, $F(1, 22) = 2.08, p = .16$, as was the interaction between time and inference type, Pillai's $V = .01, F(3, 20) = .04, p = .99$. For the speed of inferences for negative intentional behaviors, there was not a significant effect of time, $F(1, 28) = .55, p = .45$, nor a time by inference type interaction, Pillai's $V = .05, F(3, 26) = .46, p = .71$.

Adherence to the Intervention

In order to determine whether adherence measures were associated with changes in intervention outcomes (hypothesis 12), the three groups (fall intervention, wait-list control, and winter only) were combined in order to increase the power to detect the effects of adherence to the intervention (i.e., the number of classes attended, number of minutes practiced).

Unfortunately some participants neglected to turn in their homework sheets every week and thus, there was a lot of missing data for the number of minutes practiced variable. It is unclear whether participants practiced and forgot to turn in the sheets or did not practice at all. Participants ($n = 5$) who reported minutes for less than half of the eight weeks (i.e., four or less) were excluded from the analyses involving the minutes variable. A composite was formed by combining the eight reports of minutes practiced. On average participants ($n = 49$) practiced 168 minutes per week ($SD = 69.43$). The average minutes practiced each week was unrelated to changes in mindfulness, $r(44) =$

.04, $p = .81$. In addition, the average minutes practiced was not significantly related to changes in any of the outcomes, $ps > .12$

The number of class sessions attended might be a better measure of adherence to the intervention because every participant has a valid score and class sessions were very important for learning mindfulness. The average minutes of practice and the number of classes attended were unrelated, $r(47) = -.10, p = .50$. The number of classes attended was unrelated to pre-intervention to post-intervention changes in mindfulness, $r(49) = -.09, p = .52$. However, class attendance was positively associated with changes in the positive relations with others scale, $r(49) = .40, p = .004$, suggesting that attending more classes was associated with increases in positive relations. Attendance was not significantly associated with changes in any other variables, $ps > .12$. The results from these analyses are consistent with previous research that has not found a relationship between average minutes practiced and changes in intervention outcomes (Shapiro et al., 2007).

Discussion

In this study participants who completed an eight-week mindfulness meditation course in the fall of 2008 showed increases in dispositional mindfulness, especially the describing facet, relative to a wait-list control. Similar to the findings reported in Study 1, mindfulness meditation affected emotional experience. Specifically, those in the intervention group had significantly greater decreases in negative affect, and greater increases in serenity than the wait list control. The increases in dispositional mindfulness fully mediated the decreases in negative affect, suggesting that the intervention reduced

negative affect because of increases in mindful awareness. The mediational analyses involving serenity were inconclusive. There was an effect of the condition on positive affect such that those in the control group experienced decreased positive affect while the intervention group maintained their level of positive affect. Perhaps this decrease is due to the timing of the time 2 measurements with final exams. If so, then mindfulness may be a protective factor that helps to maintain positive affect. Mediational analyses found that the mediated effect of condition on positive affect through mindfulness was significant demonstrating that greater mindfulness explained why participants in the intervention condition had greater positive affect at time 2.

The current study also found that the intervention group had significantly greater decreases in tension and greater increases in joy despite not showing a reduction in worries or demands. This pattern of results for the four sub-scales of the Perceived Stress Questionnaire is an exact replication of the pattern of results that Weber, Arck, Mazurek, and Klapp (as cited in Fliege et al., 2005) found when they measured patients before and after ten weeks of relaxation training. Their patients showed an increase in joy and decrease in tension while worries and demands remained unchanged (see Fliege et al., 2005 Figure 5) and this differed from the pattern found for psychotherapy patients who showed a decrease in tension, demands, and worries, and no increase in joy. The current study extends the previous research by providing evidence that increases in mindfulness mediate the increases in joy and decreases in tension.

Mindfulness training had an effect on dispositional empathy in both fall and winter groups. The winter intervention group showed significant increases in empathic

concern. Unfortunately it is unclear whether those increases were caused by the intervention or by demand characteristics because there was no control group to compare to. The fall mindfulness meditation intervention did produce greater decreases in the IRI empathy component of personal distress compared to the waitlist control suggesting that participants were less overwhelmed by distressing situations after the intervention.

Mediational analyses revealed that the decreases in personal distress could not be attributed to increases in dispositional mindfulness. The direct effect of condition on personal distress remained, suggesting that the course reduced personal distress in ways that went beyond its effect on mindfulness. In addition, mediational analyses revealed that mindfulness training caused increases in dispositional mindfulness that were associated with increases in empathic concern, perspective taking, and felt connection to other people and nature.

The effect of mindfulness training on social perception was less clear. Those in the intervention condition made more mental state inferences in the modified empathic accuracy task at time 2 compared to the control group and this increase can be attributed to increases in dispositional mindfulness. Intervention participants also had greater increases in the hit rate of their inferences than the control group, indicating that participants who completed the mindfulness training were better able to pick up on points in the video where the target had actually experienced a thought or feeling. The remaining direct effect of condition on hit rate in the mediational model suggests that the intervention produced increases in hit rate in an additional way over and above the effect through dispositional mindfulness. Despite these increases in performance, there was no

evidence that the accuracy of these inferences were any better as a result of the intervention. Thus, while participants' ability to know that a mental state was occurring increased, they were not any more accurate at inferring the content of that mental state. Contrary to predictions, the control group showed greater increases than the intervention group in speed for goal and personality inferences in the video task.

In the whole sample at time 1, dispositional mindfulness was found to be related to greater self-reported relationship satisfaction. Specifically, high observing and nonreactivity scores were associated with higher ratings of satisfaction in specific relationships while high nonjudging scores were associated with greater overall relationship satisfaction. However, mindfulness training did not impact relationship satisfaction. Previous research has found that mindfulness-based interventions for couples increases satisfaction, but these interventions often include additional components such as eye gazing (Carson et al., 2004). In fact, Carson and colleagues (2007) found that the effect of their mindfulness intervention on enhanced satisfaction was mediated by the couples' engagement in exciting, self-expanding activities (these included mindfulness, touching, eye gazing, etc.). More research is needed to determine whether mindfulness practice alone can increase relationship satisfaction. It is possible that changes in relationship satisfaction depend on both partners learning mindfulness meditation together. Future research should examine whether an MBSR intervention (similar to what was conducted in this research) would increase relationship satisfaction when both individuals in a couple complete the intervention together.

CHAPTER IV

GENERAL DISCUSSION

The main goal of the current research was to investigate whether individual differences in mindfulness and mindfulness training are associated with greater empathy, allo-inclusive identity, and enhanced social perception. This research is one of the first investigations to show how scores on the Five Facet Mindfulness Questionnaire are related to dispositional and state empathy, how these scores change in response to mindfulness training, and whether these scores mediate the relationship between the intervention and other outcomes. In addition, the current research is one of the first to examine the effects of a short guided mindfulness meditation and to investigate how mindfulness is related to allo-inclusive identity and performance on tasks that assess social perception.

The relationship between mindfulness and empathy is complex because both constructs are multifaceted. The current study measured three components of dispositional empathy (empathic concern, personal distress, and perspective taking) and found that these components were related to different facets of mindfulness. Across both studies, higher describing scores were associated with higher perspective taking scores; higher observing scores were associated with higher empathic concern scores; and higher nonreactivity scores were associated with lower personal distress scores.

Study 1 showed that a 20 minute guided mindfulness meditation CD can result in less negative affect and more serenity. Although the mindfulness manipulation had

limited effects on task performance, there were associations between dispositional mindfulness and task performance. Participants who scored higher on the describing facet made more mental state inferences during section 1 of the empathic accuracy task and gave lower blame ratings to characters they read about who engaged in negative behaviors. Higher nonjudging and nonreactivity scores were also associated with greater ease in making emotion inferences for characters in short video clips. Taken together these results suggest that at the dispositional level mindfulness is associated with some of the cognitive competencies that Gilbert and Tirsch (2009) claim are needed to generate compassion (e.g., recognition of others' emotions, refraining from condemning).

Results from Study 2 supported the hypothesis that an eight week mindfulness training course would cause increases in dispositional mindfulness (on the FFMQ) compared to a waitlist control group. Follow-up analyses revealed that those in the intervention had greater increases in their observing and describing scores than those in the control condition. Examination of the 16 participants from the fall intervention group who completed measurements at all four time points (pre, post, 4 and 12 week follow up) revealed that there were significant linear increases in four of the five mindfulness facets (describing, acting with awareness, nonjudging, and nonreactivity), as well as significant quadratic trends indicating that these increases began to level off after the 4 week follow up.

Compared to the wait list control group, the intervention condition showed greater increases in serenity and joy, and greater decreases in negative affect and tension.

Importantly, increases in mindfulness fully mediated the effects of condition on all of

these outcomes except for serenity. It is possible that there was not enough power to detect the indirect effect of condition on serenity and it is also possible that the course increased serenity in some other way, although the lack of a significant direct effect of condition on serenity does not support the latter.

Contrary to hypotheses, the fall mindfulness intervention group did not experience greater increases in state or trait empathic concern or perspective taking than the waitlist control. However, the mediated effects of condition on empathic concern and perspective taking through mindfulness were significant indicating that mindfulness training causes increased mindfulness, and greater mindfulness is associated with greater empathic concern and perspective taking. In addition, the fall intervention group decreased in their level of IRI personal distress relative to the control. The IRI personal distress scale items address how people feel in response to extremely emotional situations, including emergencies involving other people. Thus, decreases in these scores are consistent with theory suggesting that mindfulness training teaches people how to tolerate negative emotions (Brown et al., 2007; Segal et al., 2002). Some researchers claim that overcoming negative emotional reactions to the pain of others is the first step towards developing compassion for others (Tucker et al., 2005). The reductions in personal distress scores were not significantly mediated by increases in mindfulness. However, the direct effect of condition on decreased personal distress remained significant suggesting that some other component of the course affected this outcome. Perhaps the class discussion of how to handle situations without over reacting affected

participants' levels of personal distress over and above the effect of increased mindfulness.

The current research is the first to establish that there is a positive relationship between mindfulness and allo-inclusive identity (i.e., felt connection to other people and the natural world). This relationship is important because Buddhist philosophy emphasizes interdependence and many meditation teachers discuss the importance of the experiential realization of inter-relatedness between self and environment. Interestingly, across both studies, high describing scores (i.e., a greater ability to label one's own thoughts and feeling with words) were associated with more felt connection to other people while high observing scores (i.e., a greater ability to notice physical sensations and internal states) were associated with more felt connection to nature. Although intervention condition was not a significant predictor of changes in either Allo-Inclusive Identity sub-scale (people or nature), the mediated paths from condition through mindfulness to increased felt connection to people and nature were significant. Thus, there was evidence that the intervention indirectly affected allo-inclusive identity such that participants who underwent the intervention felt more connected to people and nature to the extent that they increased in mindfulness. In addition, participants in the winter intervention group showed an increase in felt connection to nature from pre to post intervention suggesting that mindfulness meditation might lead to experiential realizations of connection with nature.

Consistent with previous research, greater dispositional mindfulness was related to greater relationship satisfaction in Study 2. Specifically, the nonreactivity and

observing facets of mindfulness uniquely predicted greater relationship satisfaction while the describing facet predicted less relationship satisfaction. However, mindfulness training did not produce increases in relationship satisfaction. Previous studies that have found increases in satisfaction included additional components in their interventions (Carson et al., 2004).

The current research found evidence that dispositional mindfulness is related to many of the emotional and cognitive competencies needed for compassion (Gilbert & Tirsch, 2009). Short- and long-term mindfulness meditation training affected emotional competencies such as increased serenity and reduced personal distress. There was some indication that cognitive competencies such as attention to the mental states of others were affected by mindfulness training, but the ease, speed, and accuracy of mental state inferences were unaffected by the intervention. Perhaps these cognitive abilities take longer to train, so people would need to practice mindfulness meditation for longer than eight weeks to alter these abilities. This is supported by the correlational findings linking greater dispositional mindfulness to greater ease and speed in making emotion inferences and less ease in making evaluative (blame and praise) judgments. It is also possible that these abilities will not change without the specific motivation to change them. There was some evidence that greater mindfulness was associated with greater felt connection to others, which may serve as a motivation to attend to others' needs and act compassionately towards them. Whether such changes in allo-inclusive identity might indeed elicit sharper social-perception processes remains to be determined by future research.

This research is the first investigation of mindfulness to measure state empathy in response to photographs of those in need as well as to include behavioral tasks such as empathic accuracy and mental state inference tasks. Thus, I will discuss the results for each of these tasks in detail.

Mindfulness and the Social Perception Tasks

Given that dispositional levels of mindfulness and empathy are related, it was surprising that mindfulness was unrelated to state levels of empathic concern and personal distress in the picture task. However, in Study 1 dispositional measures of empathy were related to the state measures suggesting that the task was an empathy related task. In Study 2 the effect of the intervention on increases in empathic concern and reductions in state personal distress was in the predicted direction suggesting that with increased power these effects would reach significance. In fact, the winter intervention group showed increases in state empathic concern to the pictures from pre- to post-intervention. However, the winter intervention group lacked a comparison group and thus, the increase may be due to demand characteristics.

Modifications that were made in the empathic accuracy task proved to be beneficial in the current research. While mindfulness did not appear to affect the traditional empathic accuracy scores, the outcome variables from the modified portion of the task were affected by both short and long term mindfulness meditation practice. As described in the method section participants were allowed to stop the video at any point during the first 3 minutes (section 1) and make an inference about the target's thoughts and/or feelings. The number of mental state inferences made served as an outcome

variable as well as the proportion of the target's actual thoughts and feelings that participants chose to make inference about (i.e., the hit rate). Giving participants the opportunity to spontaneously make mental state inferences is perhaps more naturalistic than traditional empathic accuracy tasks that force participants to make inferences when the experimenter asks them to. In addition, this modification allowed us to examine whether participants would pick up on "active" moments in which the target was actually experiencing a mental state (participants' ability to do this was their hit rate). In Study 1, participants in the mindfulness condition who completed the task immediately after the 20 minute meditation had a higher hit rate than those in the control conditions. In Study 2, participants in the mindfulness intervention had a significantly greater increase in the number of mental states they made and in their hit rate compared to participants in the wait-list control condition. These increases cannot be due to practice effects since those in the waitlist control condition also completed the same task at both time points. In fact, mediational analyses suggest that the increase in the number of mental state inferences participants made was due to increased dispositional mindfulness. The condition effect on increased hit rate was not significantly mediated by increases in mindfulness, but this may be due to a lack of power. In any case, the intervention caused an increase in the hit rate over and above its impact on dispositional mindfulness (the direct effect was still significant) suggesting that there may be another component of the intervention that led to an increased ability to know when another person is having a mental state. Perhaps the interaction between participants in the class and/or between the instructors and participants can explain this result. It is also possible that participants attempted to apply

the mindful skills they developed in class to the task. The winter intervention group also showed an increase in the number of mental state inferences made and on the hit rate for these inferences from pre- to post-intervention replicating the results from the fall intervention group.

Mindfulness did not impact empathic accuracy, but perhaps increased attention to one's interaction partner increases accuracy over time. Paying more attention to the other person and making more inferences at critical times may be a prerequisite for more accurate inferences. Moreover, in a face-to-face conversation, a correct recognition that one's partner is having a potentially important mental state provides an opportunity to ask the person what they are thinking or feeling. In fact, in many social situations inference accuracy itself is not required; rather, one is expected to listen attentively and ask for clarification at appropriate times. Partners may then be willing to disclose their mental states.

The experimental paradigms used in this research allowed assessment of the ease and speed of mental state inferences as well as the extremity of evaluative judgments of others. The current research did not find support for the hypothesis that mindfulness training would be associated with faster mental state inferences. Perhaps this is not surprising given that the theory under which these tasks were developed assumes that the speed and ease of these inferences should be relatively universal and should differ largely as a function of the type of inference made (e.g., intentional inferences are made more quickly than others; Holbrook, 2006; Malle, 2008). It is also possible that increased mindfulness would actually lead participants to make inferences less quickly due to the

fact that highly mindful individuals are expected to rely less on automatic processing and have an increased ability to be nonreactive and nonjudging. Participants higher in these facets of mindfulness may have taken more time to consider the characters' situation. Although this is post hoc speculation, it is consistent with findings from Study 2 that showed participants in the control condition had increased speed in making mental state inferences while those in the intervention did not. The current research also did not find support for the hypothesis that mindfulness training would increase the ease of inferences or reduce evaluative judgments.

Despite the lack of mindfulness training effects on these basic social perception processes, there were some interesting associations between these process measures and dispositional mindfulness (for Study 2, the results discussed below are from time 1 prior to the beginning of the intervention). First, in both studies higher total mindfulness scores were associated with greater ease in making emotion inferences. Examination of the correlations between the ease of emotion inferences and the facet scores revealed that the attitudinal facets of mindfulness--nonreactivity and nonjudging--were both positively correlated with the ease of emotion inferences. Perhaps this is because those who score high on the nonreactivity and nonjudging facets are able to avoid getting caught up in their own minds or perspectives and thus find it easier to identify emotions in others. Second, in both studies, higher describing scores were associated with greater ease in making personality inferences, suggesting that the ability to verbally label one's own mental states is associated with more inferences about others' personalities. Third, in Study 2, higher describing scores were also associated with greater speed in making

emotion and personality inferences. The correlations involving the describing facet scores may be due to the fact that both labeling one's own mental states and labeling another person's emotions or personality depend on verbal ability. Forth, in contrast to the correlations suggesting that greater dispositional mindfulness is associated with greater ease in making emotion inferences, in both studies specific facets of mindfulness (nonjudging in Study 1 and observing in Study 2, time 1) were associated with a reluctance to make praise judgments. In addition, in Study 1, higher scores on the acting with awareness facet were associated with reluctance to make blame judgments. The relationship between greater dispositional mindfulness and disinclination to make evaluative judgments suggests that highly mindful participants may refrain from judging others.

Limitations

The biggest limitation in Study 1 was the manipulation of mindfulness. There are currently no standard experimental manipulations of mindfulness available, so I chose to use a guided meditation CD that is often given to students of mindfulness intervention courses. I did not use a measure of state mindfulness to determine whether the manipulation actually increased mindfulness because there is currently only one state measure available and there was a risk that it would have increased demand characteristics by telling participants what they should have felt after the guided meditation.

A major limitation of Study 2 is that the intervention did not include several components (yoga, day long retreat) found in most eight week mindfulness interventions

(e.g., MBSR and MBCT). The exclusion of yoga may actually be a benefit to the current study because it means that the results of the intervention are due to mindfulness and not yoga. However, the benefit of practicing yoga prior to sitting meditation is that stretching gets the blood flowing through the body. Many participants in the intervention complained of their legs falling asleep during sitting meditation and, although this is a common complaint for beginning meditators, it may have been less severe if we had done yoga prior to meditating. The exclusion of the day-long retreat may have reduced the impact of the intervention because this is an important experience for people learning meditation. The only reason it was not included was that we were limited to a 2 ½ hour long class session, and participants were already asked to do a lot of work outside of class (i.e., 45 minutes of meditation practice 6 times a week).

Demand Characteristics

As in all studies measuring outcomes with self-report questionnaires, there is a possibility that participants responded in a socially desirable or expected manner. To the extent that participants understood that the intervention was intended to produce specific results (e.g., less perceived stress), they may have completed the post-measures in a manner that made it seem as if these outcomes had occurred even if they did not. The current study used self-report measures for outcomes such as empathy, emotional experience, perceived stress, and relationship functioning. All of these are susceptible to demand characteristics and the influence of demand characteristics may have been greater for those in the winter term intervention course due to the publication of a news

article discussing how the mindfulness course was expected to reduce stress and increase empathy.

Control Conditions

The control conditions were a limitation of Study 1. Although having both the offset control (in which participants did not listen to any CD) and the active control (in which participants listened to a self-help CD) was better than having only one, interpretation of several effects remained difficult. For example, the active CD control condition appears to have influenced the picture task such that participants in that condition expressed much less empathic concern than participants in the other two conditions. It is possible that the CD increased self-focused attention, future focus, and/or goal-focus by telling participants how they could reach their goals.

Study 2 lacked an active control condition. The wait list control group did not attend any special class between the pre and post intervention measures and this makes it hard to attribute differences between the two groups to the intervention itself (i.e., learning and practicing mindfulness meditation) rather than to something else about the students' participation in the class (e.g., social support, discussions). However, the results from the mediational analyses support the conclusion that many of the effects of condition were due to increases in dispositional mindfulness. It is of course possible that those increases in dispositional mindfulness could occur because of the course content itself, rather than because of mindfulness meditation practice. This possibility is supported by the lack of relationship between minutes practiced and changes in mindfulness.

Self-selection

All participants in Study 2, the intervention study, self-selected to join the class. Self-selection is a limitation in most mindfulness intervention research, and it may not be possible to avoid it, because participants have to be motivated to engage in meditation practice every day. However, this limitation also makes Study 2 generalizable to real world situations in which people seek out mindfulness meditation training. Furthermore, self-selection in the intervention study may have been less influential than in other studies because at least some participants reported joining the study in order to gain course credit, so not all of them were seeking meditation training. A limitation specific to this study was that several participants selected the term in which they would attend the class sessions, and these participants were different (e.g., older, more mindful) from other participants who were randomly assigned. Even though this was not ideal from a research perspective, participants were granted these requests because denials would have resulted in a smaller sample size, and this was already a concern in the intervention study. There may well be effects of mindfulness training that were not found due to a lack of power. For example, the effect of the intervention on changes in state empathic concern and allo-inclusive identity.

Self-reported Mindfulness

Using self-report measures of dispositional mindfulness is a limitation of both studies, but one that is necessary because there are currently no other ways to measure mindfulness. One concern with extant questionnaire measures of mindfulness is whether or not they are consistent with the Buddhist understanding of mindfulness (Carmondy et

al., 2008; Grossman, 2008). The FFMQ captures both the attentional and attitudinal components of mindfulness, but it is not clear that the observing and describing facets are actually part of the construct of mindfulness and not just part of the process of becoming more mindful. When learning mindfulness meditation, one learns to observe internal states in a different manner and this has been the argument for why the observing facet is not consistently positively related to the other facets of mindfulness or to positive outcomes (Baer et al., 2006, 2008). In fact, for those without meditation experience, the observing facet does not load on the broad mindfulness construct (Baer et al., 2006). In Study 1 of the current research, the observing facet was unrelated to the nonjudging and acting with awareness facets. In Study 2, an examination of the inter-correlations of the mindfulness facets at pre-and post-intervention among those the intervention group revealed that the correlations with the observing facet were different after the eight-week intervention. Specifically, at time 1 the observing facet was negatively related to the nonjudging facet, whereas at time 2 the observing facet was positively related to the nonjudging facet. The correlations among those in the control group did not change (i.e., observing was still negatively associated with nonjudging at time 2). Thus, the observing facet may not be a facet of mindfulness.

Meditation instructions sometimes include labeling mental states with verbal labels as a way of distancing oneself from them. The describing facet merely captures how easily people can find words for their thoughts and feelings, and not whether people have distance from them. High scores on the describing facet may imply that one is paying more attention to one's own experience, but it may also be biased by verbal

abilities. Thus, it is unclear whether the ability to label mental states is part of the mindfulness construct.

Another related problem with the FFMQ is the interpretation of the items. Specifically, meditators and non-meditators may understand the items differently because terms such as “noticing” and “judging” take on different meaning for meditators (Grossman, 2008). Indeed, recent research has found evidence that items on the FFMQ function differently for meditators and non-meditators (Van Dam, Earleywine, & Danoff-Burg, 2009). For example, meditators responded similarly to items that asked about mindfulness and items that asked about the absence of mindfulness whereas non-meditators responded differently to these two sets of items.

Finally, we cannot be sure that increases in self-reported mindfulness actually reflect greater mindfulness. It is possible that participants presented themselves as more mindful, merely viewed themselves as more mindful, or just gained a better understanding of the terminology used in the questionnaire. A mere self-presentation interpretation is unlikely given the specific pattern of results in which outcomes did not change for the better across the board (e.g., dispositional perspective taking did not increase), and several indirect measures that are less susceptible to impression management did show effects (e.g., people’s hit rates increased in the empathic accuracy task). As to the other two interpretations, the current data certainly cannot rule out that people changed their self-views or refined their semantic network of mindfulness-related terms. Nonetheless, the changes in dispositional mindfulness (regardless of what they mean) mediated the effect of the intervention on improvements in affect and at least some

aspects of social perception, so the increases in self-reported mindfulness in this study can be considered beneficial.

Future Directions

Most research examining mindfulness uses eight-week interventions and the few studies that have manipulated mindfulness have only manipulated one component (e.g., focus on breathing). More research is needed to examine the effects of short-term mindfulness meditation practice. Participants in traditional MBSR courses are asked to meditate for 50 minutes at a time and this is a barrier for a lot of people. The current research adds to the evidence that shorter meditations can produce beneficial emotional results and these shorter meditations might be more attractive to many people. In the current study participants reported benefits from a three-minute breathing exercise (from MBCT; Segal et al., 2002) and reported that this three-minute exercise was easier to work into their day. In addition to shorter meditations, mindfulness training could better enhance relationship functioning and empathy by focusing on applications to daily social life. The MBSR program includes one class discussion about applying mindfulness to daily life, but this mainly focuses on being aware of daily activities that are done individually. Future research should investigate whether participants spontaneously apply mindfulness techniques to social activities such as conversations with others.

Despite the benefits of the Five Facet Mindfulness Questionnaire over unidimensional measures like the MAAS, there is still a need for better measures of mindfulness and related constructs. As mentioned, the FFMQ includes facets that may not be part of genuine mindfulness (e.g., the observing facet), but it might also be missing

some important facets of mindfulness. One such process is “reperceiving”—that is, shifting one’s perspective in a manner that allows disidentification from the contents of one’s mental states to view experience with greater objectivity and clarity (Shapiro Carlson, Astin, & Freedman, 2006). Future research should develop scales to measure these other constructs and distinguish between the construct of mindfulness and the outcomes of mindfulness meditation. Given the limitations of self-report measures of mindfulness, research would benefit from the development of behavioral measures of mindfulness.

Although the current research provides initial evidence that mindfulness is related to some social perception processes, much more research is needed in this area because it could help to explain the relationship between mindfulness and empathy. The present studies did not find evidence that mindfulness training affects deep cognitive processes such the ease, speed, and accuracy of mental state inferences. However, in both studies greater dispositional mindfulness scores were associated with greater ease in making emotion inferences for people in short video clips. Perhaps it would require extensive mindfulness practice to improve these cognitive abilities, so future research should follow meditators for a longer period of time. In addition, future research should continue to investigate whether mindfulness meditation can increase these cognitive abilities using different experimental paradigms such as real time social interactions.

Some mindfulness interventions have included loving kindness meditation and this meditation is different from mindfulness in that participants explicitly try to generate feelings of compassion. Perhaps compassion is only increased for meditators who

explicitly focus on compassion as a goal of their practice. Future research should directly compare the effects of training in mindfulness meditation and loving kindness meditation.

Conclusions

Two studies examined the effects of dispositional mindfulness and mindfulness training on social perception, felt connection, and empathy. Results revealed that participants who scored higher on dispositional mindfulness were more likely to report greater empathic concern, felt connection to other people and the world around them, positive emotions, and relationship satisfaction and lower levels of personal distress, perceived stress, and negative affect. Greater dispositional mindfulness was also associated with greater ease of inferring emotions in others. Both short- and long-term mindfulness meditation practice resulted in more serenity and less negative affect compared to control conditions. An eight-week mindfulness training course caused significant increases in dispositional mindfulness and these increases fully mediated the effect of the intervention on changes in emotional experience and perceived stress. Mindfulness training also resulted in decreased personal distress scores. In addition, participants who learned mindfulness meditation made more mental state inferences about other people, suggesting that mindfulness affects attention to others' minds. In sum, mindfulness is associated with greater empathy at the dispositional level, and mindfulness meditation training affects several emotional and cognitive abilities that are important for the development of compassion such as the tolerance of negative emotions and attention to others' minds.

Research on mindfulness meditation has produced much evidence that mindfulness can improve people's lives by reducing stress and changing emotional experience (Brown et al., 2007). However, it is important to remember that mindfulness meditation practice originated in a Buddhist context, which includes an understanding of interconnection that encourages compassion for others. More research is needed to determine whether secularized versions of mindfulness training can increase felt connection to others, enhance social perception and increase perspective taking, and foster compassion. In order for mindfulness practice to improve social functioning and ultimately society, interventions may need to specifically focus on applying mindfulness to interactions with other people.

APPENDIX A

MINDFULNESS COURSE SYLLABUS

PSY 409: Practicum in Mindfulness Meditation

Instructors Contact Information

Jessica Tipsord, M.A.
Psychology Department
Email address: jtipsord@uoregon.edu
Office: 358 Straub Hall
Lab: 427 Straub Hall
Office Hours and Lab sessions: By appointment

Joshua Felver-Gant
School Psychology Department
Phone: 315-372-9091
Email address: jfelverg@uoregon.edu
Office Hours: By appointment

Overview and Course Objectives

Hello and welcome to the practicum in mindfulness meditation! We are very excited about teaching this course, and are looking forward to working with you! This is a practicum class, and as such there will be no tests, quizzes, or papers for you to complete. Coursework will completely revolve around attending class, participating in group activities, and completing the weekly homework assignments, which will involve practicing the mindfulness meditation skills that you learn and develop during class.

There are two objectives of this course. First, to learn and practice mindfulness meditation. Skills and techniques will be taught and practiced during class. You will then be expected to continue to practice these skills on a daily basis on days that class doesn't meet. Second, you will be involved in research about mindfulness meditation, both directly as a research participant, and indirectly through group discussion of research topics in the field. Through both practice and instruction, you will leave this course with a thorough understanding of what mindfulness is as a practical life application, and as a topic of scientific inquiry.

As this class is completely experiential in nature, class attendance is absolutely critical!!! We cannot stress this enough, activities will be taught during class that you will be

expected to practice during the week. So, if you were to miss even a single class, you will miss out on learning and developing that particular week's skill, and you will fall behind. You will also not receive the week's handouts, which will detail the homework and discussion topics. If you absolutely cannot make a class, please contact Jessica or Josh before class!!! By doing this, we will be able to send you electronically the weeks handouts, and fill you in on what you missed as best we can. And also, we will be concerned about where you are and if you are ok, so please don't make us worry!

During class, it is expected that you will participate in the activities, as well as the group discussion. Discussion in this class is critical, as we will all be learning this information together. Your contribution to class will help make this course richer for everyone, so please contribute!

Homework and Daily Practice

Every week assignments for practicing mindfulness and developing mindfulness skills will be assigned. We strongly encourage you to complete all the assignments. In our experience, and in the scientific literature, people really get out what they put into their practice. For this course to have a meaningful impact on your life (e.g., reduce your stress, help you concentrate, increase positive emotions, etc.), you will need to practice, practice, and practice! Remember, we are cultivating a skill, and just like you would practice a sport or an instrument, you won't see results unless you do the work. Also, there is never any "bad" practice (or "good" for that matter), there is just practice. If this doesn't make sense, that's ok, it will later in the term. But for now, just remember, you don't have to like practice, just do it!

To guide you with your home practice, please use the CDs we have distributed during class. People find that at least initially, these guided sessions are really helpful.

Josh and Jessica can be contacted by email if there are any questions. We are really looking forward to working with you this term, and in participating in class along with you (we're doing the homework too!).

Have a great term--we know you'll enjoy this class ☺

“Mindfulness means paying attention in a particular way:
on purpose,
in the present moment,
and nonjudgmentally.”

-Jon Kabat-Zinn

APPENDIX B

DESCRIPTION OF MINDFULNESS CLASS SESSIONS

Week 1:

- Discussion of class expectations
- Auto-pilot discussion
- Raisin Exercise
- 40 minute body scan practice (guided)

Week 2:

- 40 minute Body Scan meditation (guided)
- Discussion of barriers that arise during mindfulness practice, such as finding the time in one's day to practice, and finding a suitable location for practice.
- 10 minute sitting meditation

Week 3:

- 30 minute sitting meditation (guided)
- Discussion of sitting meditation problems and experiences
- ACT "milk" exercise*
- 5 minute mindfulness of sounds
- 10 minute sitting meditation

Week 4:

- 45 minute sitting meditation (guided)
- Discussion of staying present (i.e., continuing practice even when difficult)
- 3 minute breathing space exercise
- 5 minute Walking meditation exercise*

Week 5:

- 30 minute sitting meditation (not guided)
- Discussion of Allowing/Letting be (acceptance)
- Reading of "The Guest House"—a poem by Rumi
- 15 minute acceptance of difficult things meditation
- Short discussion of last meditation
- 10 minute sitting meditation

Week 6:

- 40 minute sitting meditation (guided with cinema metaphor)
- Discussion of relating to thoughts (i.e., thoughts are not facts)
- Exercise—Imagery meditations*
- 10 minute sit

Week 7 (win) and Week 8 (fall)

- 30 minute sitting meditation (not guided)

Week 8 (win) and Week 7 (fall)

- 40 minute sitting meditation (not guided)
- Discussion of psychological stress and appraisals
- Exercise on reactions vs. mindful responding to stress*
- Stress and the body discussion (fight or flight response)
- 10 minute sitting meditation

Week 9:

- 30 minute sitting meditation (not guided)
- Discussion of the course and what students have learned
- 45 minute body scan (guided)

Note. * These exercises were added to the intervention and are included below.

Exercise for Week 6 Imagery Meditation Examples

Some people find imagery a very useful tool in practicing meditation. There are many guided meditations that one can practice, I suggest looking at the Jack Kornfield's tapes if you are interested. Below are some imagery exercises that you may wish to try in addition to your standard mindfulness practice. Start off by focusing on the breath, coming to rest in the present moment, just as we normally do. Then, imagine the scenarios described below. If at any point you have gotten carried away by your thoughts, or notice that you have gotten carried away by the image-exercise and are not actually doing the exercise, simply return to the task just as you would your breath.

1) Cinema. Imagine you are sitting in a cinema. You are simply watching a blank, empty screen, one which will play your thoughts. If there are no thoughts, just wait for them. See if you can notice exactly when they come, what they are, and what happens with them. Relate to them without judgment, rather, with acceptance, simply just notice them. Some of the thoughts will fade off, some will stay. Just be aware. When no thoughts are happening, notice this. Be alert for when the next thought enters your awareness. If the thought that "this is silly" comes into awareness, put that on the screen.

2) Leaves floating down stream. Imagine a nice sunny field that you are walking across a field by yourself. You come to a bridge that crosses a stream. You walk to the middle of the bridge, then lean out over the side and stare down into the water, where you notice autumn leaves are being carried down the current. Fill your minds-eye with this vision of leaves floating down this stream, coming into your vision, and out again. Place whatever

thought you are having on each leaf. Let each thought you are having rest on the leaf. Simply watch the leaves go by with your thoughts on them. If you notice any thoughts such as “this isn’t work” or “I can’t do this”, put these thoughts on the leaves too. Let your awareness rest with this image of leaf-thoughts coming and going into your consciousness.

3) Mind like Sky- You are walking down a sunny field by yourself on a summer day. You lay down in some grass, and stare up into the clear blue sky. There is nothing in your field of vision except the blue expanse of sky. Eventually, clouds begin to cross your vision. Each cloud is actually one of your thoughts. Let these clouds enter into your awareness, and then leave again. Clouds come and go, appear and disappear. Clouds can look anyway you imagine them, some big, some small, dark, light. Just notice these cloud thoughts, and let them be, coming and going out of your awareness. Thoughts such as “this is great” or “this is ridiculous” are also turned into clouds to observe.

Exercise for Week 8 (win) and Week 7 (fall)

Participants were read scenarios and were given 10 seconds to write down their automatic reactions. After all 4 scenarios, participants formed small groups and shared their reactions and thought of mindful responses. After the small group discussion the entire class discussed their reactions and the mindful responses their group had thought of.

Stress Worksheet

#1

Reaction (10 seconds, write fast!):

-Cognitive (thoughts):

-Emotional:

-Physical Behavioral:

#2

Reaction (10 seconds, write fast!):

-Cognitive (thoughts):

-Emotional:

-Physical Behavioral:

#3

Reaction (10 seconds, write fast!):

-Cognitive (thoughts):

-Emotional:

-Physical Behavioral:

#4

Reaction (10 seconds, write fast!):

-Cognitive (thoughts):

-Emotional:

-Physical Behavioral:

Alternative Responses (small group):

-Cognitive perspectives (thoughts):

-Emotional:

-Physical Behavioral

- “mindful” response:

Exercise for Week 3
ACT “milk” exercise

This exercise was adopted from the Acceptance and Commitment Therapy (ACT) intervention manual. The purpose of the exercise is to demonstrate an example of cognitive defusion, or separation of the verbal meaning of a word from the actual auditory sound. In this exercise, participants are simply asked to verbally repeat a word (“milk”) over and over for one minute. Following this, a discussion is held regarding what the experience was like for individuals. Generally, most people find that upon first uttering the word “milk”, the image, flavor, or other quality of the physical object of “milk” was conjured in their mind. However, after a minute of repeating the word, people find that the associated meaning of “milk” eventually falls away, and one is then left with the stripped auditory experience of the sound “milk”.

Exercise for Week 4
Walking meditation exercise

This exercise is a common practice in eastern contemplative traditions (e.g. Buddhism). Subjects are asked to simply pay attention to the sensations of walking. Subjects are instructed to walk as slowly as possible, and focus their attention on the present moment sensation of walking (e.g. , first the pressure of the heel touching the ground, followed by the toes, then the planting of the whole foot, next the raising of the back foot etc.). This exercise is simply another demonstration of present centered focused awareness; instead of being mindful of breathing as in aforementioned exercises, participants focus on the somatic sensation of walking slowly.

APPENDIX C

EXAMPLE HOMEWORK SHEET FOR MINDFULNESS COURSE

Homework Record Form – Week 1

Personal ID Number: _____

(Reminder: Your Personal ID Number is comprised of the first two letters of your mother's maiden name and the last two numbers of the year you were born)

Please record the number of minutes you practiced the assigned mindfulness exercise (body scan) in the "Minutes Practiced" column below. Also, please record anything that comes up for you in the "Notes" column so that we may discuss this during class

Date	Minutes Practiced	Notes/Comments
Wednesday 10.8	45	Man, I'm so happy to be in this class! I was really aware of how my body relaxed. I also noticed how exhausted Josh looks.
Thursday 10.9		
Friday 10.10		
Saturday 10.11		
Sunday 10.12		
Monday 10.13		
Tuesday 10.14		

APPENDIX D

ALPHAS FOR STUDY 2 SELF-REPORT MEASURES OVER TIME

Chronbach alphas at each time point

Scale	Time1	Time2	Time3	Time4
Total FFMQ	.92	.90	.94	.96
Nonreactivity	.80	.81	.83	.89
Observing	.69	.87	.90	.88
Actingaware	.87	.87	.90	.93
Describing	.90	.94	.94	.92
Nonjudging	.93	.95	.95	.97
iriPT	.72	.84	.83	.75
iriEC	.68	.84	.82	.84
iriPD	.67	.77	.74	.80
AI total	.83	.94	.93	.93
AI people	.71	.86	.85	.88
AI natural	.88	.95	.95	.93
RWBPRO	.76	.80	.75	.81
ISEL	.88	.87	.87	.82
PA	.88	.91	.89	.86
NA	.87	.89	.92	.92
Serenity	.79	.75	.89	.82
Psqworry	.83	.86	.89	.87
Psqtension	.77	.79	.87	.84
Psqjoy	.81	.86	.85	.91
Psqdemands	.82	.78	.82	.88
Overall rel sat	.64	.80	.65	.82

APPENDIX E

TEST RE-TEST CORRELATIONS FOR SELF-REPORT MEASURES IN STUDY 2

Correlations of self-report measures over time by condition

Variable	t1 with t2		t1 with t3		t1 with t4		t2 with t3		t2 with t4		t3 with t4	
	F	W	F	W	F	W	F	W	F	W	F	W
Mindfulness	.51	.82	.47	.87	.53	.59	.84	.92	.60	.58	.83	.66
Nonjudging	.45	.78	.34	.81	.18	.53	.70	.87	.62	.67	.86	.71
Nonreactivity	.29	.60	.39	.70	.38	.60	.48	.81	.47	.56	.63	.67
Observing	.43	.73	.45	.63	.55	.57	.95	.76	.68	.60	.77	.61
Describing	.78	.83	.69	.83	.79	.82	.57	.86	.55	.83	.82	.84
Acting with awareness	.28	.57	.16	.44	.53	.42	.56	.56	.46	.24	.62	.31
IRI Perspective Taking	.23	.75	.42	.60	.13	.37	.83	.83	.33	.57	.53	.72
IRI Empathic Concern	.68	.62	.65	.70	.85	.52	.83	.59	.78	.68	.75	.89
IRI Personal Distress	.82	.76	.69	.80	.43	.73	.85	.87	.55	.74	.72	.81
Allo-Inclusive Identity	.52	.77	.67	.78	.71	.65	.86	.88	.87	.72	.93	.77
AIpeople	.50	.52	.67	.68	.56	.64	.87	.78	.91	.64	.96	.65
AINatural	.56	.88	.61	.82	.76	.68	.83	.92	.67	.80	.88	.82
Positive Relations	-.09	.42	.17	.11	.47	.17	.61	.61	.39	.59	.67	.39
Specific Rel Sat	.61	.93	.28	.67	.53	.38	.75	.79	.63	.53	.84	.77
Overall Rel Sat	.34	.65	.08	.75	.26	.37	.84	.74	.83	.35	.76	.34
Perceived Support	.29	.61	.55	.59	.70	.51	.67	.66	.57	.64	.51	.56
PSQ worries	.25	.53	.34	.53	.37	.48	.79	.77	.66	.35	.88	.76
PSQ tension	.23	.77	.12	.71	-.05	.73	.77	.71	.71	.76	.59	.70
PSQ joy	.33	.54	.45	.48	.37	.62	.71	.75	.57	.65	.56	.70
PSQ demands	.37	.40	.10	.61	.29	.74	.69	.53	.74	.47	.82	.85
Positive Affect	.03	.62	.05	.43	-.08	.55	.87	.57	.65	.63	.68	.54
Serenity	.28	.66	.02	.61	.16	.70	.32	.60	.20	.40	.49	.65
Negative Affect	.13	.69	.18	.63	.21	.55	.89	.64	.63	.48	.75	.50

Note. F = fall term intervention participants ($n = 16$), W = Wait-list control/Winter term intervention participants ($n = 19$). Fall term participants received the intervention between time 1 and 2, winter term participants received the intervention between time 3 and 4.

REFERENCES

- Abbott, R. A., Ploubidis, G. B., Huppert, F. A., Kuh, D., Wadsworth, M. E. J., & Croudace, T. J. (2006). Psychometric evaluation and predictive validity of Ryff's psychological well-being items in a UK birth cohort sample of women. *Health and Quality of Life Outcomes, 4*, 76-92.
- Andersen, D. T. (2005). Empathy, psychotherapy integration, and meditation: A Buddhist contribution to the common factors movement. *Journal of Humanistic Psychology, 45*, 483-502.
- Apperly, I. A., Riggs, K. J., Simpson, A., Chiavarino, C., & Samson, D. (2006). Is belief reasoning automatic? *Psychological Science, 17*, 841-844.
- Aron, A., Aron, E. N., & Smollen, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology, 63*, 596-612.
- Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behaviour Research and Therapy, 44*, 1849-1858.
- Astin, J. A. (1997). Stress reduction through mindfulness meditation: Effects on psychological symptomatology, sense of control, and spiritual experiences. *Psychotherapy and Psychosomatics, 66*, 97-106.
- Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*, 191-206.
- 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*, 27-45.
- Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., et al. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*, 329-342.
- Barnes, S., Brown, K. W., Krusemark, E., Campbell, W. K., & Rogge, R. D. (2007). The role of mindfulness in romantic relationship satisfaction and responses to relationship stress. *Journal of Marital and Family Therapy, 33*, 482-500.

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Boston: MIT Press/Bradford Books.
- Batson, C. D., Eklund, J. H., Chermok, V. L., Hoyt, J. L., & Ortiz, B. G. (2007). An additional antecedent of empathic concern: Valuing the welfare of the person in need. *Journal of Personality and Social Psychology, 93*, 65-74.
- Batson, C. D., Fultz, J., & Schoenrade, P. A. (1987). Distress and empathy: Two qualitatively distinct vicarious emotions with different motivational consequences. *Journal of Personality, 55*, 19-39.
- Batson, C. D., Lishner, D. A., Cook, J., & Sawyer, S. (2005). Similarity and nurturance: Two possible sources of empathy for strangers. *Basic and Applied Social Psychology, 27*, 15-25.
- Bauer, J. J. & Wayment, H. A. (2008). The psychology of the quiet ego. In J. J. Bauer & H. A. Wayment (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 7-19). Washington, DC: American Psychological Association.
- Begley, S. (2007). *Train you mind, change your brain*. New York: Random House Publishing.
- Beitel, M., Ferrer, E., & Cecero, J. J. (2004). Psychological mindfulness and awareness of self and others. *Journal of Clinical Psychology, 61*, 739-750.
- Block-Learner, J., Adair, C., Plumb, J. C., Rhatigan, D. L., & Orsillo, S. M. (2007). Case for mindfulness-based approaches in the cultivation of empathy: Does nonjudgmental present-moment awareness increase capacity for perspective taking and empathic concern? *Journal of Marriage and Family Therapy, 33*, 501-516.
- Bozarth, J. D., Zimring, F. M., & Tausch, R. (2002). Client-centered therapy: The evolution of a revolution. In D. J. Cain & J. Seeman (Eds.), *Humanistic psychotherapies: Handbook of research and practice* (pp. 147-188). Washington, DC: American Psychological Association.
- 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*, 822-848.

- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*, 211-237.
- Brown, K. W., Ryan, R. M., Creswell, J. D., & Niemiec, C. P. (2008). Beyond Me: Mindful responses to social threat. In J. J. Bauer & H. A. Wayment (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 75-84). Washington, DC: American Psychological Association.
- Canfield, J. (Speaker). (2005). *The success principles audio course* [CD]. New York: HarperAudio.
- Carlson, L. E., & Garland, S. N. (2005). Impact of mindfulness-based stress reduction (MBSR) on sleep, mood, stress and fatigue symptoms in cancer outpatients. *International Journal of Behavioral Medicine, 12*, 278-285.
- Carmody, J., Reed, G., Kristeller, J., & Merriam, P. (2008). Mindfulness, spirituality, and health-related symptoms. *Journal of Psychosomatic Research, 64*, 393-403.
- Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D. H. (2004). Mindfulness-based relationship enhancement. *Behavior Therapy, 35*, 471-494.
- Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D. H. (2007). Self-expansion as a mediator of relationship improvements in a mindfulness intervention. *Journal of Marriage and Family Therapy, 33*, 517-528.
- Cohen, S., & Hoberman, H. M. (1983). Positive events and social support as buffers of life change stress. *Journal of Applied Social Psychology, 13*, 99-125.
- Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. (1985). Measuring the functional components of social support. In I. G. Sarason & B. R. Sarason (Eds.), *Social support: Theory, research, and application* (pp. 73-94). The Hague, Holland: Martinus Nijhoff.
- Costa, P. T., & McCrae, R. R. (1992). *NEO PI-R Professional manual*. Odessa, FL: Psychological Assessment Resources, Inc.
- Creswell, J. D., Way, B. M., Eisenberger, N. I., & Lieberman, M. D. (2007). Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine, 69*, 560-565.
- Davidson R. J., & Harrington, A. (Eds.). (2002). *Visions of compassion: Western scientists and Tibetan Buddhists examine human nature*. New York: Oxford University Press.

- Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. G., et al. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, *65*, 564-570.
- Davis, M. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*, *10*, 85.
- Davis, M. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, *44*, 113-126.
- Decety, J., & Sommerville, J. A. (2003). Shared representations between self and other: A social cognitive neuroscience view. *Trends in Cognitive Science*, *7*, 527-533.
- Dekeyser, M., Raes, F., Leijssen, M., Seysen, S., & Dewulf, D. (2008). Mindfulness skills and interpersonal behaviour. *Personality and Individual Differences*, *44*, 1235-1245.
- Eisenberg, N., Fabes, R. A., Murphy, B., Karbon, M., Smith, M., & Maszk, P. (1996). The relations of children's dispositional empathy-related responding to their emotionality, regulation, and social functioning. *Developmental Psychology*, *32*, 195-209.
- Fliege, H., Rose, M., Arck, P., Walter, O. B., Kocalevent, R., Weber, C., et al. (2005). The Perceived Stress Questionnaire (PSQ) reconsidered: Validation and reference values from different clinical and healthy adults. *Psychosomatic Medicine*, *67*, 78-88.
- Fruzzetti, A. E., & Iverson, K. M. (2004). Mindfulness, acceptance, validation, and "individual" psychopathology in couples. In S. C. Hayes, V. M. Follette, & M. M. Linehan (Eds.), *Mindfulness and Acceptance: Expanding the cognitive-behavioral tradition* (pp. 168-191). New York: Guilford Press.
- Galantino, M. L., Baime, M., Maguire, M., Szapary, P. O., & Farrar, J. T. (2005). Short communication: Association of psychological and physiological measures of stress in health-care professionals during an 8-week mindfulness meditation program: Mindfulness in practice. *Stress and Health*, *21*, 255-261.
- Gilbert, P., & Tirch, D. (2009). Emotional memory, mindfulness, and compassion. In F. Didonna (Ed.), *Clinical handbook of mindfulness* (pp.99-110). New York: Springer Science.
- Grossman, P. (2008). On measuring mindfulness in psychosomatic and psychological research. *Journal of Psychosomatic Research*, *64*, 405-408.

- Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57*, 35-43.
- Hassin, R. R., Aarts, H., & Ferguson, M. J. (2005). Automatic goal inferences. *Journal of Experimental Social Psychology, 41*, 129-140.
- Hayes, A. M., & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology: Science and Practice, 11*, 255-262.
- Heppner, W. L., Kernis, M. H., Lakey, C., Campbell, W. K., Goldman, B. M., Davis, P. J., et al. (2008). Mindfulness as a means of reducing aggressive behavior: Dispositional and situational evidence. *Aggressive Behavior, 34*, 1-11.
- Hodges, S. D., & Biswas-Diener, R. (2007). Balancing the empathy expense account: Strategies for regulating empathic response. In T. F. D Farrow & P. W. R Woodruff (Eds.), *Empathy in mental illness* (pp. 389-407). Cambridge, UK: Cambridge University Press.
- Holbrook, J. (2006). The time course of social perception: Inferences of intentionality, goals, beliefs, and traits from behavior. (Doctoral dissertation, University of Oregon, 2006). *Dissertation Abstracts International, 67*, 6113.
- Ickes, W. (1990). Naturalistic social cognition: Empathic accuracy in mixed-sex dyads. *Journal of Personality and Social Psychology, 59*, 730-742.
- Ickes, W. (1997). *Empathic Accuracy*. New York: Guilford Press.
- Ickes, W. (2003). *Everyday Mind Reading*. Amherst, NY: Prometheus Books.
- Ickes, W., Gesn, P. R., & Graham, T. (2000). Gender differences in empathic accuracy: differential ability or differential motivation? *Personal Relationships, 7*, 219-234.
- James, W. (1902/1985). *The Varieties of Religious Experience*. Cambridge, MA: Harvard University Press.
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102-138). New York: Guilford.
- Judd, C. M., McClelland, G. H., & Ryan, C. S. (2009). *Data analysis: A model comparison approach* (2nd ed.). New York: Routledge.

- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York: Delacourt.
- Kabat-Zinn, J. (Speaker). (2001). *In this moment: A guided mindfulness meditation practice* [CD]. Louisville, CO: Sounds True.
- Kernis, M. H., & Heppner, W. L. (2008). Individual differences in quiet ego functioning: Authenticity, mindfulness, and secure self-esteem. In J. J. Bauer & H. A. Wayment (Eds.), *Transcending self-Interest: Psychological explorations of the quiet ego* (pp. 85-94). Washington, DC: American Psychological Association.
- Klein, K. J. K., & Hodges, S. D. (2001). Gender differences, motivation, and empathic accuracy: When it pays to understand. *Personality and Social Psychology Bulletin*, 27, 720-730.
- Krueger, J. I., & Funder, D. C. (2004). Towards a balanced social psychology: Causes, consequences, and cures for the problem-seeking approach to social behavior and cognition. *Behavioral and Brain Sciences*, 27, 313-376.
- La Monica, E. (1981). Construct validity of an empathy instrument. *Res. Nurse Health*, 4, 389-400.
- Lama, D. (2002). Understanding our fundamental nature. In R. J. Davidson & A. Harrington (Eds.), *Visions of compassion: Western scientists and Tibetan Buddhists examine human nature* (pp. 66-80). New York: Oxford University Press.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (2005). *International affective picture system (IAPS): Affective ratings of pictures and instruction manual* (Tech. Rep. A-6). Gainesville: University of Florida.
- Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., et al. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology*, 62, 1445-1467.
- Laurent, S. M., & Hodges, S. D. (2009). Gender roles and empathic accuracy: The role of communion in reading minds. *Sex Roles*, 60, 387-398.
- Leary, M. R. (2004). *The curse of the self: Self-awareness, egotism and the quality of human life*. New York: Oxford University Press.
- Leary, M. R., & Tate, E. B. (2007). The multi-faceted nature of mindfulness. *Psychological Inquiry*, 18, 251-255.

- Leary, M. R., Tipsord, J. M., & Tate, E. B. (2008). Allo-inclusive identity: Incorporating the social and natural worlds into one's sense of self. In J. J. Bauer & H. A. Wayment (Eds.), *Transcending self-Interest: Psychological explorations of the quiet ego* (pp. 137-148). Washington, DC: American Psychological Association.
- Lesh, T. (1970). Zen meditation and the development of empathy in counselors. *Journal of Humanistic Psychology*, 10, 39-74.
- Levenson, R. F., & Ruef, A. M. (1992). Empathy: A physiological substrate. *Journal of Personality and Social Psychology*, 63, 234-246.
- Levenstein, S., Prantera, C., Varvo, V., Scribano, M. L., Berto, E., Luzi, C., et al. (1993). Development of the Perceived Stress Questionnaire: A new tool for psychosomatic research. *Journal of Psychosomatic Research*, 37, 19-32.
- Long, E. C. J., Angera, J. J., Carter, S. J., Nakamoto, M., & Kalso, M. (1999). Understanding the one you love: A longitudinal assessment of an empathy training program for couples in romantic relationships. *Family Relations*, 48, 235-242.
- Malle, B. F. (2005). The puzzle of mindreading. In B. F. Malle & S. D. Hodges (Eds.), *Other Minds: How humans bridge the divide between self and others* (pp. 26-43). New York: Guilford Press.
- Malle, B. F. (2008). The fundamental tools, and possibly universals, of social cognition. In R. Sorrentino & S. Yamaguchi (Eds.), *Handbook of motivation and cognition across cultures* (pp. 267-296). New York: Elsevier/Academic Press.
- Malle, B. F., & Pearce, G. (2001). Attention to behavioral events during social interaction: Two actor-observer gaps and three attempts to close them. *Journal of Personality and Social Psychology*, 81, 278-294.
- Mor, N., & Winquist, J. (2002). Self-focused attention and negative affect: A meta-analysis. *Psychological Bulletin*, 128, 638-662.
- Neff, K. D. (2003). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2, 85-102.
- Nhat Hanh, T. (1991). *Peace is every step*. New York: Bantam Books.
- Perner, J. (1991). *Understanding the representational mind*. Cambridge, MA: MIT Press.

- Ramel, W., Goldin, P. R., McQuaid, J. R., & Carmona, P. E. (2004). The effects of mindfulness meditation on cognitive processes and affect in patients with past depression. *Cognitive Therapy and Research, 28*, 433-455.
- Rogers, C. (1957). The necessary and sufficient conditions of therapeutic personality change. *Journal of Consulting Psychology, 21*, 95-103.
- Rosch, E. (2007). More than mindfulness: When you have a tiger by the tail, let it eat you. *Psychological Inquiry, 18*, 258-264.
- Ryff, C. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*, 1069-1081.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-Based Cognitive Therapy for Depression*. New York: Guilford Press.
- Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive Psychology. *American Psychologist, 55*, 5-14.
- Shapiro, S. L., Astin, J. A., Bishop, S. R., & Cordova, M. (2005). Mindfulness-based stress reduction for health care professionals: Results from a randomized trial. *International Journal of Stress Management, 12*, 164-176.
- Shapiro, S. L., Brown, K. W., & Biegel, G. M. (2007). Teaching self-care to caregivers: Effects of mindfulness-based stress reduction on the mental health of therapists in training. *Training and Education in Professional Psychology, 1*, 105-115.
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*, 373-386.
- Shapiro, S. L., Oman, D., Thoresen, C. E., Plante, T. G., & Flinders, T. (2008). Cultivating mindfulness: Effects on well-being. *Journal of Clinical Psychology, 64*, 840-862.
- Shapiro, S. L., Schwartz, G. E., & Bonner, G. (1998). Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioral Medicine, 21*, 581-597.
- Shapiro, S. L., Schwartz, G. E. R., & Santeere, C. (2005). Meditation and positive psychology. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 632-645). Oxford, England: Oxford University Press.

- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, 7, 422-445.
- Smith, B. W., Shelley, B. M., Dalen, J., Wiggins, K., Tooley, E., & Bernard, J. (2008). A pilot study comparing the effects of mindfulness-based and cognitive-behavioral stress reduction. *The Journal of Alternative and Complementary Medicine*, 14, 251-258.
- Speca, M., Carlson, L. E., Goodey, E., & Angen, M. (2000). A randomized, wait-list controlled clinical trial: The effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients. *Psychosomatic Medicine*, 62, 613-622.
- Springer, K. W., Hauser, R. M., & Freese, J. (2006). Bad news indeed for Ryff's six factor model of well-being. *Social Science Research*, 35, 1120-1131.
- Thompson, B. L., & Waltz, J. (2007). Everyday mindfulness and mindfulness meditation: Overlapping constructs or not? *Personality and Individual Differences*, 43, 1875-1885.
- Tipsord, J., & Leary, M. R. (2004, January). *Inclusion of others in the self: Extensions to generic people, animals, nature, and God*. Poster session presented at the annual meeting of the Society for Personality and Social Psychology, Austin, TX.
- Tipsord, J., & Malle, B.F. (2007, January). *The effects of mindfulness, previous experience, and metacognitive awareness on emotion*. Poster session presented at the annual meeting of the Society for Personality and Social Psychology, Memphis, TN.
- Tipsord, J., & Malle, B. F. (2008, February). *Mindfulness and emotion: The importance of nonjudging and breathing*. Poster session presented at the annual meeting of the Society for Personality and Social Psychology, Albuquerque, NM.
- Tucker, D. M., Luu, P., & Derryberry, D. (2005). Love hurts: The evolution of empathic concern through the encephalization of nociceptive capacity. *Development and Psychopathology*, 17, 699-713.
- Van Boven, L., & Lowenstein, G. (2003). Social projection of transient drive states. *Personality and Social Psychology Bulletin*, 29, 1159-1168.

- Van Dam, N. T., Earlywine, M., & Danoff-Burg, S. (2009). Differential item function across meditators and non-meditators on the Five Facet Mindfulness Questionnaire. *Personality and Individual Differences, 47*, 516-521.
- Wachs, K., & Cordova, J. V. (2007). Mindful relating: Exploring mindfulness and emotion repertoires in intimate relationships. *Journal of Marital and Family Therapy, 33*, 464-481.
- Watson, D., & Clark, L. A. (1994). *THE PANAS-X: Manual for the positive and negative affect schedule-expanded form*. Unpublished manuscript, University of Iowa, Iowa City.
- Weiss, A. (2004). *Beginning Mindfulness: Learning the way of awareness*. Novota, CA: New World Library.