A Dissertation

entitled

Minding the Reflexive Stage of the Temporal Need-Threat Model:

State and Trait Mindfulness as Moderators of the Immediate Effects of Social Exclusion

by

Joseph A. Reed

Submitted to the Graduate Faculty as partial fulfillment of the

requirements for the Doctor of Philosophy Degree in Psychology

_____
Wesley A. Bullock, PhD, Committee Chair

_____
Stanley Edwards, PhD, Committee Member

_____
Sarah E. Francis, PhD, Committee Member

_____
Peter G. Mezo, PhD, Committee Member

_____
Jason P. Rose, PhD, Committee Member

_____
Mojisola F. Tiamiyu, PhD, Committee Member

_____
Amanda Bryan-Friedrich, Dr. rer. Nat, Dean
College of Graduate Studies

The University of Toledo

May 2018

Copyright 2018, Joseph A. Reed

This document is copyrighted material. Under copyright law, no parts of this document may be reproduced without the expressed permission of the author.

An Abstract of

Minding the Reflexive Stage of the Temporal Need-Threat Model:
State and Trait Mindfulness as Moderators of the Immediate Effects of Social Exclusion

by

Joseph A. Reed

Submitted to the Graduate Faculty as partial fulfillment of the
requirements for the Doctor of Philosophy Degree in Psychology

The University of Toledo
May 2018

Social exclusion or ostracism is a common and universally distressing phenomenon that elicits a "social pain" response that is neurologically similar to a physical pain response (Eisenberger, 2015; Hartgerink et al., 2015; Nezlek et al., 2012). The temporal need-threat model posits that individuals respond to social exclusion in three successive stages. The reflexive stage is characterized by an immediate, brief, reflex-like reaction to social exclusion. The reflexive stage is followed by reflective and resignation stages, which are characterized by shorter- and longer-term reactions to social exclusion (Williams, 2001). The purpose of the current study was to evaluate whether a brief mindful meditation exercise lessens the immediate, reflexive negative effects of being socially excluded while playing Cyberball. The impact of trait mindfulness and the "Big Five" personality traits on the immediate negative effects of being socially excluded were also examined. Sixty-five undergraduate participants were recruited and randomly assigned to a mindful breathing intervention group or an educational video control group. Participants were also randomly assigned to Cyberball inclusion or Cyberball exclusion conditions. Participants completed multiple state and trait mindfulness measures, the Big Five Inventory (BFI;

John & Srivastava, 1999), and the Need Threat Scale (Williams, 2009). During the Cyberball procedure, participants' moods were rated at eight time points; thus, the trajectories of participants' moods were tracked during Cyberball. Growth curve modeling found no significant differences in the linear or quadratic growth rates of mood ratings between participants in the mindful breathing and video control groups. Growth curve modeling also found no significant differences in the linear or quadratic growth rates of mood ratings between participants designated higher in trait mindfulness and lower in trait mindfulness. These findings suggest that state and trait mindfulness do not moderate the immediate, reflex-like responses to social exclusion and add further evidence in support of the reflexive stage of the temporal need-threat model.

Acknowledgements

Firstly, I want to thank my advisor, Dr. Wesley Bullock, for his guidance, patience, and support throughout my graduate school training. He has taught me the wisdom of recovery and mindfulness, all the while being humane, compassionate, and inexplicably forgiving of the foibles of others. He is the kind of psychologist I aspire to be. I want to thank my dissertation committee, Dr. Stanley Edwards, Dr. Sarah Francis, Dr. Peter Mezo, Dr. Jason Rose, and Dr. Mojisola Tiamiyu, for their support and encouragement. I want to thank Dr. Joni Mihura for teaching me the value of the Rorschach and introducing me to the practice of psychodynamic therapy.

I have been fortunate to have met and worked with so many kind, intelligent people over the years. I want to thank my current and former lab peers: Dan Charek, Josh Eblin, Rob Graceffo, Wilson Hsiao, Heidi Haenisch, Andrea Kiss, David Marino, David Medved, Heather Schultz, and Sean Walsh. I especially want to thank David Medved for his feedback on an early draft of this dissertation. I also want to thank Michelle Davis for her review of my statistical analyses and her thoughtful feedback.

Finally, I want to thank my family for their lifelong support and encouragement, without which this dissertation would not have been possible.

Table of Contents

Abstract iii

Acknowledgements v

Table of Contents vi

List of Tables ix

List of Figures x

I. Chapter One: Review of the Literature 1

A. Social Exclusion, Ostracism, and Rejection 1

B. The Belongingness Hypothesis 3

C. Social Exclusion Experimental Paradigms 7

D. The Exclusion Theory of Anxiety 12

E. The Cognitive Deconstruction Model 14

F. The Temporal Need-Threat Model 17

G. The Social Exclusion of Everyday Life 24

H. State and Trait Mindfulness 26

I. Mindfulness Meditation 29

J. The Effects of Mindfulness Meditation 30

K. Mindfulness and Social Exclusion 34

L. Statement of the Problem 40

M. Purpose of the Current Study 42

N. Hypotheses 42

II. Chapter Two: Method 44

A. Pilot Study 44

B. Participants and Setting 44

C. Design and Procedure 45

D. Measures 48

a. Demographics Form 48

b. Mindfulness Attention Awareness Scale - Trait 48

c. Five Facet Mindfulness Questionnaire 49

d. Big Five Inventory 49

e. Mindfulness Attention Awareness Scale - State 50

f. Toronto Mindfulness Scale 50

d. Need Threat Scale 51

C. Data Analyses 52

a. Hypothesis One 52

b. Hypothesis Two 54

c. Hypothesis Three 55

d. Hypothesis Four 56

e. Hypothesis Five 56

III. Chapter Three: Results 57

A. Descriptive Statistics 57

B. Manipulation Checks 58

C. Hypothesis One 59

D. Hypothesis Two 64

E. Hypothesis Three 65

F. Hypothesis Four 66

G. Hypothesis Five 66

H. Post Hoc Analyses 67

VI. Chapter Four: Discussion 70

A. Summary of the Study 70

B. Key Findings 70

C. Limitations 79

D. Implications and Future Directions 81

References 85

Appendices

A. Consent Form 105

B. Demographics Form 107

C. Mindful Attention Awareness Scale (MAAS) – Trait 108

D. Five Facet Mindfulness Questionnaire (FFMQ) 110

E. Big Five Inventory (BFI) 112

F. Mindful Attention Awareness Scale (MAAS) – State 113

G. Mindful Breathing Exercise Transcript 114

H. Toronto Mindfulness Scale (TMS) 115

I. Need Threat Scale 116

J. Need Threat Scale - Delay 117

List of Tables

Table 1. Descriptive statistics for participants (N=65). …… ... 57

Table 2. Mood rating growth rates for mindfulness and video control groups. 61

Table 3. Mean BFI traits (N=65). 68

List of Figures

Figure 1. Screenshot of the Cyberball procedure. The participant plays as "Player 2." . 8

Figure 2. Descriptions of the stages of the temporal need-threat model. 20

Figure 3. Line Graph of Mean Mood Ratings for the Mindful Breathing – Excluded and Video Control – Excluded Groups. 63

Figure 4. Line Graph of Mean Mood Ratings for Mindful Breathing – Included and Video Control – Included Groups. 63

Figure 5. Line Graph of Mean Mood Ratings for the Low Trait Mindfulness – Excluded and High Trait Mindfulness – Excluded Groups. 65

Chapter One

Review of the Literature

Social Exclusion, Ostracism, and Rejection

Social exclusion, ostracism, and rejection are similar terms that can generally be defined as actual or perceived social rejection (Baumeister, Brewer, Tice, & Twenge, 2007; Maner, DeWall, Baumeister, & Schaller, 2007; Stillman et al., 2009; Williams, 2007). Unfortunately, these terms have been used interchangeably throughout the literature and there is not currently an agreed upon distinction between them (Williams, 2007). For the purposes of this review, the term social exclusion will be used throughout and will be treated as synonymous to ostracism and rejection.

As a phenomenon, social exclusion has been observed across cultures, history, and even species, e.g., bees, primates, lions, bears, and wolves (Williams, 2001; Williams, 2007). Social exclusion is believed to be an adaptive response to deviance within a group, wherein deviant group members are excluded until their behavior conforms to the group's behavior. This ensures group cohesion and cooperation and is believed to increase the chances of survival of the group (Gruter & Masters, 1986; Molleman, Quiñones, & Weissing, 2013; Williams, Cheung, & Choi, 2000; Williams, 2007).

Whether perpetrated by group, individual, or institution, social exclusion is generally a punitive act, i.e., social exclusion is punishment for unacceptable behavior. The contemporary term ostracism originates from the Greek term "ostrakismos" (Williams, 2001). Ostrakismos was a fifth century B.C. Greek political procedure in which Athenian citizens would gather and vote whether or not to ostracize political elites

who had violated social mores. Votes were recorded on pottery tablets, "ostraca," sometimes alongside spiritual/religious curses directed at those being ostracized. It should be noted that ostracism in Athens was not synonymous with being banished or exiled. The citizens who were ostracized were generally allowed to return to Athens after a period of several years (Forsdyke, 2005).

Though social exclusion is also perpetrated by groups and institutions, it more often than not arises interpersonally. Children, for instance, have been observed to exclude classroom bullies without the prompting of teachers or parents (Barner-Barry, 1986). Another example, observed in children and adults alike, is the "silent treatment" (Asher & Coie, 1990; Williams, 2001). The silent treatment is especially common in romantic relationships, with an estimated 70 percent of people in the United States (US) reporting that they have received the silent treatment from their partner and a little less than 70 percent reporting that they have given their partner the silent treatment (Faulkner et al., 1997, as cited by Williams, 2007).

Whether perpetrated by a group, individual, or romantic partner, social exclusion is painful (e.g., Eisenberger, Lieberman, & Williams, 2003; Williams, 2001; Williams & Sommer, 1997; Zadro, Williams, & Richardson, 2004). As Williams James (1890) noted:

> We are not only gregarious animals, liking to be in sight of our fellows, but we have an innate propensity to get ourselves noticed, and noticed favorably, by our kind. No more fiendish punishment could be devised, were such a thing physically possible, than that one should be turned loose in society and remain absolutely unnoticed by all the members thereof… a kind of rage and impotent despair would ere long well up in us, from which the cruelest bodily tortures

> would be a relief; for those would make us feel that, however bad might be our plight, we had not sunk to such a depth as to be unworthy of attention at all. (p. 293-294)

Before reviewing the theory and effects of social exclusion, it is important to delineate the concept of social exclusion from other similar related concepts. Social exclusion differs from loneliness, which generally refers to the disparity that exists between one's desired relationships and actual or perceived relationships (Russell, Peplau, & Cutrona, 1980; Weiss, 1973). In colloquial terms, loneliness has been defined as the unwanted, subjective sense of feeling alone, accompanied with the belief that one has no choice in the matter (Killeen, 1998; Tzouvara, Papadopoulos, & Randhawa, 2015). Relatedly, "aloneness" refers to being alone and may be either positive or negative depending on a person's desires. Social isolation refers to reduced or limited social contacts and is not synonymous with loneliness, though they often co-occur. Social isolation has been considered intermediate to the concepts of loneliness and aloneness (Tzouvara et al., 2015). A person who chooses social isolation experiences aloneness; a person who does not choose social isolation but is socially isolated experiences loneliness (Killeen, 1998); a person who is excluded by others incidentally or purposefully experiences social exclusion (Williams, 2007). Social isolation, aloneness, loneliness, and social exclusion can and often do co-occur.

The Belongingness Hypothesis

It is not easy being a "social animal" (Aristotle, 1885/2000). The tension between the desire for social relationships and the problems inherent in social relationships is perhaps best illustrated in Schopenhauer's (1964) porcupine allegory.

> A number of porcupines huddled together for warmth on a cold day in winter; but, as they began to prick one another with their quills, they were obliged to disperse. However the cold drove them together again, when just the same thing happened… In the same way the need of society drives the human porcupines together, only to be mutually repelled by the many prickly and disagreeable quality of their nature (p. 226).

Freud considered the relationship between infant and mother to be of primary importance and attributed the importance of the relationship to the mother's ability to satiate the infant's drives. The drive cannot be satisfied without the mother (Freud, 1912; Mitchell & Black, 1995) and the mother is the "object" of the drive (Moore & Fine, 1990). The relationship functions as a mechanism for satisfying the drive but is of secondary importance to satisfying the drive.

Theoretical work by Horney (1945/1992), Erikson (1950/1993), Maslow (1968/1999), and especially Fairbairn (1941) transformed Freud's drive theory into an object relations theory, in which drive gratification was of secondary importance to the relationship. Object relations theory argues that the motivation for relationships is the superordinate "drive", not sexuality or aggression (Greenberg & Mitchell, 1983).

Empirical research into the significance of social relationships as an innate motivation began with the work of Spitz (1946; 1949), Harlow (1958; Harlow & Zimmermann, 1959), and most influentially, Bowlby (1958; 1988), whose attachment theory continues to inform developmental and clinical research. Spitz, Harlow, and Bowlby focused on the significance and biological roots of the relationship between mother and infant (Baumeister & Leary, 1995). Though research supports the existence

of an innate, biologically-based motivation for infants and mothers to connect, this phenomenon does not necessarily extend to other types of relationships.

Baumeister and Leary's (1995) comprehensive, theoretical paper, "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation," provided an empirical, evidence base for the hypothesis that the motivation for social relationships is an innate drive. They refer to this as the "belongingness hypothesis" and argue that the desire for social relationships, i.e., belongingness, is a human need, not a want.

> …The belongingness hypothesis is that human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships. Satisfying this drive involves two criteria: First, there is a need for frequent, affectively pleasant interactions with a few other people, and second, these interactions must take place in the context of a temporarily stable and enduring framework of affective concern for each other's welfare…A lack of belongingness should constitute severe deprivation and cause a variety of ill effects. Furthermore, a great deal of human behavior, emotion, and thought is caused by this fundamental interpersonal motive (p. 497).

In their review, they argue that the following predictions would be true if the belongingness hypothesis were correct: 1) social bonds would normally form easily and rapidly, 2) there would be resistance to breaking social bonds once formed, 3) relationships would both be a subject of cognitive processes and influence cognitive processes, 4) positive affect would normally result from establishing and maintaining social bonds, 5) negative affect would normally result from loss of or exclusion from

social bonds, and 6) deprivation of belongingness would lead to diverse problems. In their review of the literature, they find strong support for the first prediction, modest support for the second prediction, strong support for the third prediction, modest support for the fourth and fifth prediction, and modest support for the sixth prediction (Baumeister & Leary, 1995).

Key constructs within the belongingness hypothesis include "satiation," "substitution," and "innateness." Satiation refers to the phenomenon of decreased motivation for belongingness once a certain level of belongingness is reached or satiated. Substitution refers to the ability for individuals to replace one social bond with another social bond when necessary. The authors find tentative evidence for both satiation and substitution. Innateness refers to the hypothesis that the need to belong is biologically, constitutionally present in all humans and that belongingness is an end in and of itself, not a means to an end (Baumeister & Leary, 1995).

Evolutionary explanations for the belongingness hypothesis are similar to the evolutionary hypotheses for mother and infant attachment (Maxwell, Spielmann, Joel, & MacDonald, 2013). Safety is paramount; relationships with others are necessary for group survival and for the sharing of resources (Brewer, 2004). Early humans would not likely have been able to survive on their own. In ancient Greece, for example, exile and death were considered equivalent punishments (DeWall, Deckman, Pond, & Bonser, 2011). Though the contention that belongingness is an innate motivation is plausible, Baumeister & Leary (1995) found only tentative support in the extant literature. Irrespective of whether belongingness is an innate motivation, there is a large body of

evidence in the experimental literature indicating that social exclusion is universally aversive.

Social Exclusion Experimental Paradigms

Much of the research on social exclusion has been conducted experimentally by inducing social exclusion in laboratory settings. There have been several experimental paradigms developed to induce social exclusion or an analogue state similar to social exclusion. The most commonly used paradigm within the literature is Cyberball, a virtual ball tossing computer game in which participants ostensibly toss a ball back forth with two other players connected over the internet. See Figure 1 for a screenshot of the Cyberball computer game. The game typically consists of between 30 and 50 ball tosses. In the included condition, participants are tossed the ball an equal number of times to the other computer players. In the exclusion condition, however, participants are quite obviously tossed the ball fewer times than either of the other players (Hartgerink, van Beest, Wicherts, & Williams, 2015; Williams & Jarvis, 2006; Williams, 2007). Cyberball is based on Williams's original ball tossing paradigm which consisted of a participant tossing a ball back and forth with two live confederates who would then exclude the participant (Williams, 2007).

Researchers often compare the effects of Cyberball between inclusion and exclusion conditions. A major question in the Cyberball literature has been whether the inclusion condition is indeed a true "control" condition or a condition that might produce a positive effect in itself. In a recent study, Simard and Dandeneau (2017) compared the effects of Cyberball between an included condition and a "neutral" control condition, in which participants were tasked with classifying 24 words into four categories. The

authors found the effects of the inclusion condition and "neutral control" condition to be comparable in terms of self-reported belongingness, self-esteem, meaningful existence, and control. These factors are believed to be threatened in response to social exclusion and will be explored further below.

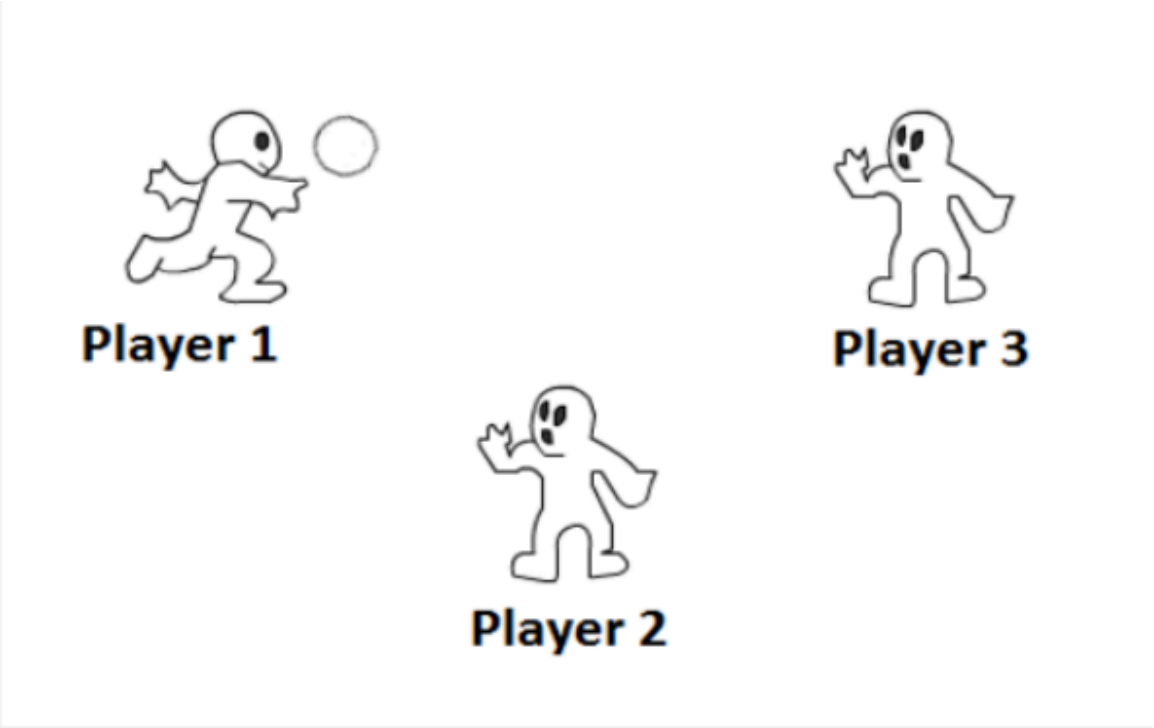

Figure 1. Screenshot of the Cyberball procedure. The participant plays as "Player 2."

Neurophysiologically, a review of 42 studies found the Cyberball exclusion condition to activate the insula, anterior cingulate cortex, temporal lobe, and prefrontal cortex (Wang, Braun, & Enck, 2017). Hartgerink et al.'s (2015) meta-analysis of 120 published studies found Cyberball to have a large effect on self-reported distress, Cohen's $d > 1.4$, and found the effect to be robust against sample characteristics, such as age, gender, and structural characteristics of the game, e.g., number of ball tosses, duration. Though the authors found effect sizes to be generally consistent across dependent measures, they noted that the effect sizes decreased from first to last measure.

Thus, the effects of Cyberball dissipate rather quickly. In addition to increases in distress, Cyberball has also been found to decrease self-esteem and increase state paranoia (Stewart et al., 2017).

Another experimental paradigm, the life-alone prognosis paradigm, begins with participants taking the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) and then being provided with accurate feedback about their degree of extraversion, i.e., whether they score low, medium, or high in extraversion (Twenge, Baumeister, Tice, & Stucke, 2001; Twenge, Catanese, & Baumeister, 2002; Williams, 2007). Participants are then provided with printouts of one of three predictions. In the accepted/non-excluded condition, participants read:

> You're the type who has rewarding relationships throughout life. You're likely to have a long and stable marriage and have friendships that will last into your later years. The odds are that you'll always have friends and people who care about you. (Twenge et al., 2001, p. 1060)

In the excluded condition, participants read:

> You're the type who will end up alone later in life. You may have friends and relationships now, but by your mid 20s most of these will have drifted away. You may even marry or have several marriages, but these are likely to be short-lived and not continue into your 30s. Relationships don't last, and when you're past the age where people are constantly forming new relationships, the odds are you'll end up being alone more and more. (Twenge et al., 2001, p. 1060)

In the misfortune control condition, participants read:

> You're likely to be accident prone later in life – you might break an arm or leg a few times, or maybe be injured in car accidents. Even if you haven't been accident prone before, these things will show up later in life, and the odds are you will have a lot of accidents. (Twenge et al., 2001, p. 1060)

Participants in the excluded condition have quite negative reactions. The life-alone prognosis paradigm has been found to be associated with generally more aggressive reactions than the Cyberball paradigm. It has been suggested that the life-alone prognosis paradigm may induce an emotional state more akin to depression than social exclusion (Twenge et al., 2001; Twenge et al., 2002; Twenge, Catanese, & Baumeister, 2003; Williams, 2007). Differential responses to the exclusion paradigms will be discussed further below.

A third paradigm is the first impressions paradigm, which begins with participants exchanging video messages with an assigned partner. Participants first view a recorded message by their partner introducing him or herself and are then instructed to record their own video. After participants record their message, experimenters leave the room for five minutes and then return to provide participants with one of three possible feedbacks. In the accepted condition feedback, participants are informed that their partners held favorable views of them and were looking forward to meeting them. In the neutral condition feedback, participants are informed that their partners had forgotten about an appointment and had to leave abruptly prior to viewing the participant's video. In the exclusion condition feedback, however, participants are informed that their partners viewed their video but declined to meet with them (Maner et al., 2007; Stillman et al., 2009; Vorauer, Cameron, Holmes, & Pearce, 2003).

The “Get Acquainted” paradigm begins with participants meeting as a group and casually discussing several general topics selected by the experimenter. Participants are then separated and instructed to indicate the group members with whom they would most prefer to work. The experimenter provides participants with one of two feedback responses. In the included condition, participants are informed that all group members had selected them to be their partner, while in the excluded condition, participants are notified that none of the group members had selected them to be their partner (Maner et al., 2007; Williams, 2007).

In another permutation of the “Get Acquainted” paradigm, participants read descriptions of other possible group members, write descriptions of themselves, select two group members with whom they would prefer to work, and rank-order the remaining group members. Participants are informed that, depending on rankings, some participants will be working in groups while others will work individually. Participants in the excluded condition are notified that, based on how they were ranked, they will be working alone (Nezlek, Kowalski, Leary, Blevins, & Holgate, 1997).

Another experimental manipulation of note involves having participants visualize and write about a past experience of social exclusion. Participants are instructed to “relive” this past experience of being excluded. Though this manipulation is procedurally quite different from the other experimental paradigms, preliminary research has found the effects of “reliving” an experience of social exclusion to be similar to the effects of other active experimental manipulations, e.g., Cyberball (Gardner, Pickett, & Brewer, 2000; Maner et al., 2007; Pickett, Gardner, & Knowles, 2004).

The Exclusion Theory of Anxiety

Baumeister and Tice (1990) formulated one of the first comprehensive theories of social exclusion, arguing that actual or anticipated social exclusion is one of the factors responsible for the experience of anxiety. The exclusion theory of anxiety is grounded in the assumption that humans have evolved to live in small groups and experience distress when excluded from the group. According to the theory, anxiety arises from both actual exclusion and anticipated exclusion. Exclusion is dangerous; the function of anxiety for social exclusion is the same as the function of anxiety for other phenomena. Baumeister and Tice (1990) argue that anxiety functions as an "interrupt mechanism." Anxiety directs attention to behaviors that could lead one to be excluded, i.e., anxiety triggers self-focused attention which prevents one from engaging in behaviors that could lead to exclusion (Baumeister & Tice, 1990, p. 170).

Baumeister and Tice (1990) posit three reasons people may be excluded from the group. Firstly, people may be excluded for not contributing as much to the group as expected of them. Related to this type of exclusion include anxieties about not living up to one's expectations, being evaluated, and performance. A second reason people may be excluded from the group is for transgression of the group's interpersonal rules and mores. Anxiety about breaking rules and guilt for having broken rules are associated with this type of exclusion. Thirdly, people may be excluded from the group for physical and/or characterological unattractiveness. Social anxieties related to appearance and social competence are associated with this form of exclusion.

Components of the exclusion theory of anxiety are well supported in the literature. Research over the previous two decades has clearly demonstrated that people

find social exclusion distressing (e.g., Hartgerink et al., 2015). With regard to anxiety, recent research conducted by Fung and Alden (2017) found that experiences of social exclusion can contribute to the development of social anxiety. In Fung and Alden (2017), participants played Cyberball on one occasion and then returned to play Cyberball a second time, two days later. Participants excluded in the first round of Cyberball reported greater social anxiety prior to and during the second Cyberball game. Interestingly, the authors found participants social anxiety to be mediated by the intensity of the "pain" associated with the exclusion event.

Social exclusion has also been found to be associated with depression, increased rates of suicide attempts (Williams & Zadro, 2001), and increased suicide mortality (Yur'yev et al., 2011). The distress that arises from social exclusion is a generalized distress. Research participants are distressed by social exclusion even when the exclusion is perpetuated by a disliked outgroup or when the excluder is indicated to be a computer (Fayant, Muller, Hartgerink, & Lantian, 2014; Gonsalkorale & Williams, 2007; Zadro et al., 2014).

The exclusion theory of anxiety predicts that people who are excluded or anticipate being excluded will modify their behavior in order to rejoin the group or remain included within the group. There is some research that suggests that exclusion can increase an individual's conformity to the group (Williams et al., 2000). Prosocial behavior, for example, has been observed to be a response to social exclusion when participants expect their prosocial behavior to lead to social acceptance (Maner et al., 2007). One of the weaknesses of the exclusion theory of anxiety is its difficulty in explaining common and seemingly counterproductive responses to exclusion, including

increases in aggression and self-defeating behaviors and decreases in prosocial behavior (Buckley, Winkel, & Leary, 2004; DeWall & Richman, 2011; DeWall, Twenge, Gitter, & Baumeister, 2009; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007; Twenge, Catanese, & Baumeister, 2002). In addition, it remains to be seen whether anxiety or mood is most impacted by exclusion. As noted, social exclusion has also been found to decrease participants ratings of self-esteem and meaningful existence and to increase self-reported sadness (Leary, Tambor, Terdal, & Downs, 1994; Williams, 2001; Williams & Sommer, 1997; Zadro et al., 2004).

The Cognitive Deconstruction Model

Twenge et al.'s (2003) cognitive deconstruction model of social exclusion posits that people defend against the distress of exclusion by entering a mental state referred to as cognitive deconstruction. It should be noted that cognitive deconstruction is also hypothesized to be a mental state that occurs in some individuals just prior to attempting suicide. The state of cognitive deconstruction is characterized by a fixed focus on the present, the perception that time is passing more slowly, a sense of the meaninglessness of life, lethargy, lack of emotion or emotional numbness, and the avoidance of self-awareness. The effect of cognitive deconstruction has been compared to the imagined effect of a "stun gun" (Twenge et al., 2003; Williams, 2001). The function of cognitive deconstruction is believed to be the avoidance of both negative emotion and self-awareness (Baumeister, 1990; Twenge et al., 2003).

Across five experiments, Twenge et al. (2003) found some support for the cognitive deconstruction model of social exclusion. The authors found excluded participants to report a distorted sense of time, i.e., time passed more slowly. Excluded

participants were also found to focus more on the present, to struggle to think of the future, and to report less of a sense of meaning in life. Excluded participants reported to be more passive and lethargic than non-excluded participants. In addition, excluded participants showed emotional numbness, as evidence by the apparent absence of impact of exclusion on explicit mood ratings. This absence of effect on explicit mood rating, however, did not extend to implicit mood ratings. On the implicit mood task, participants were instructed to select, from a list of four possible words, the words that they had seen flash across a computer screen (with one word being a positive emotion or negative emotion). Excluded participants were found to select fewer emotion words than non-excluded participants, which the authors conclude suggests that social exclusion may lead to greater levels of emotional numbness.

Twenge et al. (2003) also found support for the hypothesis that social exclusion would result in participants attempts to avoid self-awareness. After leading participants into an empty room containing two chairs and a mirror, excluded participants were more likely to sit away from the mirror than facing the mirror, suggesting that excluded participants were attempting to avoid self-awareness.

Twenge et al. (2003) argue that excluded people may engage in more impulsive, self-destructive behaviors due to lack of meaning, a fixed focus on the present, and emotional numbness. In one experiment, the authors presented participants with a scenario in which a friend was offered two jobs. The first job opportunity had a high starting salary but little prospect for advancing within the company. The second job opportunity had a lower starting salary but good prospects for advancing within the company. Excluded participants were more likely than non-excluded participants to

recommend the first job, which suggests poorer delay of gratification among excluded participants.

In addition to the above findings, social exclusion has been observed to decrease prosocial behavior (Twenge et al., 2007), increase self-defeating behaviors (Twenge et al., 2002), and undermine self-regulation (Baumeister, DeWall, Ciarocco, & Twenge, 2005). With regard to the "stun gun" effect, social exclusion has been found to impact not only emotion, but also cognition. Social exclusion has been found to impair overall cognitive performance, working memory, decision making, and task persistence (Baumeister, Twenge, & Nuss, 2002; Buelow, Okdie, Brunell, & Trost, 2015). In addition, social exclusion has been observed to increase dichotomous thinking, making the world seem more "black-and-white" (Sacco, Wirth, Hugenberg, Chen, & Williams, 2011).

One of the more robust negative effects of social exclusion is an increase in aggression (e.g., Buckley et al., 2004; DeWall & Richman, 2011; DeWall et al., 2009). Participants who are excluded have been found to direct aggression not only at those perceived as responsible for the exclusion, but also at those not directly responsible for the exclusion (Gaertner, Iuzzini, & O'Mara, 2008; Twenge et al., 2001). These findings lend support to the argument that excluded people can become more impulsive and self-destructive in response to exclusion.

It is important to note that the cognitive deconstruction model arose based on prior research that found that, though social exclusion produced different behavioral responses, it did not impact self-reported distress (Twenge et al. 2001; Twenge et al., 2002; Twenge et al, 2003). Research conducted over the last decade, however, has

consistently found social exclusion to impact self-reported distress. Recall that a recent meta-analysis of 120 studies found Cyberball to have a large effect on self-reported distress (Hartgerink et al., 2015).

Williams (2007) suggests that the divergent findings within the social exclusion literature have in large part been a result of the different social exclusion experimental paradigms. The life-alone prognosis paradigm, in particular, has been found to induce both "freeze" and "fight" responses in participants (Baumeister et al., 2002; Twenge et al., 2001; Twenge et al., 2002). Williams (2007) argues that the life-alone prognosis paradigm, which predicts long term, permanent social exclusion and isolation, induces a depressive rather than anxious affect. The state of cognitive deconstruction may be less of a universal response to social exclusion and more of a response to long term, chronic exclusion and isolation. Given the associations between cognitive deconstruction and severe depression and suicidality (Baumeister, 1990), it is possible that long term exclusion can lead to a state of cognitive deconstruction. Compared to other models of social exclusion, the cognitive deconstruction model may be particularly relevant for the study of more pathological reactions to social exclusion. Unfortunately, there has not been very much research on cognitive deconstruction over the last decade.

The Temporal Need-Threat Model

The temporal need-threat model has been the most researched social exclusion theory within the literature (Williams, 2001; Williams, Forgas, von Hippel, 2005; Williams, 2007). The temporal need-threat model proposed that social exclusion threatens four fundamental psychological needs, including belonging, control, meaningful existence, and self-esteem (Williams, 2009). Belonging refers to having a

stable and positive connection with at least a few others and is associated with the belongingness described by Baumeister and Leary (1995). Control is believed to protect against learned helplessness and generates a sense of self-efficacy (Williams, 2001). Meaningful existence is thought to protect against the awareness of one's vulnerability and mortality. Self-esteem refers to the positive beliefs held about the self (Williams, 2001).

The temporal need-threat model posits that people respond to social exclusion in three successive stages and that responses to exclusion largely depend on which psychological needs are most threatened by the exclusion (Williams, 2007). Please see Figure 2 for a diagram of the Temporal Need-Threat Model. The first stage is the reflexive stage, which refers to the automatic and immediate responses to social exclusion (Williams, 2007; Williams, 2009). Immediate responses to exclusion include physiological changes like elevated blood pressure and increased blood cortisol levels (e.g., Stroud, Tanofsky-Kraff, Wilfley, & Salovey, 2009, 2009) and self-reported distress, e.g., increased sadness, increased anger (Williams & Zadro, 2005).

Following the reflexive stage is the reflective stage, when the exclusion is appraised and responded to on a conscious level (Williams, 2007). Responses to social exclusion can be broken down into short term and long term responses. The reflexive stage of the temporal need-threat model is characterized by brief, immediate responses to social exclusion, whereas the reflective stage is characterized by shorter term and longer term responses to social exclusion (Williams, 2001). Longer term responses to social exclusion may be mediated or moderated by individual differences. For example, attributions such as blaming the self for being excluded versus blaming others for the

exclusion will moderate reactions to exclusion. Differences in attachment styles and psychological needs may also moderate reactions to exclusion (Williams, 2001).

Another individual difference is the perceived motive or interpretation of the exclusion. Williams (2001) outlines five possible interpretations, with the first being "not ostracism," that is, the excluded person reasons that he was not actually excluded, e.g., "they were not ignoring me, they just didn't hear me speaking to them." "Role-prescribed" exclusion refers to exclusion that occurs and is socially appropriate given the context, e.g., not acknowledging strangers on an elevator. "Defensive" exclusion refers to the exclusion or avoidance of others for the sake of avoiding a negative consequence, e.g., avoiding someone who is angry with you. "Punitive" exclusion is avoidance for the sake of harming others, e.g., the "silent treatment." "Oblivious" exclusion refers to the non-acknowledgement of others perceived to be of lesser import or of lower status, e.g., not acknowledging maintenance or cleaning staff in the workplace (Williams, 2001).

Sommer and Rubin (2005) argue that expectancies, whether positive or negative, determine if individuals respond to exclusion by way of approach or avoidance. Despite varied responses to exclusion, responses tend to fall into one of the following categories: fight/flight, freeze, or tend-and-befriend (Williams, 2007). Williams argues that whether responses to exclusion are prosocial or antisocial depend on which of the four basic psychological needs are being threatened. Threats to belonging and self-esteem may trigger more prosocial responses, whereas threats to control and meaningful existence may trigger more aggressive responses. When power needs are threatened, people engage in more aggressive behaviors; when inclusion needs are threatened, people engage in more prosocial behaviors (Ren, Wesselmann, & Williams, 2018; Williams, 2007).

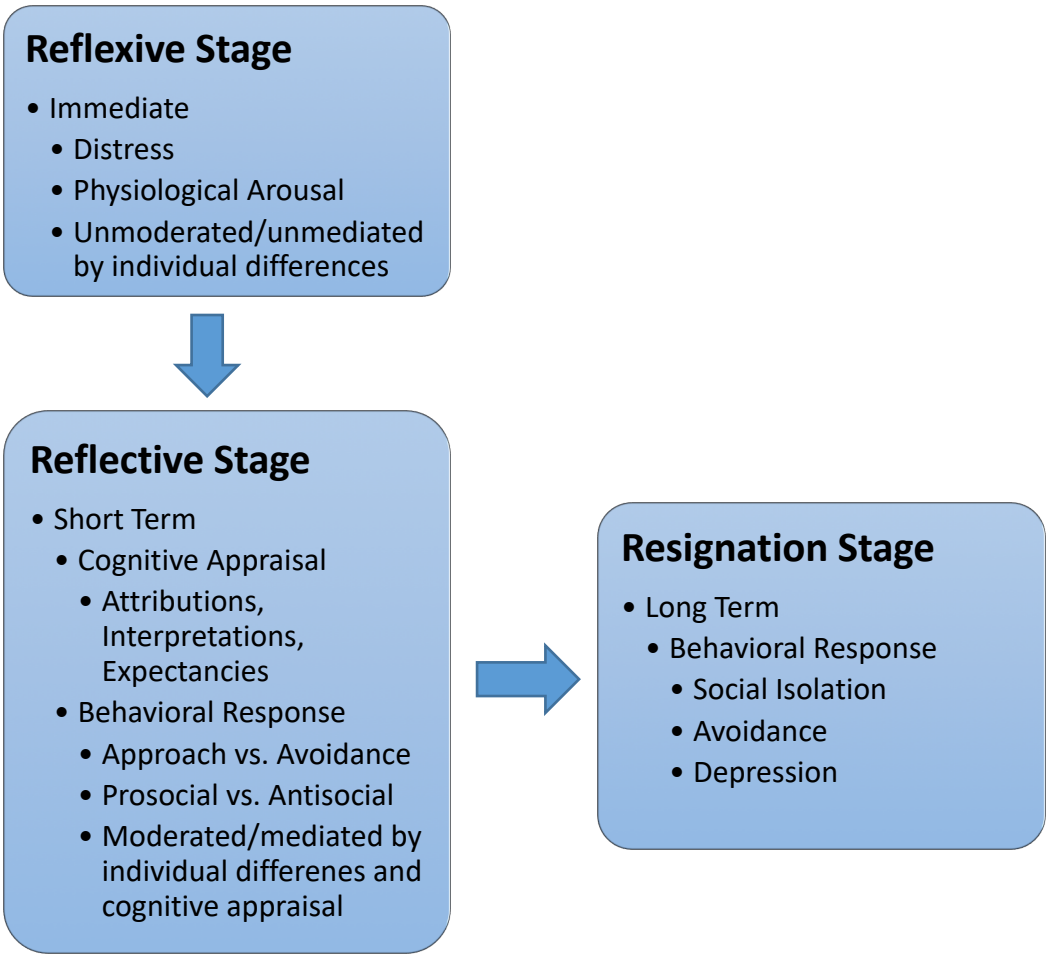

Figure 2. Descriptions of the stages of the temporal need-threat model.

The third stage of the temporal need-threat model, the resignation stage, is believed to be a result of longer term social exclusion and describes long term reactions to exclusion. This stage is associated with depression and social isolation (DeWall & Richman, 2011; Williams, 2007; Zadro, 2004). One long term response to social exclusion, for example, is to become hypersensitive to exclusion and to actively distance oneself from others in order to avoid rejection (Allen & Badcock, 2003; Williams, 2007). Those who respond in this manner may resemble patients with characteristics of Social

Anxiety Disorder or Avoidant Personality Disorder (American Psychiatric Association, 2013).

There is strong support for many components of the temporal need-threat model. Social exclusion has been found to lower research participants' self-reported belonging, control, self-esteem, and meaningful existence as predicted by the temporal need-threat model (Leary et al., 1994; Williams, 2001; Williams & Sommer, 1997; Zadro et al., 2004). Interestingly, the immediate, reflexive distress of social exclusion, as observed in the Cyberball paradigm, has been found to be largely consistent across populations and robust against moderation by individual differences (Wesselmann, Wirth, Mroczek, & Williams, 2012; Zadro, Boland, & Richardson, 2006). One study, however, suggests that this finding may, in part, be a measurement issue. Dependent variables have typically been assessed retrospectively immediately following Cyberball. Wesselmann, Wirth, et al. (2012) had participants use a mood dial while playing Cyberball to track mood changes as they occurred. Though the authors found no moderating effect of individual differences in retrospective self-reports, the authors did find moderators based on mood dial data. Participants high in social-avoidance were found to recover from Cyberball more slowly than participants low in social-avoidance. In addition, lonely participants were found to show faster increases in affect in response to being included than non-lonely participants. Unexpectedly, lonely participants who were excluded showed slower decreases in affect compared to non-lonely participants. The authors suggest that lonely participants may expect to be excluded, thus, the negative impact of being excluded occurs more slowly (Wesselmann, Writh, et al., 2012). This study is important because it demonstrates that the moderating effects of individual differences on social exclusion

may be masked by the typical method for measuring social exclusion. The implications of this finding will be discussed further below.

With regard to the reflexive nature of social exclusion, the effect of social exclusion has been likened to a "social pain" (Eisenberger, 2015). Neuroimaging studies have found excluded research participants to show activation of their dorsal anterior cingulate cortex, a region of the brain also activated while experiencing physical pain (Eisenberger et al., 2003). A similar study found acetaminophen to reduce activation of the dorsal anterior cingulate cortex in response to social exclusion (DeWall, Twenge, Bushman, Im, & Williams, 2010). Social exclusion may, in effect, trigger a social conformity reflex similar to the way pain triggers a withdrawal reflex.

In addition to its intuitive appeal, there is some support for the reflective stage of the temporal need-threat model. How research participants appraise their exclusion moderates their reactions to the exclusion. Participants with a hostile cognitive bias, for example, have been found to respond more aggressively to social exclusion than participants without a hostile cognitive bias (DeWall et al., 2009). In addition, DeBono and Muraven (2014) compared aggressive responses to exclusion after participants felt either disrespected or disliked and found that feeling disrespected was more predictive of aggression than feeling disliked.

Levinson, Langer, and Rodebaugh (2013) examined the relationship between self-reported peer victimization, reactivity to social exclusion, and social anxiety symptoms among young adult research participants. Participants reactivity to social exclusion was calculated by subtracting participants anxiety ratings after being excluded during a round of Cyberball from their anxiety ratings after being included during a round of Cyberball.

The authors found that greater reactivity to social exclusion, as opposed to self-reported peer victimization, predicted social anxiety symptoms at two-month follow-up. This finding is meaningful because it suggests that a person's reactivity to exclusion, i.e., sensitivity to exclusion, may have a longer term impact on the individual than the exclusion event itself.

There has been limited research addressing the resignation stage of the temporal need-threat model. Given its association with depression and social anxiety, it is possible that the resignation stage is more similar to a clinical condition or group of clinical conditions than a reaction to social exclusion per se. Jobst and colleagues (2015) found chronically depressed research participants to report higher rates of both anger and resentment after being socially excluded compared to healthy controls. Interestingly, the authors also found chronically depressed participants to show decreases in oxytocin plasma levels after being excluded. This is in contrast to healthy controls who showed increases in oxytocin plasma levels after exclusion. Since increases in oxytocin are associated with seeking out connections with others (e.g., Maner et al., 2007), these findings suggest that, following exclusion, healthy controls may be motivated to seek out connections with others, whereas chronically lonely participants may be motivated to isolate and avoid connecting with others. This would be in line with Williams's (2007) predictions for the resignation stage.

Participants with Borderline Personality Disorder have been found to report more anger after being excluded compared to healthy controls (Renneberg et al., 2012). Participants with Borderline Personality Disorder also report more negative emotions while being excluded. In addition, they report being having been more negatively

impacted after being excluded (Jobst et al., 2013). Participants with Borderline Personality Disorder have also been found to report higher rates of exclusion in experimental settings when they actually had not been excluded (Renneberg et al., 2012). Thus, and unsurprisingly, people with Borderline Personality Disorder may be hypersensitive to signs of exclusion. Similar to their findings with chronically lonely participants, Jobst and colleagues (2013) found participants with Borderline Personality Disorder to show a decrease in oxytocin plasma levels after being excluded in contrast to controls. This suggests that people with Borderline Personality Disorder may also have a tendency to isolate after being excluded.

The Social Exclusion of Everyday Life

One of the major questions within the social exclusion literature is to what degree social exclusion in the laboratory is analogous to social exclusion in reality. Social exclusion manipulations are generally brief in duration and the effects (i.e., for Cyberball) have been shown to deteriorate from first to last dependent measure (Hartgerink et al., 2015; Nezlek, Wesselmann, Wheeler, & Williams, 2012). Also, it is important to note that research participants in the laboratory are excluded by strangers. Outside of the laboratory, participants are likely to experience exclusion from people with whom they have frequent contact, e.g., romantic partners, family, colleagues (Nezlek et al., 2012).

A naturalistic study by Nezlek et al. (2012) sheds some light on the characteristics and effects of social exclusion outside the laboratory setting. Forty participants with a mean age of 26 were recruited through a newspaper advertisement in Sydney, Australia, and instructed to maintain a diary in which they would record any and all instances of

social exclusion over a period of two weeks. Participants were instructed to note the time and date of the exclusion, their relationship to the excluder (e.g., stranger, family member, colleague, etc.), the social status of the excluder (e.g., inferior, equal, superior), and how the exclusion took place (e.g., socially, physical separation, cyberostracism). Participants were also instructed to record their attributions as to the motivation for the exclusion, e.g., "not clear," "role prescribed," "punitive," "defensive," or "oblivious." Participants were instructed to record how clear it was that they had been excluded and how clear the excluders motivation for excluding them was on a scale of 1 to 5. In addition, participants were instructed to rate, immediately after an episode of exclusion, the degree to which the following had changed: their sense of belonging, control, self-esteem, meaningful existence, anger, and how apologetic they felt. Ratings were on a -3 to +3 scale, with 0 representing no change. The NEO Five Factor Inventory was also administered to participants at the end of the study.

Nezlek and colleagues (2012) used a series of multilevel random coefficients models to analyze the data. More than 700 exclusion episodes were recorded, with participants recording an average of one episode per day. The authors noted that many of the episodes were innocuous, role prescribed episodes. Overall, Nezlek and colleagues (2012) results were similar to results observed experimentally. Participants reported lower mood, lower sense of belonging, control, self-esteem, and meaningful existence after being excluded. Participants reported to be more affected by exclusion when the excluder was close to them. Interestingly, participants reported more instances of being excluded by strangers or acquaintances than close others. Participants reported to be most impacted by exclusion when the attributed motive for the exclusion was punitive. In

addition, participants also reported to be more impacted by exclusion when they attributed the exclusion to be the result of something about themselves. Participants higher in neuroticism reported to be more distressed by exclusion. Importantly, the Nezlek et al. (2012) findings are similar to findings from laboratory settings.

Questions remain within the literature as to what degree the effects of exclusion are moderated by individual differences. Recall that there is some evidence to suggest that, with proper measurement, individual differences, e.g., loneliness and social avoidance, have an impact on immediate responses to exclusion (Wesselmann, Wirth, et al., 2012). An important research question that remains is whether or not it is possible to lessen the immediate, reflexive distress of social exclusion by altering the way people perceive being excluded. This question will be the focus of the remainder of this review.

State and Trait Mindfulness

Over the past couple of decades, mindfulness has captured the attention of academics and non-academics alike (Kabat-Zinn, 2003; Wylie, 2015). Mindfulness is a complex construct and a universally agreed upon definition for mindfulness remains elusive. Mindfulness can broadly be defined as "the awareness that emerges through paying attention, on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145).

> In a state of mindfulness, thoughts and feelings are observed as events in the mind, without over-identifying with them and without reacting to them in an automatic, habitual pattern of reactivity. This dispassionate state of self-observation is thought to introduce a "space" between one's perception and

response. Thus mindfulness is thought to enable us to respond to situations more reflectively (as opposed to reflexively). (Bishop et al., 2004)

Despite the growth of mindfulness research over the past couple of decades, mindfulness as a term has been used to mean many different things. Mindfulness may refer to a state, a trait, a practice, or an intervention (Chiesa, 2013; Chiesa & Malinowski, 2011; Chambers, Gullone, & Allen, 2009; Vago & Silbersweig, 2012). There is a fair amount of conceptual overlap between the terms state and trait. In general, a state refers to a more temporary, more situation-specific, and often externally caused mode of being. Traits, in contrast, are believed to be longer term, less situationally-specific, and often internally caused modes of being (Chaplin, John, & Goldberg, 1988). Traits are considered to be personal attributes or personal descriptors that are not cultural-bound or culturally specific (Deyoung, 2010; John, Naumann, & Soto, 2008).

The most well researched trait theory in psychology is the Five Factor Model (FFM) or "Big Five." The "Big Five" were identified using factor analytic methods and include the following traits: 1) openness, 2) conscientiousness, 3) extraversion, 4) agreeableness, and 5) neuroticism. Each trait is considered to be a personality dimension or domain (John et al., 2008). Traits are conceptually related to states in that people high in a particular trait are expected to experience higher levels of state associated with that particular trait (Deyoung, 2010). For example, an individual high in trait neuroticism would be expected to experience greater states associated with neuroticism than an individual low in trait neuroticism. Encompassed within each trait are "facets," which are lower-level traits that make up each of the "Big Five" personality traits. There are

believed to be many facets to each trait and no consensus exists as to how many facets make up each trait (Deyoung, 2010).

There are "fuzzy" boundaries between state and trait mindfulness. One distinction between state and trait mindfulness is that state mindfulness is an intentional mode of being.

> In a state of mindfulness, thoughts and feelings are observed as events in the mind, without over-identifying with them and without reacting to them in an automatic, habitual pattern of reactivity. This dispassionate state of self-observation is thought to introduce a "space" between one's perception and response. (Bishop et al., 2004)

An individual does not accidentally enter a state of mindfulness. State mindfulness is a specific kind of attention. One frequently used operationalized definition for state mindfulness is a two-component model in which mindfulness refers to the self-regulation of attention to the present moment coupled with an orientation of curiosity, openness, and acceptance (Bishop et al., 2004). In other words, state mindfulness is state awareness coupled with state non-reactivity (Suelmann, Brouwers, & Snippe, 2018). Though this operationalized definition is the most commonly used operationalized definition in the literature, it is not universally accepted, and other authors have proposed different operationalized definitions (Keng, Smoski, Robins, 2011).

Trait mindfulness, in contrast to state mindfulness, is the disposition to be mindful (Lau et al., 2006). In fact, within the literature, trait mindfulness is sometimes referred to as "dispositional mindfulness" (e.g., Medvedev, Norden, Krägeoh, & Siegert, 2018). A recent systematic review of 93 studies found trait mindfulness to be negatively associated

with depressive symptoms, negatively associated with rumination, and positively associated with more adaptive emotion regulation (Tomlinson, Yousaf, Vittersø, & Jones, 2018). Of the facets implicated in trait mindfulness, nonjudgmental attitude has been found to be most associated with lower levels of depression, anxiety and stress (Medvedev et al., 2018).

There is some evidence that trait mindfulness is malleable and can be increased through mindfulness practice. Kiken and colleagues (2015) demonstrated that measures of trait mindfulness increase with repeated mindful meditation exercises, i.e., increasing state mindfulness over time leads to greater trait mindfulness in daily life. With regard to trait mindfulness's association with other personality traits, trait mindfulness has been found to be positively associated with conscientiousness and negatively associated with neuroticism (Hanley, 2016; Latzman & Masuda, 2013).

Mindfulness Meditation

Mindfulness dates back over 2,500 years and is derived from the Sanskrit word, smriti, and the Pali word, sati, which loosely translates as "memory" or "remembrance" (Bodhi, 2011; Hanley, Abell, Osborn, Roehrig, & Canto, 2014; Nilsson & Kazemi, 2016). "Meditation" is derived from the Latin word, "meditari," to contemplate or reflect (Chiesa & Malinowski, 2011). A type of meditation within the Theravāda school of Buddhism is Vipassana or Insight Meditation, which is better known in the West as mindfulness meditation (Germer, 2005; Jennings, 2010). Mindfulness meditation is the practice of allowing thoughts and sensations to enter and exit one's awareness non-judgmentally. Mindfulness meditation typically begins with a focus on the breath, i.e.,

mindful breathing, with the breath being foundational to the mindfulness exercise (Germer, 2005; Stahl & Goldstein, 2010).

Kabat-Zinn (2013) proposes that there is a foundational attitude necessary for mindfulness meditation. He describes this attitude as consisting of the following: 1) non-judgment, 2) patience, 3) beginner's mind, 4) trust, 5) non-striving, 6) acceptance, 7) letting go. "Non-judgement" refers to the practice of refraining from the tendency to judge, label, and categorize experience, including likes and dislikes. A "patient" attitude of mind is characterized by openness to the moment, while "beginner's mind" refers to an attitude uninfluenced by expectations. One should strive to experience the moment as if for the first time. "Trust" refers to the practice of trusting your own intuition and not discounting yourself on the basis of authorities. "Non-striving" is similar to "non-doing" and refers to a goal-less attitude, i.e., one engages in mindfulness for the sake of mindfulness, not for the sake of articulated goals. "Acceptance" refers to "taking each moment as it comes and being with it fully, as it is" (Kabatt-Zinn, 1990/2013, p. 28). "Letting go" describes an attitude of non-attachment, i.e., allowing thoughts, feelings, and experiences to come and go without holding them in mind.

The Effects of Mindfulness Meditation

Mindfulness meditation was first investigated as a possible intervention for people with chronic pain in the US in the 1970s. This intervention came to be known as mindfulness-based stress reduction (MBSR; Kabat-Zinn, 2003, 2013). The following decades saw the development of numerous mindfulness-based interventions (MBIs; Chiesa & Malinowski, 2011), e.g., mindfulness-based cognitive therapy (MBCT; Fjorback, Arendt, Ørnbøl, Fink, & Walach, 2011; Segal, Williams & Teasdale, 2002),

dialectical behavior therapy (DBT; Linehan et al., 2006; Robins, Schmidt, Linehan, 2004), and acceptance and commitment therapy (Hayes, 2004; Ruiz, 2012; Twohig, 2012). Though mindfulness is rooted in Buddhism, MBIs are secular interventions and do not require adherence to or knowledge of any Buddhist beliefs. MBIs vary with regard to how prominent mindfulness meditation is in the treatment (Hanley et al., 2014). MBSR, for example, is very similar to traditional Vipassana meditation, whereas ACT and DBT do not include formal meditation training (though patients are taught "mindfulness skills"; Chiesa & Malinowksi, 2011).

MBIs have been found to be helpful treatments for a wide variety of conditions, e.g., anxiety, depression, stress (Fjorback et al., 2011; Galante, Iribarren, & Pearce, 2012; Khoury et al., 2013), social anxiety (Norton, Abbott, Norberg, & Hunt, 2015), Borderline Personality Disorder (Linehan et al., 2006), emotional reactivity (Keng et al., 2011), emotion dysregulation (Chiesa, Serretti, & Jakobsen, 2013), binge eating, emotional eating (Katterman, Kleinman, Hood, Nackers, & Corsica, 2014), chronic pain, insomnia, and irritable bowel syndrome (Crowe et al., 2016). Research also suggests that MBIs, i.e., MBSR and MBCT, are efficacious adjunctive treatments for patients with cancer and cardiovascular disease. In addition, there is some evidence to suggest that MBIs can be beneficial preventative treatments that improve patient health (Gotink et al., 2015). Some researchers have argued that mindful meditation may be a helpful practice for healthy people to improve their subjective well-being (Davidson & Dahl, 2018). A recent meta-analysis of 142 randomized clinical trials of MBIs found MBI's to be generally as effective as other established evidence-based treatments for a range of conditions (Goldberg et al., 2018). The authors found the strongest evidence for the treatment of

depression, pain, smoking, and addiction. There is some evidence that mindfulness practice can improve prosociality (Bankard, 2015; Berry et al., 2018).

In addition to the evidence that MBIs increase trait mindfulness and improve a range of physical and psychological conditions, there is also evidence that brief mindfulness exercises can have positive immediate, temporary effects (e.g., Kiken & Shook, 2011). For example, research participants who engage in a brief mindful breathing exercise prior to a negative mood induction have been found to be less affected by the mood induction (Broderick, 2005) and to recover more quickly from dysphoric mood compared to controls (Keng et al., 2011).

Brief mindfulness exercises have also been observed to impact memory. Alberts and Thewissen (2011) assessed participants' delayed recall for a list of 30 words, 10 of which were positive, 10 negative, and 10 neutral, after having undergone a 12-minute mindful breathing exercise. The authors found participants in the mindfulness condition to recall fewer negative words than participants in the control condition. There was no difference in recall of positive or neutral words. Interestingly, there was no difference in self-reported mood between groups, ruling out mood-congruent memory effects. The authors conclude that mindfulness can decrease memory for negative stimuli and suggest that a mindful state may "'neutralize' the negative valence of a stimulus" (Alberts & Thewissen, 2011, p. 76).

Brief mindfulness exercises have been found to decrease negativity bias and increase positive judgments. Kiken and Shook (2011) examined participants' performance on "BeanFest," a computer game designed to elicit negativity bias. Participants who had completed a brief mindful breathing exercise prior to playing

BeanFest were found to have less negativity bias than controls. In addition, participants in the mindful breathing group were also found to more accurately classify positive stimuli in BeanFest and to report greater optimism. The authors suggest that mindfulness may free up cognitive resources and allow participants to notice positive stimuli that would otherwise go unnoticed.

Brief mindfulness meditation has also been found to impact emotion regulation. Arch and Craske (2006) assigned participants to one of three conditions: a mindfulness breathing group, an unfocused attention group, and a worry group. Participants were first exposed to one round of aversive pictures chosen from the International Affective Picture System (Lang, Bradley, & Cuthbert, 1997). Depending on group assignment, participants then completed a mindfulness breathing induction, an unfocused attention induction, or a worry induction. Following the intervention procedure, participants completed two additional rounds of viewing aversive pictures. The authors found that participants in the mindful breathing group reported less emotional volatility across picture types compared to participants in the other conditions. Participants in the mindful breathing group also reported consistently positive responses to neutral pictures after the mindful breathing induction, whereas participants in the worry and unfocused attention groups reported neutral slides as being negative after their respective inductions. Participants in the mindful breathing group were also found to be more willing to view 25 optional negative slides after completing the third round of aversive pictures. The results suggest that even a relatively brief mindfulness exercise can improve emotion regulation.

Mindfulness and Social Exclusion

Within the literature, there is comparatively little research on the effects of mindfulness on social exclusion or the effects of social exclusion on mindfulness. Heppner et al. (2008) conducted two studies examining the effects of mindfulness on aggression. In the first study, the authors recruited 175 undergraduate research participants and, using several self-report questionnaires, assessed for trait mindfulness, dispositional aggression, and hostile attribution bias. As hypothesized, participants with greater trait mindfulness reported less dispositional aggression and less hostile attribution bias.

In their second study, Heppner et al. (2008) recruited 60 undergraduate participants and assigned them to one of three conditions: acceptance, rejection, or mindfulness-rejection. For the social exclusion induction, the authors used the "Get Acquainted" paradigm, which had participants rank order other participants with whom they would most prefer to work with in a group. Participants in the acceptance condition received the feedback: "You DID NOT receive the least amount of votes. You WILL be part of the group." Participants in the rejection and mindfulness-rejection conditions received the feedback: You DID receive the least amount of votes. You WILL NOT be part of the group" (Heppner et al., 2008, p. 491). Participants in the mindfulness-rejection condition completed a mindful raisin-eating task just prior to receiving their feedback. After having received their feedback, participants in each condition ostensibly competed in a computer reaction-time game. Participants were informed that when they win a reaction-time trial, their opponents will receive a blast of loud noise. Prior to beginning the game, participants selected the intensity and the duration of the noise that their

opponents would hear. This experimental paradigm is common within the aggression literature.

The authors found participants in the mindfulness-rejection condition to engage in less aggressive behavior than participants in the rejection condition. In fact, the authors found no significant difference in aggression between participants in the acceptance condition and participants in the mindfulness-rejection condition. The authors speculate that mindfulness may promote secure self-esteem, which in turn, lessens the impact of threats to self-esteem which trigger aggression. The authors note, however, that mindfulness could also have increased participants' self-control. This explanation would be supported by Arch and Craske's (2006) finding that brief mindfulness exercises can improve emotion regulation.

Given that brief mindfulness exercises have been found to decrease memory for negative stimuli (Albert & Thewissen, 2011), decrease the impact of negative mood induction (Broderick, 2005), and speed up recovery from dysphoric mood (Keng et al., 2011), it is possible that participants in the mindfulness-rejection condition were no longer negatively affected by the exclusion that they had experienced. Perhaps the mindfulness exercise allowed participants to remain non-attached, i.e., participants were able to "let go" (Kabatt-Zinn, 1990,2003), rather than react to the experience of exclusion.

Ramsey and Jones (2015) conducted two studies examining the effects of mindfulness on the act of excluding or ostracizing others. The first study was a field-based quasi-experiment with 51 school teachers. Twenty participants were assigned to the mindfulness condition, ostensibly a workshop for school teachers, while 29 participants

who did not attend the workshop functioned as the control group. Topics addressed during the workshop included workplace ostracism, bullying, and interpersonal conflict. Mindfulness was discussed as a potential skill for mitigating problems in the work place. Participants were guided through several MBSR exercises during the workshop and were given homework consisting of mindfulness exercises which they were instructed to complete once per day for the next two weeks. The authors found that participants in the mindfulness group reported less ostracizing behavior than participants in the control condition, even after controlling for perceived stress and experienced ostracism.

In the second study, Ramsey and Jones (2015) recruited 100 undergraduate participants and randomly assigned them to either a mindfulness treatment group or non-mindfulness control group. Participants were informed that they would be playing a virtual ball tossing game (similar to Cyberball) with three other players and that they had been assigned team captain. As team captain, each participant was provided background information on six potential players and were instructed to select three players to be on their team. Participants were informed of how many times each of the six potential players had been selected to be on teams in the past, with three of the potential players having a history of exclusion. During the game, one of the participant's teammates was excluded by the other two players. Thus, for the excluded player to be included, it was up to the participant to throw the ball to the player. Prior to selecting teammates and playing the ball tossing game, participants in the mindfulness intervention group engaged in a brief mindful raisin-eating exercise (as in Heppner et al., 2008). Participants in the control condition read a brief passage of text and then typed out a copy of the text on a computer.

Ramsey and Jones's (2015) findings were mixed. With regard to teammate selection, participants in both the mindfulness treatment group and non-mindfulness control group were more likely to select players who had been included in the past. One explanation for this is that participants may have been motivated to select players with experience playing the game. It is also possible that participants reasoned that excluded players were excluded for a reason, e.g., perhaps excluded players were not very good at the game. The authors did, however, find participants in the mindfulness treatment group to be more likely to throw the ball to the excluded player during the game. This finding provides some evidence that mindfulness can decrease the tendency to engage in ostracizing behaviors. Taken with Heppner et al.'s (2008) findings that mindfulness can decrease aggression in response to exclusion, there is indirect support for the contention that mindfulness can increase compassion for others (Germer, 2009; Gilbert & Choden, 2013).

In another study, Molet, Macquet, Lefebvre, and Williams (2013) examined the impact of a brief mindful breathing exercise on self-reported distress after social exclusion. The authors recruited 48 undergraduate participants and assigned them to either a focused attention (mindful breathing) group or an unfocused attention control group. Participants in the focused attention group completed a 12-minute mindful breathing exercise. Participants in the unfocused attention control group were directed to let their minds wander as normal for 12 minutes. Participants then played Cyberball for approximately four minutes, with half of participants being excluded and half being included.

The authors administered the Need Threat Scale, which assesses Williams's (2009) four basic needs: belonging, self-esteem, meaningful existence, and control. Mood was also assessed. Measures were administered immediately following Cyberball and again after a 3-minute delay. The authors found no significant difference in threats to basic needs between the focused attention group and unfocused attention control group immediately following Cyberball. The authors did, however, find participants in the focused attention group to recover more quickly (from immediate to delayed self-reports) than participants in the unfocused attention group after being excluded. With regard to mood, no differences were observed between participants in the focused attention group and participants in the unfocused attention group after being excluded. Interestingly, participants in the focused attention group were found to show mood improvement from immediate to delayed self-report measures regardless of whether they were included or excluded while playing Cyberball. Mood improved from immediate to delayed self-report among both included and excluded participants from the focused attention group.

The authors note that the temporal need-threat model predicts that the immediate reactions to social exclusion are reflexive and should be largely immune to moderation. In fact, past research has largely found immediate reactions to exclusion to be robust against moderation (e.g., Zadro et al., 2006). Though focused attention did not decrease the distress of exclusion, focused attention allowed participants to recover more quickly from exclusion. There are several possible reasons that mood improved (from immediate to delayed self-report) among participants in the focused attention group irrespective of whether they were excluded or included during Cyberball. Mood may have improved among participants in the included condition because mindful states promote positive

emotion and enhanced mood (e.g., Brown & Ryan, 2003). In contrast, mood may have improved among participants in the excluded condition because the effects of being excluded had worn off between immediate and delayed self-report. Recall that the effects of Cyberball are brief and have even been found to deteriorate between first and last measure (Hartgerink et al., 2015). Of course, it is also possible that mood improved among participants in the excluded condition as a result of a convergence of the deteriorating effects of being excluded and the positive effects of a mindful state. Recent studies by Droit-Volet, Chaulet, and Dambrun (2018) and Thönes and Wittmann (2016) have found participants to rate time to pass more quickly during mindfulness practice. Perhaps participants in a mindful state recover from exclusion more quickly because they perceive time to pass more quickly.

One of the major weaknesses of Molet et al.'s (2013) study is that they use only retrospective self-report measures to assess for differences between groups. Though the immediate effects of exclusion have repeatedly been found to be robust against the moderating effects of individual (or group) differences, this finding may largely be a measurement issue. When Wesselmann, Wirth, et al. (2012) used a mood dial to track participants mood ratings while playing Cyberball, they found significant differences among lonely and socially-avoidant participants compared to control participants (though they found no differences in retrospective ratings following Cyberball).

Another weakness of Molet et al.'s (2013) study is their method for assessing state mindfulness in the focused attention group. The authors constructed their own five-item questionnaire to assess mindfulness that consisted of the following questions: "I was able to follow the instructions," "I felt calm and relaxed," "I felt spiritual," "I felt in

control," and "I enjoyed the experience." With the exception of "I was able to follow the instructions," these questions do not address characteristics associated with a mindful state. In addition to the above concerns, it would also have been informative for the authors to measure trait mindfulness in addition to state mindfulness. It is possible that trait mindfulness and state mindfulness have a differential impact on exclusion.

Statement of the Problem

Social exclusion or ostracism is a common and universally distressing phenomenon that elicits a "social pain" response that is neurologically similar to a physical pain response (Eisenberger, 2015; Hartgerink et al., 2015; Nezlek et al., 2012. Behavioral reactions to social exclusion vary depending on individual differences and individual construal of the event, with some responses being more prosocial (Maner et al., 2007) and other responses being more aggressive and less prosocial (Buckley et al., 2004; DeWall & Richman, 2011; DeWall et al., 2009; Twenge et al., 2007; Twenge et al., 2002).

Given that social exclusion is both common and distressing, the development of interventions or techniques to help people cope with and healthily respond to social exclusion has been encouraged within the literature (e.g., Williams, 2007). Mindfulness has been identified as one potential technique for helping people to cope with social exclusion. Molet et al. (2013) examined the impact of a focused attention (mindful breathing) exercise on the retrospectively reported distress of social exclusion. The authors found no significant difference in retrospectively reported distress between the focused attention group and an unfocused attention control group. They did, however,

find that participants in the focused attention group recovered more quickly from exclusion than participants in the control group.

The temporal need-threat model predicts that the immediate effects of social exclusion are reflexive and not subject to moderation (e.g., Zadro et al., 2006). This premise has recently been called into question, however, by Wesselmann, Wirth et al. (2012) who used a mood dial to track second-by-second mood fluctuations during a game of Cyberball. The authors ultimately found loneliness and social-avoidance to moderate distress, despite their being no difference in retrospective ratings between participants high in loneliness and social-avoidance compared to control participants. Though there is a reflexive, social pain response, it seems that this pain response may be experienced differently overtime.

Though Molet et al. (2013) found no differences in retrospective ratings of distress between participants in a focused attention group and participants in a control group, it is possible that differences would be observed using more sensitive measurement, e.g., time-course mood ratings. In addition, the authors attempted to assess state mindfulness using a five-item unvalidated measure that was constructed specifically for their study rather than an established state mindfulness measure, e.g., the Toronto Mindfulness Scale (TMS; Lau et al., 2006). It is possible that mindfulness was not well assessed or induced in their study. Furthermore, the authors did not assess for trait mindfulness, which has been associated with many positive effects in the MBI literature (e.g., Gu, Strauss, Bond, & Cavanagh, 2015) and may also moderate the immediate effects of social exclusion.

Purpose of the Current Study

The purpose of the current study was to evaluate whether a brief mindful meditation exercise lessens the immediate, reflexive negative effects of being socially excluded while playing Cyberball. The impact of trait mindfulness and the "Big Five" personality traits on the immediate negative effects of being socially excluded were also examined.

Hypotheses

This study had five hypotheses:

1) Participants who complete a mindful breathing exercise prior to being excluded while playing Cyberball would show slower declines in mood ratings than participants who viewed an educational video (control group) prior to being excluded while playing Cyberball.

2) Participants higher in trait mindfulness would show slower declines in mood ratings than participants lower in trait mindfulness when excluded while playing Cyberball.

3) Participants who engaged in the mindful breathing exercise would recover from being excluded more quickly than participants who viewed the educational video (control group).

4) Participants who engaged in the mindful breathing exercise would report an increase in mood after completing the exercise. Participants who viewed the educational video (control group) would not report an increase in mood after viewing the video.

5) Participants who engaged in the mindful breathing exercise would report an increase in mood (recovery of mood) following the Cyberball exercise, after a three-minute delay.

Chapter Two

Method

Pilot Study

Prior to beginning this study, the procedure was piloted within the University of Toledo Psychology Department. Four undergraduate psychology research assistants, one psychology graduate student, and one psychology professor were recruited to participate in the pilot. The duration of the procedure for each participant was between 30 and 50 minutes. Following the procedure, participants provided oral feedback to the examiner (this writer) as to the "smoothness" of the procedure and their ability to attend to and engage in the mindful breathing exercise and Cyberball task. Pilot study participants denied having any problems completing the procedure. They confirmed that they had been able to attend to the mindful breathing exercise and Cyberball task and reported that the questionnaires administered were manageable.

Participants and Setting

This study was conducted within the University of Toledo Psychology Department. Research participants were recruited using the SONA Research Participation System (SONA) and consisted of undergraduate students enrolled in introductory psychology courses. The procedure was carried out in a small office with a desk and computer. Total participants in previous research studies that examined the impact of mindfulness on the effects of Cyberball or life-alone prognosis have ranged from a low of 48 (Molet et al., 2013) to a high of 100 (Ramsey & Jones, 2015). Molet et al. (2013) conducted a 2 x 2 x 2 factorial design and were able to detect between-subject differences with 12 participants assigned to a mindful breathing group and 12 participants assigned to

a non-mindful breathing control group. A power analysis (G*Power) was conducted for a repeated measures, within-between subjects ANOVA, with an alpha of .05, and a medium effect size. Based on the results of the power analysis and previous research, the current study recruited a total of 70 research participants. One research participant, for whom English was not his primary language, was excluded from this study because he was not able to understand the instructions. Four research participants were excluded from this study for not being aged 18 or older. Thus, the current study included 65 participants.

Design and Procedure

Participants volunteered for the experiment on SONA, which provided the following "cover story" for the study:

> This experiment examines how personality traits related to mindfulness impact mood over time. Participants will be required to complete several questionnaires and will be instructed to rate their moods on multiple occasions. Over the course of the experiment, participants may be asked to engage in a variety of tasks, including practicing a brief mindful breathing exercise, viewing an educational video, and playing a mental visualization computer game.

Using a random number generator, participants were randomly assigned to one of four conditions: 1) mindful breathing – excluded, 2) mindful breathing – included, 3) video control – excluded, and 4) video control – included. Each participant was run through the experiment by the author and took between 30 and 50 minutes to complete the experiment.

Upon arriving for the study, participants were instructed to turn off their cell phones and to refrain from using their cell phones throughout the course of the procedure. Participants were provided with an Adult Research Subject - Informed Consent Form (see Appendix A) and then administered a brief demographic questionnaire (see Appendix B), the Mindfulness Attention Awareness Scale – Trait (MAAS – Trait; see Appendix C; Brown & Ryan, 2003), the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; see Appendix D), and the Big Five Inventory (BFI; John & Srivastava, 1999; see Appendix E). On the demographics questionnaire, in addition to demographic questions, participants were instructed to rate their current mood on a scale of 1 to 10, with 10 being the best. They were also asked on the demographics questionnaire how often they practice mindful meditation and if they have heard of or played Cyberball before.

After completing the questionnaires, participants in the mindful breathing – excluded and mindful breathing – included conditions were instructed to close their eyes and engage in a five-minute mindful breathing exercise that was delivered auditorily on an office computer. The specific exercise was taken from *A Mindfulness-based Stress Reduction Workbook* (Stahl & Goldstein, 2010) and is track three of the accompanying MP3 CD (for transcript, see Appendix F). Participants in the video control – excluded and video control – included conditions were instructed to watch a five-minute educational video that discusses nutrition and healthy eating.

After completing the mindful breathing exercise or educational video, participants were administered two state mindfulness questionnaires, the TMS (Lau et al., 2006) and the MAAS – State (Brown & Ryan, 2003), to assess the degree to which participants

were in a mindful state of mind during the preceding exercise (mindful breathing or educational video). Participants were then instructed to select the Cyberball icon on their desktops. A description of the game appeared on the computer screen and indicated that Cyberball was a game designed to help participants practice "mental visualization." Cyberball was programmed to terminate after 30 ball tosses, which took approximately two and a half minutes. According to the literature, thirty ball tosses have been found to be sufficient to produce the "excluded" effect. Participants in the mindful breathing – excluded and educational video – excluded conditions were excluded while playing Cyberball. Participants in the mindful breathing – included and educational video – included conditions were included while playing Cyberball.

Prior to beginning the game, participants were informed that, while playing Cyberball, they would be asked to rate their mood on several occasions. Participants were instructed to orally rate their mood, on a scale of 1 to 10, with 10 being the best, every time they heard the beep of an interval timer (every 20 seconds). As the participant played Cyberball, the examiner sat behind and out of sight of the participant recording the participant's mood ratings.

After completing the game, participants were administered the Need Threat Scale (see Appendix E), based on the temporal-need threat model, which assessed the degree to which participants felt excluded during Cyberball. After completing the measure, participants were asked to wait quietly for a few minutes alone in the office. After three minutes, the author returned and participants were again administered the Need Threat Scale. This provided data on the degree to which participants continued to feel excluded after a three-minute delay.

Measures

Demographics Form. The Demographics Form (See Appendix A) gathered basic demographic information, e.g., age, sex, race/ethnicity, class standing. In addition, participants were asked to rate their current mood on a scale of 1 to 10, with 10 being the best. Another question included on the demographics form was: "Have you ever heard of or played Cyberball? If yes, please write a description of Cyberball below. If no, please skip this question." The demographics form also included the question: "Do you practice mindful meditation? If yes, please write below how often you practice mindful meditation. If no, please skip this question."

Mindfulness Attention Awareness Scale – Trait. The MAAS - Trait (see Appendix C) is a 15-item, unidimensional trait mindfulness questionnaire designed to assess how attentive individuals tend to be to the present moment throughout their daily lives. It has been validated with college and community samples and has shown good test-retest reliability (Brown & Ryan, 2003). Exploratory and confirmatory factor analyses have found the internal consistency of the MAAS – Trait to range from an alpha of .80 to .87 (Sauer et al., 2013). The test-retest reliability for a college student sample was acceptable, with an intraclass correlation of .81 (Brown & Ryan, 2003). A recent review found the MAAS – Trait measure to be the most widely used trait mindfulness measure within the literature (Tomlinson et al., 2018).

The MAAS- Trait measure actually measures "mindlessness," the inverse of mindfulness (Sauer et al., 2013). Each item describes a mindless-type of experience. Respondents are instructed to rate how often they have the mindless experience on a scale of 1 ("Almost Always") to 6 ("Almost Never"). Items are reverse scored and a total score

is calculated. High total scores reflect higher trait mindfulness and low total scores reflect lower trait mindfulness. Questions on the MAAS - Trait include: "I could be experiencing some emotion and not be conscious of it until some time later," and, "I break or spill things because of carelessness, not paying attention, or thinking of something else."

Five Facet Mindfulness Questionnaire. The FFMQ (see Appendix D) is a 39-item trait mindfulness measure developed from five mindfulness questionnaires using factor analytic methods. The FFMQ assesses five facets believed to be components of trait mindfulness: 1) Observing, 2) Describing, 3) Acting with Awareness, 4) Non-judging of Inner Experience, and 5) Non-reactivity to Inner Experience. The FFMQ mindfulness facets have been argued to be the underlying skills used by those with high trait mindfulness. The FFMQ has been found to have good internal consistency, with Cronbach alphas ranging from .75 to .91 (Baer et al., 2006), and has demonstrated construct validity (Baer et al., 2008). A recent review found the FFMQ to be the second most widely used trait mindfulness measure within the literature (Tomlinson et al., 2018). FFMQ items are rated on a scale from 1 ("Never or very rarely true") to 5 ("Very often or always true"). Questions on the FFMQ include, "I watch my feelings without getting lost in them," and, "I am easily distracted."

Big Five Inventory. The BFI (see Appendix E) is a brief, 44-item personality measure that assesses the "Big Five" personality traits: 1) Openness, 2) Conscientiousness, 3) Extraversion, 4) Agreeableness, and 5) Neuroticism. The "Big Five" were identified empirically, using factor analytic methods, and can be understood to be broad, dimensional personality traits (Goldberg, 1990; John, Naumann, & Soto, 2008). Openness refers to a general openness to ideas and experiences. Conscientiousness

refers to the disposition to follow norms, rules, and to delay gratification. Extraversion is the tendency to approach social situations and socialize and is associated with positive emotions. Agreeableness refers to a prosocial and communal disposition. Neuroticism refers to the tendency to experience negative emotionality (John & Srivastava, 1999).

Items are rated on a scale from 1 ("Disagree strongly") to 5 ("Agree strongly"). Between eight and 10 items load onto each of the BFI traits. The BFI is a well-researched, efficient, and frequently used measure of personality. It has been found to have good convergent and divergent validity. In US samples, BFI reliability estimates have ranged from an alpha of .75 to .90 (John et al., 2008). Questions on the BFI include: "I see myself as someone who is talkative," and, "I see myself as someone who is reserved."

Mindfulness Attention Awareness Scale – State. The MAAS – State (see Appendix F) is a brief, five-item questionnaire designed to assess state mindfulness. Similar to the MAAS – Trait, the MAAS – State actually measures state "mindlessness." Items on the MAAS – State inquire about the subject's lack of a mindful state in the very recent past, e.g., "I was finding it difficult to stay focused on what was happening." Each item is rated on a 0 ("Not at all") to 6 ("Very much") scale. The MAAS – State has been found to have good reliability, i.e., Cronbach alpha = .92. MAAS – Trait total scores have been found to be predictive of MAAS – State total scores (Brown & Ryan, 2003).

Toronto Mindfulness Scale. The TMS (see Appendix C) is a 13-item, two-factor state mindfulness questionnaire designed to retrospectively assess a respondent's degree of mindfulness while engaged in a mindfulness practice. The TMS contains two subscales: curiosity and decentering. Each item on the TMS is a statement that describes

an experience that respondents may have had while engaging in mindful meditation moments earlier. Respondents are instructed to rate each statement based on how true it was of their experience. Items are rated on a scale of 0 ("Not at all") to 4 ("Very much"). Questions on the TMS include: "I experienced myself as separate from my changing thoughts and feelings," and, "I was more concerned with being open to my experiences than controlling or changing them" (Lau et al., 2006). Exploratory and confirmatory factor analyses have found the internal consistency of the TMS to range from an alpha of .84 to .88 (Sauer et al., 2013). Respondents scores have also been found to increase as a result of increased mindfulness practice (Lau et al., 2006).

Need Threat Scale. The Need Threat Scale (See Appendix I) is a 20-item questionnaire designed to assess threats to basic needs, as described by the temporal-need threat model (Williams, 2009). It has been used extensively within the Cyberball literature (e.g., Molet et al., 2013). Each item on the measure is a statement about how a respondent may have felt while playing Cyberball. Items are rated on a scale of 1 ("Not at all") to 5 ("Extremely"). In addition to the 20 basic needs questions, the measure also contains two manipulation checks. Respondents are instructed to rate on the same five-point scale the statements, "I was ignored," and, "I was excluded." Respondents are then asked to estimate the percentage of throws that they received during the game.

Since this measure is administered immediately following Cyberball and again after a three-minute delay, the instructions for the immediate measure and the delayed measure differ slightly (See Appendix J). The instructions for the immediate measure read: "For each question, please circle the number to the right that best represents the feelings you were experiencing DURING the game," while instructions for the delayed

measure read: “For each question, please circle the number to the right that best represents the feelings you are experiencing RIGHT NOW.” Questions on the measure include: “I felt ‘disconnected,’” and, “I felt rejected.”

Recent research has called into question the factor structure of the Need Threat Scale. Gerber, Chang, and Reimel (2017) examined the convergent and discriminant validity of the Need Threat Scale compared to the Sheldon Needs Scale (Sheldon, Elliot, Kim, & Kasser, 2001), another measure of fundamental psychological needs. The authors corroborated that the Need Threat Scale was indeed a measure of fundamental needs, but it did not appear that the needs were differentiated into the four proposed needs on the Need Threat Scale. Confirmatory factor analysis and exploratory factor analysis also did not support a four-factor model for the measure. The authors encourage researchers to interpret the Need Threat Scale as a measure of threats to overlapping basic needs.

Data Analyses

All descriptive and statistical analyses were conducted using IBM’s Statistical Package for the Social Sciences – version 19 (SPSS-19).

Hypothesis One. The first hypothesis was that excluded participants in the mindful breathing group would show slower declines in mood ratings than excluded participants in the educational video control group. Participants rated their mood while playing Cyberball every 20 seconds. A total of eight mood ratings were recorded, with each mood rating acting as a time point. A two-way mixed design ANOVA was conducted with group (mindful breathing or video control) and condition (excluded or included) being the between-subjects factors and time (time 1, time 2, time 3, etc.) being the within-subjects factor. The mindful breathing group was hypothesized to have higher

mood ratings at earlier time points, e.g., time 1, time 2, time 3, etc., than the mood ratings at earlier time points of the video control group. The mindful breathing group and video control group were hypothesized to have mood ratings that were *not significantly* different from one another at later time points, e.g., time 6, time 7, time 8. Thus, participants in the mindful breathing group were expected to report slower decreases in mood than participants in the educational video control group. Polynomial contrast analyses ("trend analyses") were conducted to determine if there were significant linear or quadrative (curvature) trends in the groups.

It was also important to examine whether groups differed in their rates of change (slope) or whether their rates of change accelerated or decelerated over time (curvature). Growth curve modeling is a robust and flexible analytic approach for repeated measures data. Similar to simple linear regression, growth curve modeling also fits a model to the data (Field, 2009). Unlike simple linear regression, growth curve modeling assesses for between-subject differences of within-subjects change (Curran, Obeidat, & Losardo, 2010). There are multiple approaches for constructing growth curve models. This study used a multilevel modeling approach (Linear Mixed Model in SPSS-19) that can be understood to be two-level analysis with repeated measures at Level 1 and participants at Level 2 (Heck, Thomas, & Tabata, 2014).

Two growth curve models were constructed. The first compared excluded participants from the mindful breathing group with excluded participants from the video control groups. The second compared included participants from the mindful breathing group with included participants from the video control groups. The growth curve models were another method for examining the hypothesis that participants in the mindful

breathing group would report slower declines in mood than participants in the video control group. Data was restructured so that time (linear slope) could be entered as a variable coded 0, 1, 2, 3, 4, 5, 6, and 7. A variable for quadratic time (curvature) was computed by squaring each of the time codes. Quadratic time was thus coded 0, 1, 4, 9, 16, 25, 36, and 49. Mood ratings were the dependent variable, with Time, Quadratic Time, and Group (mindfulness or video control) being model predictors. The interaction effect for Time x Quadratic Time x Group (mindfulness or video control) was also examined.

Hypothesis Two. The second hypothesis was that participants higher in trait mindfulness would show slower declines in mood ratings than participants lower in trait mindfulness while being excluded in Cyberball. Participants were first divided into higher and lower trait mindfulness groups. To identify participants higher in trait mindfulness and lower in trait mindfulness, a Trait Mindfulness Composite Score was computed by summing the MAAS Trait Total Score and the FFMQ Total Score into a Composite Trait Mindfulness Score. Participants were then divided by a mean split into groups of equal sample sizes of higher trait mindfulness and lower trait mindfulness. Unfortunately, there has been no agreed upon method for identifying true high trait mindfulness and true low trait mindfulness in the literature. Trait mindfulness measures are dimensional and without clear cut points in terms of high and low trait mindfulness. The Composite Trait Mindfulness score is intended to function as a rough estimate of overall trait mindfulness, with the assumption being that participants in the group above the mean generally skew towards higher trait mindfulness and participants in the group

below the mean generally skew towards lower trait mindfulness. The current study assumes that trait mindfulness is normally distributed in the population.

A growth curve model was constructed to examine whether participants higher in trait mindfulness showed slower declines in mood ratings in response to being excluded in Cyberball than participants lower in trait mindfulness. As in hypothesis one, the data was restructured so that time (linear slope) could be entered as a variable coded 0, 1, 2, 3, 4, 5, 6, and 7. Quadratic time (curvature) was computed by squaring each of the time codes. Mood ratings were the dependent variable, with Time, Quadratic Time, and Trait Mindfulness (higher or lower) being model predictors. The interaction effect for Trait Mindfulness (higher or lower) x Time x Quadratic Time was examined.

Hypothesis Three. The third hypothesis was that participants in the mindful breathing group would recover from being excluded more quickly than participants in the video control group as measured by the Need Threat Scale. As described above, lower scores on the Need Threat Scale are believed to be indicative of a greater sense of disconnectedness and exclusion. Based on previous research, it was hypothesized that, immediately following Cyberball, participants in both groups would report scores on the Need Threat Scale that were *not significantly* different from one another. This finding would suggest that participants in both groups reported a similar sense of disconnection and exclusion after being excluded while playing Cyberball. It was also hypothesized that, after a three-minute delay, participants in the mindful breathing group would show significantly lower scores on the Need Threat Scale than participants in the video control group. This finding would suggest that participants in the mindful breathing group recovered more quickly after being excluded than participants in the video control group.

This hypothesis was tested using a mixed design ANOVA, with the Need Threat Scale as a within-subjects factor and Group (mindful breathing) and Cyberball condition (included or excluded) as between-subjects factors.

Hypothesis Four. The fourth hypothesis was that participants in the mindful breathing group would report their moods to increase from their initial mood ratings at the start of the experiment on the Demographics Form to their mood ratings immediately following the mindful breathing exercise. It was hypothesized that participants in the video control group would show *no significant* differences between their initial mood rating at the start of the experiment and their mood rating immediately following the educational video. This hypothesis was tested using two paired samples *t* tests.

Hypothesis Five. The fifth hypothesis was that participants in the mindful breathing group would report greater increases in mood between their mood ratings immediately following Cyberball to their mood ratings after a three-minute delay than participants in the video control group. Gain scores were computed by subtracting participant mood ratings immediately following Cyberball from participant mood ratings after the three-minute delay. An independent *t* test was conducted to compare gain scores between participants in the mindful breathing group and video control group. Paired sample *t* tests were also conducted to clarify the changes in mood ratings from the mood ratings immediately following Cyberball to the mood rating after the three-minute delay.

Chapter Three

Results

Descriptive Statistics

A total of 65 participants were included in this study. The mean age of participants was 20.15 (SD = 4.39; range: 18-47). See Table 1 for descriptive statistics. All 65 participants denied having heard of or played Cyberball before. Participants were randomly assigned to the mindful breathing or video control groups and to the included or excluded Cyberball conditions using an online random number generator. Thirty-six participants (55.4 percent) were assigned to the mindful breathing group and 29 participants (44.6 percent) were assigned to the video control group. Thirty-one (47.7 percent) of the participants were assigned to the included Cyberball condition and 34 participants (52.3 percent) were assigned to the excluded Cyberball condition. There were 20 participants assigned to the mindful breathing – excluded group, 16 participants assigned to the mindful breathing – included group, 14 participants assigned to the video control – excluded group, and 15 participants assigned to the video control – included group.

Table 1

Descriptive Statistics for Participants (N=65)

	Frequency	Percent
Gender		
Male	22	33.8
Female	43	66.2
Race/Ethnicity		

White	44	67.7
African American/Black	7	10.8
Asian	4	6.2
Hispanic/Latino	4	6.2
Other	6	9.2
Class Standing		
Freshman	35	53.8
Sophomore	12	18.5
Junior	3	4.6
Senior	2	3.1
Other/Declined to Answer	13	20.0
Practice Mindfulness		
Yes	3	4.6
No	62	95.4

Three participants reported to practice mindfulness meditation on their own: one reported to practice daily, one reported to practice once per week, and one reported to have practiced regularly in the past, but not to practice currently. All three participants were randomly assigned to the video control group; two of whom were assigned to the video control - included group and one to the video control - excluded group.

Manipulation Checks

Independent *t* tests were conducted to determine if participants in the mindful breathing group reported greater state mindfulness compared to participants in the control

group. Participants in the mindful breathing group reported significantly greater post intervention TMS Total scores (M = 31.53; SD = 8.90) than participants in the video control group (M = 24.93; SD = 8.48), t (63) = 3.03, $p > .05$, Cohen's $d = .76$. Unexpectedly, MAAS State Total Scores were not significantly different between Mindful Breathing and Video control groups, t (63) = 0.48, $p > .05$. Though the TMS suggested that the mindful breathing exercise had a strong effect on state mindfulness, the MAAS suggested that the mindful breathing exercise had no significant effect on state mindfulness.

Another manipulation check was conducted to make sure that participants in the excluded Cyberball condition reported to feel more excluded than participants in the included Cyberball condition. An independent t test found that participants in the excluded Cyberball condition reported significantly greater exclusion (lower scores indicate greater exclusion; M = 2.24; SD = 0.57) on the Need Threat Scale immediately following Cyberball than participants in the included Cyberball condition (M = 3.62; SD = 0.70), $t(67) = 8.74$, $p < .05$, Cohen's $d = 2.16$.

Hypothesis One

The first hypothesis was that excluded participants in the mindful breathing group would show slower declines in mood ratings than excluded participants in the video control group. A two-way mixed design ANOVA was conducted to determine if there were differences in mood scores between groups, conditions, and across time. Machly's test of sphericity was significant, χ^2 (27) = 205.09, $p < .001$, indicating that the assumption of sphericity was violated. To address sphericity in the data, the Greenhouse-Geisser correction was used to interpret the results of the ANOVA. There was a

significant effect for Mood, F (2.66, 122.45) = 5.36, $p < .05$, $\eta_p^2 = .10$, indicating that mood ratings were significantly different across time points. There was also a significant interaction effect for Mood x Group (mindfulness vs. video control), F (2.66, 122.45) = 2.84, $p < .05$, $\eta_p^2 = .06$, indicating that there was a significant difference in mood ratings across time points and between mindfulness and control video groups (irrespective of whether assigned to the included or excluded condition). However, the effect was quite small. Mean mood ratings for the mindfulness group were 6.89 (SD =1.34) at time 1 and 5.56 (SD = 1.95) at time 8. Mean mood ratings for the video group were 6.74 (SD = 1.82) at time 1 and 6.26 (SD = 1.74) at time 8. The interaction effects for Mood x Inclusion/Exclusion, F (2.66, 122.45) = 2.39, $p = .08$ $\eta_p^2 = .05$, and for Mood x Group (mindfulness vs. video control) x Inclusion/Exclusion, F (2.66, 122.45) = .38, $p > .05$, $\eta_p^2 < .01$, were not statistically significant.

Polynomial contrast analyses ("trend analyses") indicated that there was a significant linear relationship for mood scores over time, F (1, 46) = 9.39, $p < .01$, $\eta_p^2 = .17$. The linear relationship for Mood x Group (mindfulness vs. control), F (1, 46) = 3.93, $p = .05$, $\eta_p^2 = .08$, and for Mood x Inclusion/Exclusion, F (1, 46) = 3.50, p = .07, $\eta_p^2 = .08$, were trending towards statistical significance. There was not a significant linear relationship for Mood x Group x Inclusion/Exclusion. Likewise, there were no significant quadratic trends (curvature) across terms.

To compare rates of change between groups (mindfulness vs. video control), two growth curve models were constructed using a multilevel modeling approach. See Table 2 for mood rating growth rates for mindfulness and video control groups. The first growth curve model compared growth rates for participants in the excluded mindfulness

group and excluded video control group. The intercept (mood rating for the mindfulness group at time 1; β_{00}) was 6.87. Group membership (mindfulness vs. video control) was not predictive of mood ratings. There was a significant linear decline in mood ratings over time, $b = -0.23$, t (65.57) = -2.29, $p < .05$. There was not a significant quadratic growth rate (curvature) over time, $b = 0.00$, t (45.39) = 0.23, $p > .05$. The interaction effect for group membership (mindfulness vs. video control) and linear growth rate was not statistically significant, $b = 0.20$, t (65.57) = 1.27, $p > .05$, indicating that there was no significant difference in rates of change (slopes) between groups. Likewise, the interaction effect for group membership (mindfulness vs. video control) and quadratic growth rate (curvature) was not statistically significant, $b = -0.01$, t (45.39) = -0.50, $p > .05$, indicating that there was not a significant difference in the curvature of the growth rates between groups. See Figure 3 for a line graph of the mean mood ratings for excluded participants in the mindful breathing and video control groups.

Table 2

Mood Rating Growth Rates for Mindfulness and Video Control Groups

Effect	Included Condition *b* (SE)	Excluded Condition *b* (SE)
Intercept	7.09* (.41)	6.87* (.35)
Linear Growth Rate (Slope)	-0.22* (.11)	-0.23* (.10)
Quadratic Growth Rate (Curvature)	0.02 (.02)	0.00 (.01)
Condition		
Control	0.21 (.61)	-0.41 (.54)

Mindfulness		
Condition x Linear Growth Rate	0.10 (.17)	0.20 (.16)
Condition x Quadratic Growth Rate	0.00 (.02)	-0.01 (.02)

*$p < .05$

The second growth curve model compared growth rates for participants in the included mindfulness group and included video control group. The intercept (mood rating for the mindfulness group at time 1; β_{00}) was 7.09. Group membership (mindfulness vs. video control) was not predictive of mood ratings. There was a significant linear decline in mood ratings over time, $b = -0.22$, t (67.91) = -2.01, $p < .05$. The quadratic growth rate (curvature) was not statistically significant, $b = 0.02$, t (57.96) = 1.61, $p > .05$. The interaction effect for group membership (mindfulness vs. video control) and linear growth rate was not statistically significant, $b = 0.10$, t (67.91) = 0.58, $p > .05$, indicating that there was no significant difference in the rates of change (slopes) between groups. Likewise, the interaction effect for group membership (mindfulness vs. video control) and quadratic growth rate (curvature) was not statistically significant, $b = 0.00$, t (57.96) = -0.12, $p > .05$, indicating that there was not a significant difference in the curvature of the growth rates between groups. See Figure 4 for a line graph of the mean mood ratings for included participants in the mindful breathing and video control groups.

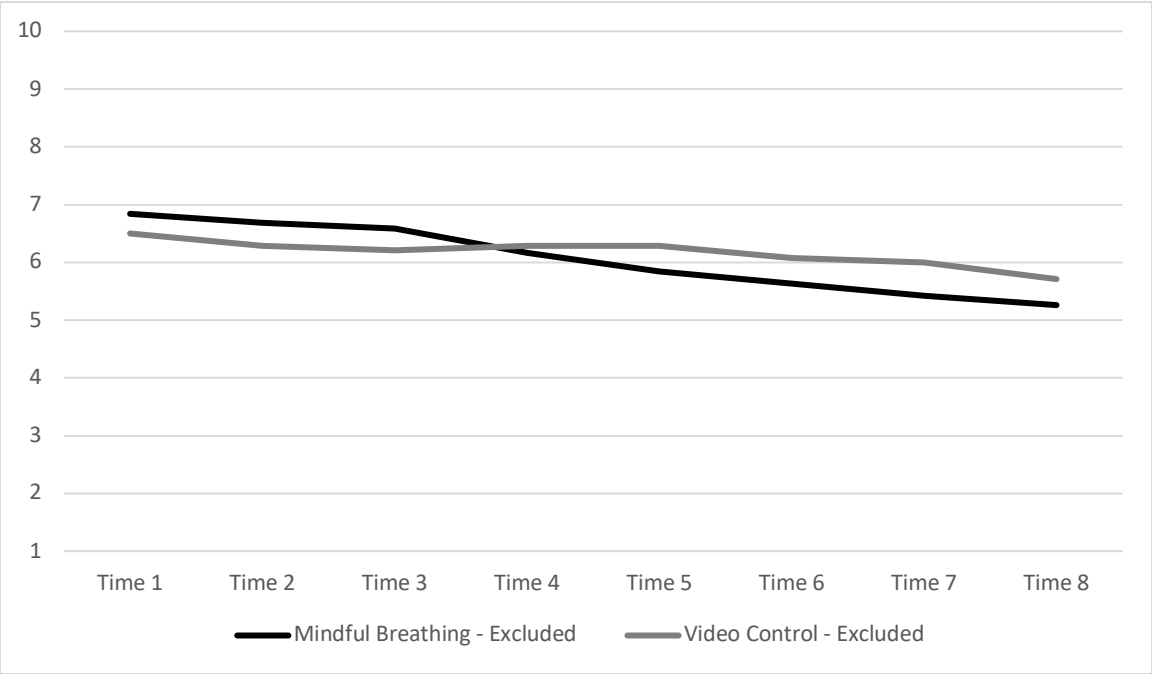

Figure 3. Line Graph of Mean Mood Ratings for the Mindful Breathing – Excluded and Video Control – Excluded Groups.

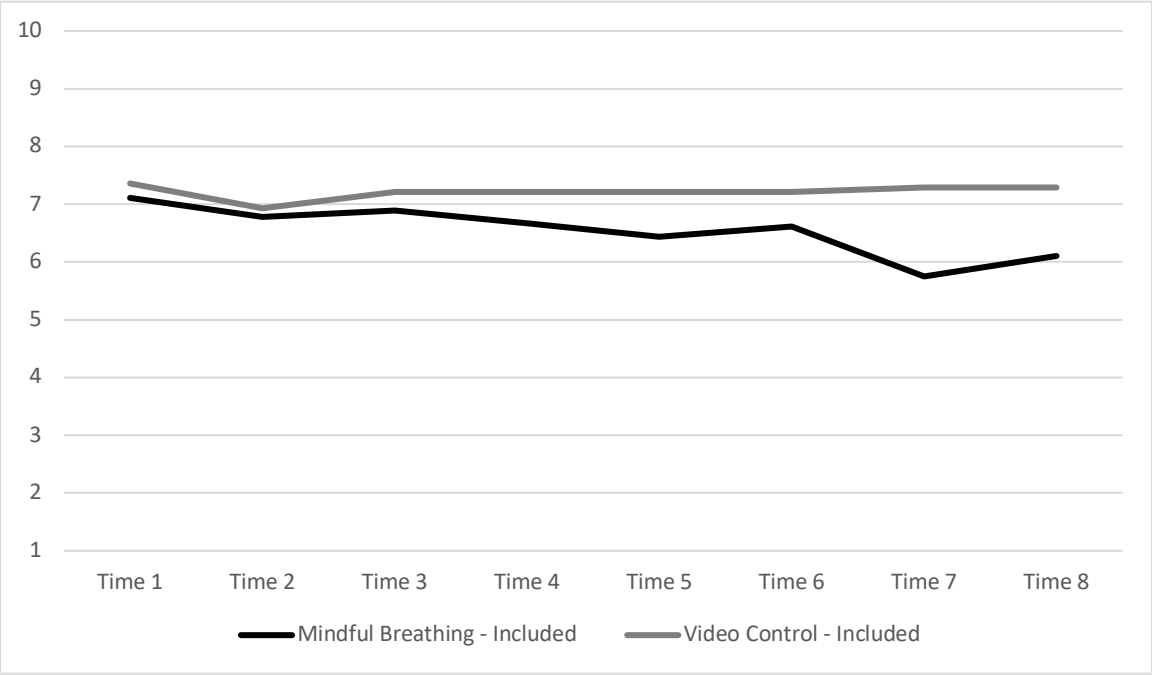

Figure 4. Line Graph of Mean Mood Ratings for the Mindful Breathing – Included and Video Control – Included Groups.

Hypothesis Two

The second hypothesis was that participants higher in trait mindfulness would show slower declines in mood ratings than participants lower in trait mindfulness while being excluded in Cyberball. To identify participants higher in trait mindfulness and lower in trait mindfulness, a Trait Mindfulness Composite Score was computed by summing the MAAS Trait Total Score and the FFMQ Total Score. Trait Mindfulness Composite Scores had a mean of 128.75 and a standard deviation of 17.05. Based on trait mindfulness composite scores, participants were assigned to higher (greater than 128.75) and lower (less than or equal to 128.75) trait mindfulness groups. A growth curve model was then constructed to examine whether participants higher in trait mindfulness showed slower declines in mood ratings in response to being excluded in Cyberball than participants lower in trait mindfulness. The intercept (mood rating for high trait mindfulness at time 1; b_{00}) was 6.53 (SE = .26). There was a significant linear decline in mood ratings over time, $b = -0.12$, t (67.83) = -3.10, $p < .05$. Membership in higher trait mindfulness or lower trait mindfulness groups was not statistically significant, $b = 0.67$, t (68.47) = 1.80, $p > .05$, thus group membership was not predictive of mood ratings. The interaction effect for group membership (higher or lower trait mindfulness) and linear growth rate (slope) was not statistically significant, $b = -0.02$, t (69.58) = 0.31, $p > .05$. See Figure 5 for a line graph of the mean mood ratings for excluded participants in higher and lower trait mindfulness groups.

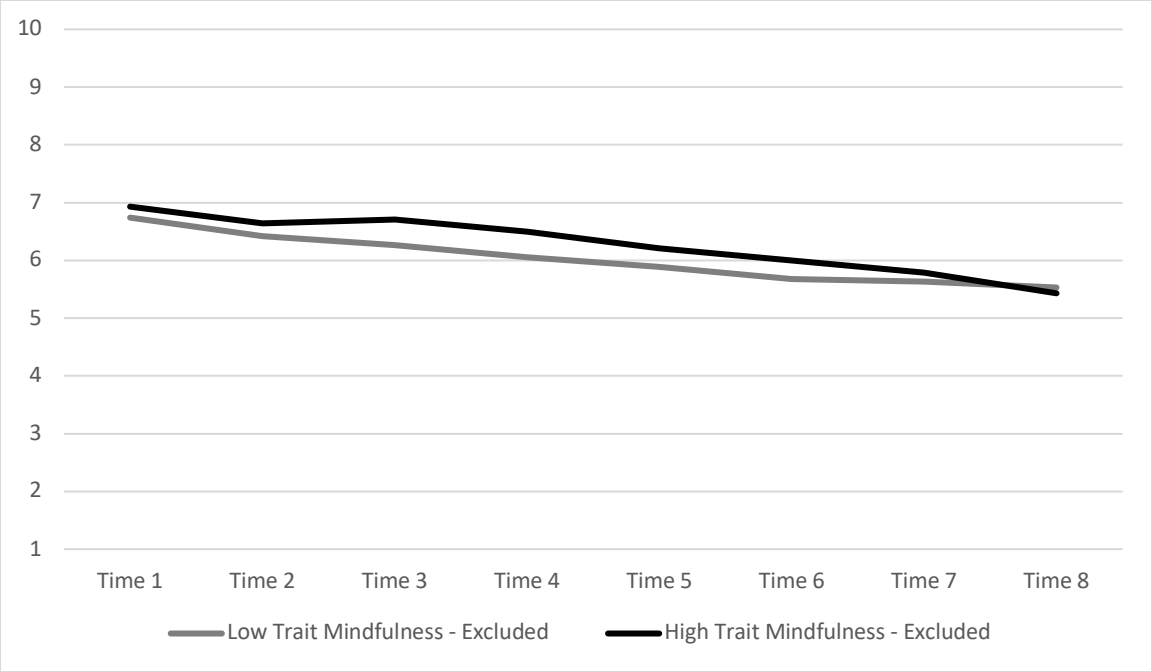

Figure 5. Line Graph of Mean Mood Ratings for the Low Trait Mindfulness – Excluded and High Trait Mindfulness – Excluded Groups.

Hypothesis Three

The third hypothesis was that participants in the mindful breathing group would recover from being excluded more quickly than participants in the video control group as measured by the Need Threat Scale. A mixed design ANOVA was conducted to determine if participants in the mindful breathing group recovered from being excluded more quickly than participants in the video control group. There was a significant interaction effect for Need Threat and Inclusion/Exclusion, $F(1, 61) = 21.38$, $p < .05$, $\eta_p^2 = .26$. These results indicate that there was a significant difference between initial Need Threat Composite Scores and delayed Need Threat Composite Scores for participants in the excluded conditions. Mean Need Threat Composite Scores (lower scores indicate greater need threat) for participants in the excluded condition immediately following Cyberball were 2.26 (SD = 0.11) and after delay were 3.07 (SD = 0.12). Mean Need

Threat scores for participants in the included condition immediately following Cyberball were 3.62 (SD = 0.12) and after delay were 3.74 (SD = 0.11). There was no significant interaction effect for Need Threat x Group (mindfulness vs. video control), $F(1, 61) = .07$, $p > .05$, or for Need Threat x Inclusion/Exclusion x Group (mindfulness vs. video control), $F(1, 61) = 1.54$, $p > .05$.

Hypothesis Four

The fourth hypothesis was that participants in the mindful breathing group would report their moods to increase from their initial mood ratings at the start of the experiment to their mood ratings immediately following the mindful breathing exercise. In contrast, participants in the video control group were not expected to show increases in mood from their initial mood ratings at the start of the experiment to their mood ratings immediately following the educational video. Two paired samples *t* tests were conducted to compare participants' mood ratings at the start of the experiment to participants' mood ratings following the mindfulness exercise or educational video. There was no significant difference in mood ratings following the mindfulness exercise, $t(35) = 1.55$, $p > .05$. Mean mood at the start of the procedure was 7.25 (SD = 1.27) and after the mindfulness exercise was 7.00 (SD = 1.45). Likewise, there was no significant difference in mood ratings after participants viewed the educational video, $t(28) = -1.29$, $p > .05$. Mean mood ratings at the start of the procedure were 6.69 (SD = 1.69). Mean mood ratings following the educational video were 6.90 (SD = 1.82).

Hypothesis Five

The fifth hypothesis was that participants in the mindful breathing group would report greater increases in mood between their mood ratings immediately following

Cyberball to their mood ratings after a three-minute delay than participants in the video control group. Gain scores were computed by subtracting participants mood ratings immediately following Cyberball from participants mood ratings after the three-minute delay. An independent *t* test of the gain scores for the mindful breathing group and video control group was not statistically significant, $t\ (63) = .03$, $p > .05$, which indicates that there was no significant difference in gain scores between groups.

To further clarify the changes in mood ratings between the mood rating immediately Cyberball and the mood rating following the three-minute delay, paired sample *t* tests were also conducted. There was a significant increase in mood following delay for participants in the mindful breathing group, $t\ (35) = -2.50$, $p < .05$, Cohen's $d = .35$. Mean mood ratings on the Need Threat Scale immediately following Cyberball were 3.44/5 (SD = 1.18). Mean mood ratings on the Need Threat Scale following delay were 3.81/5 (SD = .89). There was also a significant increase in mood following delay for participants in the video control group, $t\ (28) = -3.48$, $p < .05$, Cohen's $d = .56$. Mean mood ratings on the Need Threat Scale immediately following Cyberball were 3.34/5 (SD = 1.07). Mean mood ratings after delay were 3.93/5 (SD = 1.03).

Post Hoc Analyses

The relationships between the state and trait mindfulness measures were explored. There was a statistically significant positive relationship between the two trait mindfulness questionnaires, the MAAS Trait and the FFMQ, $r = .43$, $p < .05$. There was not a statistically significant relationship between the two state mindfulness measures, TMS and MAAS State, $r = -.02$, $p > .05$. There were statistically significant relationships between the FFMQ and MAAS State, $r = .43$, $p < .05$, and the MAAS Trait and MAAS

State, $r = .43$, $p < .05$. There was no statistically significant relationship between the TMS and any of the other state or trait mindfulness measures.

See Table 3 for BFI descriptive statistics. The relationships between the "Big Five" and exclusion on the Needs Threat Scale were examined. There was a statistically significant relationship between Conscientiousness and Need Threat Composite Score, $r = .28$, $p < .05$, indicating that participants with greater conscientiousness reported greater sense of inclusion. There were no significant relationships between Openness, Extraversion, Neuroticism, or Agreeableness and the Need Threat Composite Score. The relationships between the "Big Five" and state and trait mindfulness were also explored. There was a statistically significant positive relationship between the FFMQ Trait Total Score and Conscientiousness, $r = .44$, $p < .05$, and Extraversion, $r = .44$, $p < .05$, and a statistically significant negative relationship between FFMQ Trait Total Score and Neuroticism, -.56, $p < .05$. There was a statistically significant positive relationship between MAAS Trait and Conscientiousness, $r = .31$, $p < .05$, and a statistically significant negative relationship between MAAS Trait and Neuroticism, $r = -.47$, $p < .05$.

Table 3

Mean BFI Traits (N=65)

BFI Trait	Mean	SD
Openness	34.70	5.06
Conscientiousness	33.50	5.09
Extraversion	25.92	6.02
Agreeableness	35.65	4.26
Neuroticism	24.06	6.13

The relationship between state mindfulness and the “Big Five” was also examined. The relationship between the TMS and Openness was trending towards statistical significance, $r = .23$, $p = .07$. The relationship between MAAS State and Conscientiousness was trending towards statistical significance, $r = .24$, $p = .05$, as was the relationship between MAAS State and Neuroticism, $r = -.23$, $p = .06$.

Chapter Four

Discussion

Summary of the Study

The purpose of this study was to examine whether a brief mindful meditation exercise lessens the immediate, reflexive negative effects of being excluded while playing Cyberball. The impact of trait mindfulness on the immediate negative effects of being excluded while playing Cyberball was also examined. Post hoc analyses were conducted to better understand that relationships between the "Big Five" personality traits, trait mindfulness, state mindfulness, and sense of exclusion.

Key Findings

The first hypothesis was that excluded participants in the mindful breathing group would show slower declines in mood ratings than excluded participants in the video control group. A two-way mixed design ANOVA found mood ratings to be significantly different across time points irrespective of group (mindful breathing or video control) or condition (included or excluded). On the whole, participants mood ratings decreased while they played Cyberball irrespective of whether they were in the mindful breathing or video control group or in the included or excluded Cyberball condition. There was also a significant difference in mood ratings over time between mindful breathing and video control groups regardless of Cyberball condition (included or excluded). There were no significant differences in mood ratings over time between participants in the included or excluded condition. Likewise, there was no significant interaction effect for mood ratings over time by group (mindful breathing or video control) and by condition (included or excluded). Polynomial contrast analyses found a significant linear relationship for mood

ratings over time, mood ratings over time by group (mindful breathing and video control), and mood ratings over time by condition (inclusion or exclusion). There was a negative linear trend for mood ratings over time. There was also a significant group (mindful breathing and video control) difference in the negative linear trend for mood ratings over time. Contrary to hypothesis one, participants in the mindful breathing group showed greater decreases in mood ratings than participants in the video control group irrespective of whether they were included or excluded while playing Cyberball.

Two growth curve models were constructed to compare the rates of change between groups (mindful breathing and video control). Excluded participants showed a statistically significant negative growth rate of 0.23 There was no significant acceleration or deceleration (curvature) of the growth rate. There was no significant interaction effect for group (mindful breathing and video control) and growth rate, i.e., there was not a significant difference in growth rates between groups. In the second growth curve model, included participants showed a statistically significant negative growth rate of 0.22. There was no significant acceleration or deceleration (curvature) of the growth rate. There was no significant interaction effect for group (mindful breathing and video control) and growth rate. The results of the ANOVAs and growth curve models do not support hypothesis one. To the contrary, the results of the ANOVAs indicate that participants in the mindful breathing group showed slightly greater decreases in mood ratings than participants in the video control group.

There are many possible explanations for why the mindful breathing group did not show slower declines in mood ratings as hypothesized. Firstly, it is possible that participants in a mindful state are more aware of their negative emotions than participants

in a less mindful state. Recall that the most commonly used operationalized definition for mindfulness is awareness of the present moment coupled with non-reactivity (Bishop et al., 2004). Participants in the mindful breathing group would be expected to be more aware of the present moment than participants in the video control group. However, participants in the mindful breathing group would also be expected to be less reactive and more able to engage in the "letting go" of thoughts and feelings (Kabat-Zinn, 2013). The above findings suggest that participants in the mindful breathing group may be more aware of not enjoying Cyberball than participants in the video control group. The findings did not suggest, however, that participants in the mindful breathing group were less reactive to Cyberball than participants in the video control group. To the contrary, they appear slightly more reactive.

An implicit assumption in the mindfulness literature is that "mindlessness" contributes to ill health. There may be times, however, in which mindlessness can be adaptive. The impact of mind-wandering on mood was recently investigated using ambulatory assessment methods. Welz, Reinhard, Alpers, and Kuehner (2018) tasked participants with recording the severity of their mind wandering along with their mood states 10 times per day over a period of five days. The authors found that, though participants whose minds wandered on negative topics saw decreases in mood, participants whose minds wandered on more positively valenced topics saw increases in mood. A relative blind spot in the Cyberball literature is participants thought content while playing Cyberball. Though certainly difficult to assess, it may be that participants who are not in a mindful state are better able to distract themselves with positive thoughts while playing Cyberball. This may improve participants moods or counteract the negative

effects of the Cyberball procedure. Participants in a mindful state, whose awareness is increased, may be more or less "stuck" in the present moment thinking about being excluded while playing Cyberball.

It is also important to consider the possibility that participants in the mindful breathing group were not actually more mindful while playing Cyberball. State mindfulness was assessed immediately following the mindful breathing exercise before the Cyberball procedure. Though the mindful breathing exercise was successful in inducing a mindful state (per the TMS), it is unknown if participant's mindful state persisted into the Cyberball procedure. Of note, participants were not instructed to remain mindful while playing Cyberball. Mindfulness is an "intentional" stance; it does not occur accidentally. Also, recall that the Cyberball instructions ask participants to practice "mental visualization." It is possible that "mental visualization" counteracted the effects of the mindful breathing exercise.

Similarly, recent research calls into question participants capacity to be mindful while attending to other more important demands for their attention. It has been hypothesized that mindfulness can be expected to fail when there are other more pressing demands for attention (Suelmann et al., 2018). Related to both Baumeister and Tice's (1990) exclusion theory of anxiety and the reflexive stage of Williams's temporal need-threat model (Williams, 2009), "loss potential" and threat, in particular, have been argued to be more pressing demands for attention than mindfulness (Suelmann et al., 2018). If so, mindfulness should be difficult to sustain in the face of loss potential and threat. These hypotheses were recently investigated experimentally. Suelmann et al. (2018) conducted an experience sampling study in which participants were tasked with recording

their awareness of the present moment five times per day over a period of several days. The authors found loss potential and threat to negatively impact participants' awareness and to especially impact participants' non-reactivity, i.e., loss potential and threat led to increased participant reactivity. Interestingly, in addition to the impact of loss potential and threat on mindfulness, the authors also found social interactions alone to undercut participants' capacity for mindfulness. Thus, the authors conclude that social interactions alone are attentionally taxing enough to impede mindfulness.

With Suelmann et al.'s (2018) findings in mind, it is conceivable that the Cyberball task required too much attentional resources for participants to remain in a mindful state. The exclusion condition, in particular, involving loss potential and threat, may have taxed participants' attentional resources such that participants did not have the attentional resources to remain mindful. It should also be noted that participants' mood ratings decreased irrespective of whether they were included or excluded while playing Cyberball. Cyberball itself was a mildly aversive experience. Even if state mindfulness mitigates the distress of being excluded, it may not mitigate the distress of playing Cyberball.

The second hypothesis was that excluded participants higher in trait mindfulness would show slower declines in mood ratings than excluded participants lower in trait mindfulness. A growth curve model was constructed to compare rates of change between participants with higher and lower trait mindfulness irrespective of whether they were assigned to the mindful breathing or video control group. There was a statistically significant negative growth rate of 0.12. In others words, all participants showed a decline in mood ratings while playing Cyberball, irrespective of whether they were

designated higher in trait mindfulness, lower in trait mindfulness, or if they were in the mindful breathing group or video control group. There was no significant interaction effect for group (higher and lower trait mindfulness) and growth rate. Contrary to hypothesis two, there was no significant difference in mood ratings over time for participants designated higher in trait mindfulness and lower in trait mindfulness.

These findings provide further support for Williams's reflexive stage of the temporal need-threat model. According to the theory, exclusion triggers an immediate, reflex-like "social pain" response that is robust against moderation by individual differences. Trait mindfulness, an individual difference, does not impact participants immediate, reflex-like response to social exclusion. Consistent with the temporal need-threat model, trait mindfulness may, however, impact longer-term reactions to social exclusion. In particular, trait mindfulness may moderate how people respond in the reflective stage of the temporal need-threat model. The reflective stage includes the cognitive appraisal and shorter-term behavioral responses to social exclusion. Individuals higher in trait mindfulness may appraise exclusion events differently from individuals lower in trait mindfulness. Trait mindfulness has been found to be negatively associated with rumination and positively associated with emotion regulation (Tomlinson et al., 2018). In addition, trait mindfulness may also impact behavioral responses to social exclusion. Some research, for example, has found mindfulness to be associated with more prosocial behavior (Berry et al., 2018; Maner et al., 2007). Trait mindfulness may also be a personality characteristic that inoculates against the resignation stage of the need threat-model, which is characterized by social isolation and anxiety.

The third hypothesis was that participants in the mindful breathing group would recover from being excluded more quickly than participants in the video control group. A repeated measures ANOVA found no statistically significant interaction effect for sense of exclusion (need threat) by group (mindful breathing and video control) and by condition (inclusion or condition). Contrary to hypothesis three and contrary to Molet and colleagues' (2013) finding, there was no significant difference in recovery from exclusion between participants in the mindful breathing and video control groups. It is unclear why this study was unable to replicate Molet and colleagues' (2013) finding, but it raises the possibility that their positive finding or this study's absence of a finding is due to Type I or Type II error.

The fourth hypothesis was that participants in the mindful breathing group would report an increase in mood following the mindful breathing exercise. Two paired samples *t* tests were conducted to compare participants' mood ratings at the start of the procedure to participants' mood ratings following the mindful breathing exercise and educational video. Neither *t* test was statistically significant, indicating that there was no significant difference between participants' mood ratings at the start of the experiment and participants' mood ratings after engaging in the mindful breathing exercise or viewing the educational video. Though mindfulness exercises have been reported to improve mood within the literature, it is possible that this study's mindful breathing exercise was too brief (~ five minutes) to impact mood. It is also possible that mindfulness exercises only improve mood when mood is more negatively valenced or dysphoric. Though this study did not assess for depressed mood or dysphoria, there is no reason to suspect that participants in the study had low moods at the start of the experiment. It should also be

noted that other studies have failed to find immediate mood improvement resulting from auditorily delivered mindful breathing exercises (e.g., Alberts & Thewissen, 2011).

The fifth hypothesis was that participants in the mindful breathing group would report greater increases in mood from their mood ratings immediately following Cyberball to their mood ratings after a three-minute delay. An independent *t* test of gain scores between the mindful breathing group and video control group was conducted. The *t* test was not statistically significant, indicating that there was no difference in gain scores between the mindful breathing and video control group. Two paired samples *t* tests were also conducted. The *t* tests found participants in the mindful breathing and video control group to report statistically significant mood increases between their mood rating immediately following Cyberball to their mood ratings after a delay. The effect size, however, was larger for participants in the video control group than for participants in the mindful breathing group. These findings are contrary to hypothesis five and contrary to Molet and colleagues' (2013) findings. Again, it is unclear why this study failed to replicate Molet and colleagues' (2013). Previous research has found mindfulness to aid in recovery from dysphoric moods so it is unexpected that the mindful breathing group would not show quicker recovery in mood (e.g., Keng et al., 2011).

Post hoc analyses found a strong correlation between both trait mindfulness questionnaires (MAAS Trait and FFMQ). The TMS showed a strong effect for participants in the mindful breathing group, suggesting that the mindful breathing exercise was successful in inducing a mindful state in participants. Unexpectedly, total scores on the MAAS State measure were not significantly different between participants in the mindful breathing group and participants in the video control groups. Likewise,

there was no significant association between the MAAS State and TMS measures. Also interesting was the finding that the TMS was not correlated with the trait mindfulness measures. Furthermore, the MAAS Trait and MAAS State measures were found to be strongly correlated. One possible explanation for why the MAAS Trait and MAAS State measures are correlated and why the MAAS State measure is not correlated with the other state mindfulness measure is that the MAAS State measure may actually measure trait mindfulness instead of state mindfulness. That would explain the strong correlation between MAAS State and MAAS Trait. However, the question then becomes why would trait mindfulness measures not be associated with state mindfulness measures? Another factor to consider is that the MAAS State measure is only five questions and therefore may not pick up as much variance between scores as the TMS measure which is 13-items. It is also important to remember that the MAAS State measure is actually a measure of mindlessness. It may be that mindlessness as measured on the MAAS State is not the opposite of mindfulness but rather a measure of distractibility or inattentiveness. As Chiesa (2013) noted, reporting that you are not depressed does not imply that you are happy. Reporting that you are not mindless may not indicate that you are mindful.

With regard to the "Big Five," there were strong positive associations between the trait mindfulness measures (FFMQ and MAAS Trait) and conscientiousness in particular. Likewise, conscientiousness was also found to be associated with scores on the Need Threat Scale that reflect a greater sense of inclusion. There were strong negative associations between the trait mindfulness measures and neuroticism. In summary, conscientiousness was associated with greater sense of inclusion and greater trait

mindfulness and neuroticism was associated with greater sense of exclusion and lower trait mindfulness.

Limitations

One of the major limitations of this study was the way in which participants' mood ratings were recorded. Rather than use a mood dial as in Wesselmann, Wirth et al. (2012), participants in this study rated their mood orally every 20 seconds as the examiner (this author) sat quietly out of sight behind them. It is possible that the examiner's presence in the room with the participants impacted the way in which participants reported their moods or the way in which participants' moods were affected by Cyberball. A recent study found even minimal acknowledgment, e.g., receiving one ball throw instead of zero, to decrease participants' sense of exclusion immediately following Cyberball (Rudert, Hales, Greifeneder, & Williams, 2017). Another study found that participants acknowledged by a confederate with brief eye contact report lesser sense of disconnection than participants not acknowledged by a confederate (Wesselmann, Cardoso, Slater, & Williams, 2012). Given that the examiner was in the room with the participants and that participants were communicating with the examiner throughout the Cyberball procedure, it is possible that participants felt less negative emotion while being excluded during Cyberball. It is also possible that some participants would feel uncomfortable reporting the impact of being excluded. With these factors in mind, it is possible that the results of this study would be different if participants used a mood dial rather than orally reported mood ratings.

It is also worth considering how comparable orally reported mood ratings are to mood dial mood ratings. The data collected for orally reported mood ratings and mood

dial mood ratings is quite different. Orally reported mood ratings assess mood at specific time points. In contrast, mood dials assess "mood" continuously. It is possible that mood dial mood ratings and orally reported mood ratings actually assess different constructs. Mood dial ratings may be more similar to rating the degree to which one is experiencing positive or negative affect. Participants who turn a mood dial as they are being excluded may be indicating that they are experiencing negative affect, not necessarily that their overall mood is decreasing. Orally reported mood ratings, however, may be more in line with what is traditionally considered "mood." Perhaps Wesselman et al. (2012) actually tracked affect with the mood dial. It is therefore possible that state and trait mindfulness may impact participants' affect but not their mood.

Another limitation of the current study was that state mindfulness was only assessed immediately following the mindful breathing exercise. State mindfulness was not retrospectively assessed following the Cyberball procedure which would have provided data on the degree to which participants in the mindful breathing group remained in a mindful state during the Cyberball procedure. The current study presumes that participants who engaged in the mindful breathing exercise remained in a state of mindfulness or continued to be affected by the mindful breathing exercise during the Cyberball procedure. It is possible that the effects of the mindful breathing exercise had waned or deteriorated before or during the Cyberball procedure.

A further limitation of the current study (and a limitation within the trait mindfulness literature) is that there has been no agreed upon method for identifying high and low trait mindfulness. Given that trait mindfulness is believed to be a personality trait, it is presumed to be present to some degree in all people. It is certainly possible that

trait mindfulness is not normally distributed across the population. It is also possible that the current study's sample may, on the whole, skew towards high or low trait mindfulness. The current study, for example, included only a few participants who practice or had practiced mindfulness in the past. Given that trait mindfulness is expected to increase with increased mindfulness practice (e.g., Kiken, Garland, Bluth, Palsson, & Gaylord, 2015), it is possible that participants in this study skewed towards average or below average levels of trait mindfulness. It is also important to note, however, that this sample is a college sample. It is conceivable that the college population possess greater attentional capacities than the general population. Thus, it is possible that this sample skewed towards average or above average levels of trait mindfulness. With regard to the statistical ability to detect differences in trait mindfulness between participants, there may not have been enough spread in trait mindfulness scores for differences between participants designated higher in trait mindfulness and participants designated lower in trait mindfulness to be detected.

Implications and Future Directions

This study adds to the body of literature (e.g., Zadro et al., 2006) that has found the immediate, reflexive effects of social exclusion to be robust against moderation. Being excluded while playing Cyberball appears to be unpleasant and distressing for everyone, irrespective of personality characteristics, state mindfulness, or trait mindfulness. However, it is important to remember that the effects of Cyberball are mild and short-lived. It is possible that other experimental paradigms of social exclusion produce effects that are moderated by personality characteristics or state and trait mindfulness. For example, the life-alone prognosis paradigm is associated with more

aggressive responses and has been thought to induce a more distressing emotional state than Cyberball (Twenge et al., 2001; Twenge et al., 2002; Twenge et al., 2003; Williams, 2007). It is conceivable that state and trait mindfulness would moderate aggressive response to Cyberball. It may be particularly valuable to examine whether state and trait mindfulness influence whether exclusion is socially activating or socially deactivating, i.e., whether participants seek out social support or withdraw socially after being excluded.

The exclusion theory of anxiety would predict that participants would respond to being excluded in Cyberball with anxiety. Given the positive effects of mindfulness on anxiety within the literature, it is possible that the mindful breathing exercise may lessen anxiety over being excluded but not its effect on mood. Future research examining physiological effects of Cyberball may be a means of assessing both its effect on mood and on anxiety.

It will also be important to explore whether different forms of meditation, e.g., mindful breathing vs. loving-kindness, have different effects. Loving-kindness meditation has been argued to promote social connectedness and some research supports this contention (Bankard, 2015; Hofmann, Grossman, & Hinton, 2011). Perhaps participants who engage in a loving-kindness meditation rather than a mindful breathing meditation would be less distressed when being excluded in Cyberball.

This study also adds to the body of literature on the strong positive association between trait mindfulness and conscientiousness and the negative association between trait mindfulness and neuroticism (e.g., Latzman & Masuda, 2013). It will be important to continue exploring personality characteristics that contribute to the ability to participate

in mindfulness and the ability to benefit from mindfulness. It will also be important to continue teasing apart whether mindfulness is a trait in itself or an amalgamation of other traits and characteristics. Given the discrepancies between the trait mindfulness measures, it will be important for future research to assess the construct validity of trait mindfulness.

Mindfulness has been poorly operationalized within the literature. Researchers mean different things when they discuss mindfulness, e.g., a trait or state or practice, and make different predictions about what mindfulness does, e.g., improves introspection, increases awareness (Van Dam et al., 2018). Given the inherent limitations of self-report, attempts are underway to construct more objective, performance-based measure of trait mindfulness. One such technique is the Breath-Counting Task (BCT), which instructs participants to engage in a traditional brief mindful meditation exercise. While engaging in the exercise participants are instructed to mentally count their breaths from one to nine and to type a key on a keyboard each time they reach nine breaths. When they have lost track of the count, they are instructed to type spacebar on the keyboard. Errors in counting are hypothesized to be associated with lapses in attention whereas self-caught errors are associated with mind wandering. Preliminary research has been supportive of the BCT as a measure of more than just sustained attention (Wong, Massar, Chee, & Lim, 2018).

Another question that remains to be explored further in the literature is for what is mindfulness not good for? The current study suggests that mindfulness may not be good at helping people feel less distressed about being socially excluded in the moment. In fact, mindfulness may slightly worsen the feeling. Though mindfulness does not appear

to impact the acute “social pain” of the reflexive stage of the temporal need-threat model, it is possible that mindfulness may have an impact on the chronic “social pain” of the resignation stage. Though mindfulness meditation is associated with increases in prosocial behavior (e.g., Berry et al., 2018), a recent meta-analysis found the prosocial effects of mindfulness meditation to be rather limited (Kreplin, Farias, & Brazil, 2018). An important avenue to explore will be *for whom* is mindfulness most helpful? Mindfulness may not be helpful for everyone but may be particularly helpful for some people with certain conditions or characteristics.

References

Alberts, H. J. E. M., & Thewissen, R. (2011). The effect of a brief mindfulness intervention on memory for positively and negatively valenced stimuli. *Mindfulness*, *2*, 72-77. doi:10.1007/s1267-011-0044-7

Allen, N. B., & Badcock, P. B. (2003). The social risk hypothesis of depressed mood: Evolutionary, psychosocial, and neurobiological perspectives. *Psychological Bulletin*, *129*(6), 887-913. doi:10.1037/0033-2909.129.6.887

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behaviour Research and Therapy*, *44*, 1849-1858. doi:10.1016/j.brat.2005.12.007

Asher, S. R., & Coie, J. D. (Eds.). (1990). *Peer rejection in childhood*. New York, NY: Cambridge University Press.

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., … & Williams, M. G. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment*, 15, 329-342. doi:10.1177/1073191107313003

Bankard, J. (2015). Training emotion cultivates morality: How loving-kindness meditation hones compassion and increases prosocial behavior. *Journal of Religion and Health*, *54*(6), 2324-2343. doi:10.1007/s10943-014-9999-8

Barner-Barry, C. (1986). Rob: Children's tacit use of peer ostracism to control aggressive behavior. *Evolution & Human Behavior*, *7*(3-4), 281-293. doi:10.1016/0162-3095(86)90054-3

Baumeister, R. F. (1990). Suicide as escape from self. *Psychological Review*, *97*(1), 90-113.

Baumeister, R. F., Brewer, L. E., Tice, D. M., & Twenge, J. M. (2007). Thwarting the need to belong: Understanding the interpersonal and inner effects of social exclusion. *Social and Personality Compass*, *1*, 506-520. doi:10.1111/j.1751-9004.2007.00020.x

Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Twenge, J. M. (2005). Social exclusion impairs self-regulation. *Journal of Personality and Social Psychology*, *88*(4), 589-604. doi:10.1037/0022-3514.88.4.589

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497-529.

Baumeister, R. F., & Tice, D. M. (1990). Anxiety and social exclusion. *Journal of Social and Clinical Psychology*, *9*(2), 165-195.

Baumeister, R. F., Twenge, J. M., & Nuss, C. K. (2002). Effects of social exclusion on cognitive processes: Anticipated aloneness reduces intelligent thought. *Journal of*

Personality and Social Psychology, *83*(4), 817-827. doi:10.1037//0022-3514.83.4.817

Berry, D. R., Cairo, A. H., Goodman, R. J., Quaglia, J. T., Green, J. D., & Brown, K. W. (2018). Mindfulness increases prosocial response toward ostracized strangers through empathic concern. *Journal of Experimental Psychology: General*, *147*(1), 93-112. doi:10.1037/xge0000392

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., … Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*(3), 230-241. doi:10.1093/clipsy/bph077

Bodhi, B. (2011). What does mindfulness really mean? A canonical perspective. *Contemporary Buddhism*, *12*(1), 19-39. doi:10.1080/14639947.2011.564813

Broderick, P. (2005). Mindfulness and coping with dysphoric mood: Contrasts with rumination and distraction. *Cognitive Therapy and Research*, *29*(5), 501-510. doi:10.1007/s10608-005-3888-0

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822-848. doi:10.1037/0022-3514.84.4.822

Buckley, K., Winkel, R., & Leary, M. (2004). Reactions to acceptance and rejection: Effects of level and sequence of relational evaluation. *Journal of Experimental Social Psychology*, *40*, 14-28.

Buelow, M. T., Okdie, B. M., Brunell, A. B., & Trost, Z. (2015). Stuck in a moment and you cannot get out of it: The lingering effects of ostracism on cognition and

satisfaction of basic needs. *Personality and Individual Differences*, *76*, 39-43. doi:10.1016/j.paid.2014.11.051

Chambers, R., Gullone, E., & Allen, N. B. (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review*, *29*, 560-572. doi:10.1016/j.cpr.2009.06.005

Chaplin, W., John, O. P., & Goldberg, L. R. (1988). Conceptions of states and traits: Dimensional attributes with ideals as prototypes. *Journal of Personality and Social Psychology*, *54*(4), 541-557.

Chiesa, A. (2013). The difficulty of defining mindfulness: Current thought and critical issues. *Mindfulness*, *4*, 255-268. doi:10.1007/s12671-012-0123-4

Chiesa, A., & Malinowski, P. (2011). Mindfulness-based approaches: Are they all the same? *Journal of Clinical Psychology*, *67*(4), 404-424. doi:10.1002/jclp.20776

Chiesa, A., Serretti, A., & Jakobsen, J. C. (2013). Mindfulness: Top-down or bottom-up emotion regulation strategy? *Clinical Psychology Review*, *33*, 82-96. doi:10.1016/j.cpr.2012.10.006

Crowe, M., Jordan, J., Burrell, B., Jones, V., Gillon, D., & Harris, S. (2016). Mindfulness-based stress reduction for long-term physical conditions: A systematic review. *Australian & New Zealand Journal of Psychiatry*, *50*(1), 21-32. doi:10.1177/0004867415607984

Curran, P. J., Obeidat, K., & Losardo, D. (2010). Twelve frequently asked questions about growth curve modeling. *Journal of Cognitive Development*, *11*(2), 121-136. doi:10.1080/15248371003699969

Davidson, R. J., & Dahl, C. J. (2018). Outstanding challenges in scientific research on mindfulness and meditation. *Perspectives on Psychological Science*, *13*(1), 62-65. doi:10.1177/1745691617718358

DeBono, A., & Muraven, M. (2014). Rejection perceptions: Feeling disrespected leads to greater aggression than feeling disliked. *Journal of Experimental Social Psychology*, *55*, 43-52. doi:10.1016/j.jesp.2014.05.014

DeWall, C. N., & Richman, S. B. (2011). Social exclusion and the desire to reconnect. *Social and Personality Psychology Compass*, *5*(11), 919-932. doi:10.1111/j.1751-9004.2011.00383.x

DeWall, C. N., Twenge, J. M., Bushman, B., Im, C., & Williams, K. (2010). A little acceptance goes a long way: Applying social impact theory to the rejection-aggression link. *Social Psychological and Personality Science*, *1*(2), 168-174. doi:10.1177/1948550610361387

DeWall, C. N., Twenge, J. M., Gitter, S. A., & Baumeister, R. F. (2009). It's the thought that counts: The role of hostile cognition in shaping aggressive responses to social exclusion. *Journal of Personality and Social Psychology*, *96*(1), 45-59. doi:10.1037/a0013196

Deyoung, C. G. (2010). Personality neuroscience and the biology of traits. *Social and Personality Psychology Compass*, *4*(12), 1165-1180. doi: 10.1111/j.1751-9004.2010.00327.x

Droit-Volet, S., Chaulet, M., & Dambrun, M. (2018). Time and meditation: When does the perception of time change with mindfulness exercise? *Mindfulness*. Advance online publication. doi:10.1007/s12671-018-0903-6

Eisenberger, N. I. (2015). Social pain and the brain: Controversies, questions, and where to go from here. *Annual Review of Psychology*, *66*, 601-629. doi:10.1146/annurev-psych-010213-115146

Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science*, *302*, 290-292.

Epstein, M. (1995). *Thoughts without a thinker*. New York, NY: Basic.

Eysenck, H. J., & Eysenck, S. B. G. (1975). Manual of the Eysenck Personality Questionnaire (Junior and Adult). Kent, UK: Hodder & Stoughton.

Fayant, M., Muller, D., Hartgerink, C. H. J., & Lantian, A. (2014). Is ostracism by a despised outgroup really hurtful? A replication and extension of Gonsalkorale and Williams (2007). *Social Psychology*, *45*(6), 489-494. doi:10.1027/1864-9335/a000209

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Los Angeles, CA: SAGE.

Fjorback, L. O., Arendt, M., Ørnbøl, E., Fink, P., & Walach, H. (2011). Mindfulness-based cognitive therapy- A systematic review of randomized controlled trials. *Acta Psychiatrica Scandinavica*, *124*, 102-119. doi:10.1111/j.1600-0447.2011.01704.x

Forsdyke, S. (2005). *Exile, ostracism, and democracy: The politics of expulsion in ancient Greece.* Princeton: Princeton University Press.

Fung, K., & Alden, L. E. (2017). Once hurt, twice shy: Social pain contributes to social anxiety. *Emotion*, *17*(2), 231-239. doi:10.1037/emo0000223

Gaertner, L., Iuzzini, J., & O'Mara, E. M. (2008). When rejection by one fosters aggression against many: Multiple-victim aggression as a consequence of social

rejection and perceived groupness. *Journal of Experimental Social Psychology*, *44*(4), 958-970. doi:10.1016/j.jesp.2008.02.004

Galante, J., Iribarren, S. J., & Pearce, P. F. (2012). Effects of mindfulness-based cognitive therapy on mental disorders: A systematic review and meta-analysis of randomized controlled trials. *Journal of Research in Nursing*, *18*(2), 133-155. doi:10.1177/1744987112466087

Gardner, W. L., Pickett, C. L., & Brewer, M. B. (2000). Social exclusion and selective memory: How the need to belong influences memory for social events. *Personality and Social Psychology Bulletin*, *26*(4), 486-496. doi:10.1177/0146167200266007

Gerber, J. P., Chang, S., & Reimel, H. (2017). Construct validity of Williams' ostracism needs threat scale. *Personality and Individual Differences*, *115*, 50-53. doi: 10.1016/j.paid.2016.07.008

Germer, C. K. (2005). Mindfulness: What is it? What does it matter? In C. K. Germer, R. D. Siegel, & P. R. Fulton (Eds.), *Mindfulness and psychotherapy* (pp. 3-27). New York, NY: Guilord Press.

Germer, C. K. (2009). *The mindful path to self-compassion: Freeing yourself from destructive thoughts and emotions*. New York, NY: Guilford Press.

Gilbert, P., & Choden. (2013). *Mindful compassion*. London, England: Robinson.

Goldberg, L. R. (1990). An alternative "description of personality". The Big-Five factor structure. *Journal of Personality and Social Psychology*, *59*, 1216-1229.

Goldberg, S. B., Tucker, R. P., Greene, P. A., Davidson, R. J., Wampold, B. E., Kearney, D. J., & Simpson, T. L. (2018). Mindfulness-based interventions for psychiatric

disorders: A systematic review and meta-analysis. *Clinical Psychology Review*, *59*, 52-60. doi:10.1016/j.cpr.2017.10.011

Gonsalkorale & Williams, 2007 The KKK won't let me play: Ostracism even by a despised outgroup hurts. *European Journal of Social Psychology*, *37*(6), 1176-1186. doi:10.1002/ejsp.392

Gotink, R. A., Chu, P., Busschbach, J. J. V., Benson, H., Fricchione, G. L., & Hunink, M. G., M. (2015). Standardised mindfulness-based interventions in healthcare: An overview of systematic reviews and meta-analyses of RCTs. *PLoS ONE*, *10*(4). doi:10.1371/journal.pone.0124344

Gruter, M., & Masters, R. D. (1986). Ostracism a social and biological phenomenon: An introduction. *Evolution & Human Behavior*, *7*(3-4), 149-158.

Gu, J., Strauss, C., Bond, R., & Cavanagh, K. (2015). How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review*, *37*, 1-12. doi:10.1016/j.cpr.2015.01.006

Gyatso, T. (1995). *The world of Tibetan Buddhism: An overview of its philosophy and practice*. Boston, MA: Wisdom Publications.

Hanley, A. W. (2016). The mindful personality: Associations between dispositional mindfulness and the Five Factor Model of personality. *Personality and Individual Differences*, *91*, 154-158. doi: 10.1016/j.paid.2015.11.054

Hanley, A. W., Abell, N., Osborn, D. S., Roehrig, A. D., & Canto, A. I. (2014). Mind the gaps: Are conclusions about mindfulness entirely conclusive? *Journal of Counseling & Development*, *94*, 103-113. doi:10.1002/jcad.12066

Hartgerink, C. H. J., van Beest, I., Wicherts, J. M., & Williams, K. D. (2015). The ordinal effects of ostracism: A meta-analysis of 120 Cyberball studies. *PLoS ONE*, *10*(5). doi:10.1371/journal.pone.0127002

Hayes, S. C. (2004). Acceptance and commitment therapy and the new behavior therapies: Mindfulness, acceptance, and relationship. In S. C. Hayes, V. M. Follette, & M. M. Linehan (Eds.), *Mindfulness and acceptance: Expanding the cognitive-behavioral tradition* (pp. 1-29). New York, NY: Guilford Press.

Heck, R. H., Thomas, S. L., & Tabata, L. N. (2014). *Multilevel and longitudinal modeling with IBM SPSS* (2nd ed.). New York, NY: Routledge.

Heppner, W. L., Kernis, M. H., Lakey, C. E., Campbell, W. K., Goldman, B. M., Davis, P. J., & Cascio, E. V. (2008). Mindfulness as a means of reducing aggressive behavior: Dispositional and situational evidence. *Aggressive Behavior*, *34*, 486-496. doi:10.1002/ab.20258

Hofmann, S. G., Grossman, P., & Hinton, D. E. (2011). Loving-kindness and compassion meditation: Potential for psychological interventions. *Clinical Psychology Review*, *31*, 1126-1132. doi:10.1016/j.cpr.2011.07.003

James, W. (1890). *Principles of psychology* (Vol. 1). New York, NY: Dover.

Jennings, P. (2010). *Mixing minds: The power of relationships in psychoanalysis and Buddhism*. Boston, MA: Wisdom Publications.

Jobst, A., Albert, A., Bauriedl-Schmidt, C., Mauer, M. C., Renneberg, B., Buchheim, A., … Padberg, F. (2013). Social exclusion leads to divergent changes of oxytocin levels in Borderline patients and healthy subjects. *Psychotherapy and Psychosomatics*, *83*, 252-254. doi:10.1159/000358526

Jobst, A., Sabass, L., Palagyi, A., Bauriedl-Schmidt, C., Mauer, M. C., Sarubin, N., … Padberg, F. (2015). Effects of social exclusion on emotions and oxytocin and cortisol levels in patients with chronic depression.

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.). *Handbook of personality: Theory and research* (3rd ed., pp. 114-158). New York, NY: Guilford Press.

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: Hisotry, 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, NY: Guilford Press.

Kabat-Zinn, J. (2013). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York, NY: Bantam.

Kabat-Zinn, J. (2003). Mindfulnesss-based interventions in context: Past, present, and future. *Clinical Psychology Science and Practice*, *10*(2), 144-156. doi:10.1093/clipsy.bpg016

Katterman, S. N., Kleinman, B. M., Hood, M. M., Nackers, L. M., & Corsica, J. A. (2014). Mindfulness meditation as an intervention for binge eating, emotional eating, and weight loss: A systematic review. *Eating Behaviors*, *15*, 197-204. doi:10.1016/j.eatbeh.2014.01.005

Keng, S., Smoski, M. J., Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review*, *31*, 1041-1056. doi:10.1016/j.cpr.2011.04.006

Khoury, B., Lecomte, T., Fortin, G., Masse, M., Therien, P., Bouchard, V., … Hofmann, S. G. (2013). Mindfulness-based therapy: A comprehensive meta-analysis. *Clinical Psychology Review*, *33*, 763-771. Doi:10.1016/j.cpr.2013.05.005

Kiken, L. G., Garland, E. L., Bluth, K., Palsson, O. S., & Gaylord, S. A. (2015). From state to a trait: Trajectories of state mindfulness in meditation during intervention predict changes in trait mindfulness. *Personality and Individual Differences*, *81*, 41-46. doi: 10.1016/j.paid.2014.12.044

Kiken, L. G., & Shook, N. J. (2011). Looking up: Mindfulness increases positive judgments and reduces negativity bias. *Social Psychological and Personality Science*, *0*, 1-7. doi:10.1177/1948550610396585

Killeen, C. (1998). Loneliness: An epidemic in modern society. *Journal of Advanced Nursing*, *28*(4), 762-770.

Kreplin, U., Farias, M., & Brazil, I. A. (2018). The limited prosocial effects of meditation: A systematic review and meta-analysis. *Scientific Reports*, *8*, 1-10. doi:10.1038/s41598-018-20299-z

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1997). *International Affective Picture System (IAPS): Technical manual and affective ratings*. NIMH Center for the Study of Emotion and Attention.

Latzman, R. D., & Masuda, A. (2013). Examining mindfulness and psychological inflexibility within the framework of Big Five personality. *Personality and Individual Differences*, *55*, 129-134. doi:10.1016/j.paid.2013.02.019

Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., … Carmody, J. (2006). The Toronto Mindfulness Scale: Development and

validation. *Journal of Clinical Psychology*, *62*(12), 1445-1467. doi:10.1002/jclp.20326

Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1994). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology*, *68*(3), 518-530.

Levinson, C. A., Langer, J. K., & Rodebaugh, T. L. (2013). Reactivity to exclusion prospectively predicts social anxiety symptoms in young adults. *Behavior Therapy*, *44*, 470-478.

Linehan, M. M., Comtois, K. A., Murray, A. M., Brown, M. Z., Gallop, R. J., Heard, H. L., … Lindenboim, N. (2006). Two-year randomized controlled trial and follow-up of dialectical behavior therapy vs therapy by experts for suicidal behaviors and Borderline Personality Disorder. *Archives of General Psychiatry*, *63*, 757-766.

Maner, J. K., DeWall, C. N., Baumeister, R. F., & Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the "porcupine problem." *Journal of Personality and Social Psychology*, *92*(1), 42-55. doi:10.1037/0022-3514.92.1.42

Medvedev, O. N., Norden, P. A., Krägeoh, C. U., & Siegert, R. J. (2018). Investigating unique contributions of dispositional mindfulness facets to depression, anxiety, and stress in general and student populations. *Mindfulness*. Advance online publication. doi:10.1007/s12671-018-0917-0

Molet, M., Macquet, B., Lefebvre, O., & Williams, K. D. (2013). A focused attention intervention for coping with ostracism. *Consciousness and Cognition*, *22*, 1262-1270. doi:10.1016/j.concog.2013.08.010

Molleman, L., Quiñones, A. E., & Weissing, F. J. (2013). Cultural evolution of cooperation: The interplay between forms of social learning and group selection. *Evolution and Human Behavior*, *34*, 342-349.

Nezlek, J. B., Kowalski, R. M., Leary, M. R., Blevins, T., & Holgate, S. (1997). Personality moderators of reactions to interpersonal rejection: Depression and trait self-esteem. *Personality and Social Psychology Bulletin*, *23*(12), 1235-1244.

Nezlek, J. B., Wesselmann, E. D., Wheeler, L., & Williams, K. D. (2012). Ostracism in everyday life. *Group Dynamics: Theory, Research, and Practice*, *16*(2), 91-104.

Nilsson, H., & Kazemi, A. (2016). From Buddhist sati to Western mindfulness practice: A contextual analysis. *Journal of Religion & Spirituality in Social Work: Social Thought*, *35*(1-2), 7-23. doi:10.1080/15426432.2015.1067582

Norton, A. R., Abbott, M. J., Norberg, M. M., & Hunt, C. (2015). A systematic review of mindfulness and acceptance-based treatments for social anxiety disorder. *Journal of Clinical Psychology*, *71*(4), 283-301. doi:10.1002/jclp.22144

Pickett, C. L., Gardner, W. L., & Knowles, M. (2004). Getting a cue: The need to belong and enhanced sensitivity to social cues. *Personality and Social Psychology Bulletin*, *30*(9), 1095-1107. doi:10.1177/0146167203262085

Ramsey, A. T., & Jones, E. E. (2015). Minding the interpersonal gap: Mindfulness-based interventions in the prevention of ostracism. *Consciousness and Cognition*, *31*, 24-34. doi:10.1016/j.concog.2014.10.003

Ren, D., Wesselmann, E. D., & Williams, K. D. (2018). Hurt people hurt people: Ostracism and rejection. *Current Opinion in Psychology*, *19*, 34-38. doi: 10.1016/j.copsyc.2017.03.026

Renneberg, B., Herm, K., Hahn, A., Staebler, K., Lammers, C. H., & Roepke, S. (2012). Perception of social participation in Borderline Personality Disorder. *Clinical Psychology & Psychotherapy*, *19*(6), 473-480. doi:10.1002/cpp.772

Robins, C. J., Schmidt, H., Linehan, M. M. (2004). Dialectical behavior therapy: Synthesizing radical acceptance with skillful means. In S. C. Hayes, V. M. Follette, & M. M. Linehan (Eds.), *Mindfulness and acceptance: Expanding the cognitive-behavioral tradition* (pp. 30-44). New York, NY: Guilford Press.

Rudert, S. C., Hales, A. H., Greifeneder, R., & Williams, K. D. (2017). When silence is not golden: Why acknowledgement matters even when being excluded. *Personality and Social Psychology Bulletin*, *43*(5), 678-692.

Ruiz, F. J. (2012). Acceptance and commitment therapy versus traditional cognitive behavioral therapy: A systematic review and meta-analysis of current empirical evidence. *International Journal of Psychology & Psychological Therapy*, *12*(2), 333-357.

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, *39*, 472-480.

Sacco, D. F., Wirth, J. H., Hugenberg, K., Chen, Z., & Williams, K. D. (2011). The world in black and white: Ostracism enhances the categorical perception of social information. *Journal of Experimental Social Psychology*, *47*, 836-842.

Safran, J. D. (2003). Psychoanalysis and Buddhism as cultural institutions. In J. D. Safran (Ed.), *Psychoanalysis and Buddhism*, (pp. 1-34). Boston, MA: Wisdom Publications.

Sauer, S., Walach, H., Schmidt, S., Hinterberger, T., Lynch, S., Büssing, A., Kohls, N. (2013). Assessment of mindfulness: Review on state of the art. *Mindfulness*, *4*, 3-17. doi:10.1007/s12671-012-0122-5

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression*. New York, NY: Guilford Press.

Sheldon, K. M., Elliot, A. J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Jouranl of Personality and Social Psychology*, *80*, 325-339.

Simard, V., & Dandeneau, S. (2017). *Revisiting the Cyberball inclusion condition: Fortifying fundamental needs by making participants the target of specific inclusion*, *74*, 38-42. doi:10.1016/j.jesp.2017.08.002

Sommer, K. L., & Rubin, Y. (2005). Role of social expectancies in cognitive and behavioral responses to social rejection. In K. D. Williams, J. P. Forgas, & W. von Hippel (Eds.), *The social outcast: Ostracism, social exclusion, rejection, and bullying* (pp.171-183). New York, NY: Psychology Press.

Song, X., & Wang, X. (2012). Mind wandering in Chinese daily lives – An experience sampling study. *PloS One*, *7*(9), e44423. doi:10.1371/journal.pone.0044423

Stahl, B., & Goldstein, E. (2010). *A mindfulness-based stress reduction workbook*. Oakland, CA: New Harbinger Publications.

Stewart, C., Rogers, F., Pilch, M., Stewart, I., Barnes-Holmes, Y., & Westerman, S. (2017). The effect of social exclusion on state paranoia and explicit and implicit self-esteem in a non-clinical sample. *Journal of Behavior Therapy & Experimental Psychiatry*, *57*, 62-69. doi:10.1016/j.jbtep.2017.04.001

Stillman, T. F., Baumeister, R. F., Lambert, N. M., Crescioni, A. W., DeWall, C. N., & Fincham, F. D. (2009). Alone and without purpose: Life loses meaning following social exclusion. *Journal of Experimental Social Psychology*, *45*, 686-694. doi:10.1016/j.jesp.2009.03.007

Stroud, L. R., Tanofsky-Kraff, M., Wilfley, D. E., & Salovey, P. (2009). The Yale Interpersonal Stressor (YIPS): Affective, physiological, and behavioral responses to a novel interpersonal rejection paradigm. *Annals of Behavioral Medicine*, *22*, 204-213.

Suelmann, H., Brouwers, A., Snippe, E. (2018). Explaining variations in mindfulness levels in daily life. *Mindfulness*. Advance online publication. doi:10.1007/s12671-018-0932-1

Thönes, S., & Wittmann, M. (2016). Time perception in yogic mindfulness meditation: Effects on retrospective duration judgments and time passage. *Psychology of Consciouness: Theory, Research and Practice*, *3*(4), 316-325. doi:10.1037/cns0000088

Tomlinson, E. R., Yousef, O., Vittersø, A. D., & Jones, L. (2018). Dispositional mindfulness and psychological health: A systematic review. *Mindfulness*, *9*, 23-43. doi:10.1007/s12671-017-0762-6

Twenge, J. M., Baumeister, R. F., Tice, D. M., & Stucke, T. S. (2001). If you can't join them, beat them: Effects of social exclusion on aggressive behavior. *Journal of Personality and Social Psychology*, *81*(6), 1058-1069. doi:10.1037//0022-3514.81.6.1058

Twenge, J. M., Catanese, K. R., & Baumeister, R. F. (2002). Social exclusion causes self-defeating behavior. *Journal of Personality and Social Psychology*, *83*(3), 606-615. doi:10.1037//0022-3514.83.3.606

Twenge, J. M., Catanese, K. R., & Baumeister, R. F. (2003). Social exclusion and the deconstructed state: Time perception, meaninglessness, lethargy, lack of emotion, and self-awareness. *Journal of Personality and Social Psychology*, *85*(3), 409-423. doi:10.1037/0022-3514.85.3.409

Twenge, J. M., Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Bartels, J. M. (2007). Social exclusion decreases prosocial behavior. *Journal of Personality and Social Psychology*, *92*(1), 56-66. doi:10.1037/0022-3514.92.1.56

Twohig, M. P. (2012). Introduction: The basics of Acceptance and Commitment Therapy. *Cognitive and Behavioral Practice*, *19*, 499-507.

Tzouvara, V., Papadopoulos, C., & Randhawa, G. (2015). A narrative review of the theoretical foundations of loneliness. *British Journal of Community Nursing*, *20*(7), 329-334.

Vago, D. R., & Silbersweig, D. A. (2012). Self-awareness, self-regulation, and self-transcendence (S-ART): A framework for understanding the neurobiological mechanisms of mindfulness. *Frontiers in Human Neuroscience*, *6*, 296. doi:10.3389/fnhum.2012.00296

Van Dam, N. T., van Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., … Meyer, D. (2018). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science*, *13*(1), 36-61. doi:10.1177/1745691617709589

Vanhalst, J., Soenens, B., Luyckx, K., Van Petegem, S., Weeks, M. S., & Asher S. R. (2015). Why do the lonely stay lonely? Chronically lonely adolescents' attributions and emotions in situations of social inclusion and exclusion. *Journal of Personality and Social Psychology*, *109*(5), 932-948. doi:10.1037/pspp0000051

Vorauer, J. D., Cameron, J. J., Holmes, J. G., & Pearce, D. G. (2003). Invisible overtures: Fears of rejection and the signal amplification bias. *Journal of Personality and Social Psychology*, *84*(4), 793-812.

Wang, H., Braun, C., & Enck, P. (2017). How the brain reacts to social stress (exclusion) – A scoping review. *Neuroscience and Biobehavioral Reviews*, 80, 80-88. doi: 10.1016/j.neubiorev.2017.05.012

Weiss, R. S. (1973). *Loneliness: The experience of emotional and social isolation*. Cambridge, MA: MIT Press.

Welz, A., Reinhard, I., Alpers, G. W., & Kuehner, C. (2018). Happy thoughts: Mind wandering effects mood in daily life. *Mindfulness*, *9*, 332-343. doi: 10.1007/s12671-017-0778-y

Wesselmann, E. D., Cardoso, F. D., Slater, S., & Williams, K. D. (2012). To be looked at as though air: Civil attention matters. *Psychological Science*, *23*(2), 166-168. doi:10.1177/0956797611427921

Wesselmann, E. D., Wirth, J. H., Mroczek, D. K., & Williams, K. D. (2012). Dial a feeling: Detecting moderation of affect decline during ostracism. *Personality and Individual Differences*, *53*, 580-586.

Williams, K. D. (2001). *Ostracism: The power of silence*. New York, NY: The Guilford Press.

Williams, K. D., Forgas, J. P., von Hippel, W. (Eds.). (2005). *The social outcast: Ostracism, social exclusion, rejection, and bullying*. New York, NY: Psychology Press.

Williams, K. D. (2007). Ostracism. *Annual Review of Psychology*, *58*, 425-452. doi:10.1146/annurev.psych.58.110405.085641

Williams, K. D. (2009). Ostracism: A temporal need-threat model. In M. Zanna (Ed.), *Advances in Experimental Social Psychology*, *41*, (pp. 279-314). New York, NY: Academic Press.

Williams, K. D., Cheung, C., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the internet. *Journal of Personality and Social Psychology*, *79*, 748-762.

Williams, K. D., & Jarvis, B. (2006). Cyberball: A program for use in research on interpersonal ostracism and acceptance. *Behavior Research Methods*, *38*(1), 174-180.

Williams, K. D., & Sommer, K. L. (1997). Social ostracism by one's coworkers: Does rejection lead to loafing or compensation? *Personality and Social Psychology Bulletin*, *23*, 693-706.

Williams, K. D., & Zadro, L. (2001). Ostracism: On being ignored, excluded, and rejected. In M. R. Leary (Ed.), *Interpersonal Rejection* (pp. 21-53). New York, NY: Oxford University Press.

Wong, K. F., Massar, S. A. A., Chee, M. W. L., & Lim, J. (2018). Towards an objective measure of mindfulness: Replicating and extending the features of the Breath-

Counting Task. *Mindfulness*. Advance online publication. doi:10.1007/s12671-017-0880-1

Wylie, M. S. (2015, January/February). The mindfulness explosion: The perils of mainstream acceptance. *Psychotherapy Networker*. Retrieved from https://www.psychotherapynetworker.org/magazine/article/66/the-mindfulness-explosion

Yur'yev, A., Värnik, P., Sisask, M., Leppik, L., Lumiste, K., & Värnik, A. (2011). Some aspects of social exclusion: Do they influence suicide mortality? *International Journal of Social Psychiatry*, *59*(3), 232-238. doi:10.1177/0020764011431792

Zadro, L., Boland, C., & Richardson, R. (2006). How long does it last? The persistence of the effects of ostracism in the socially anxious. *Journal of Experimental Social Psychology*, *42*, 692-697. doi:10.1016/j.jesp.2005.10.007

Zadro, L., Williams, K. D., & Richardson, R. (2004). How low can you go? Ostracism by a computer is sufficient to lower self-reported levels of belonging, control, self-esteem, and meaningful existence. *Journal of Experimental Social Psychology*, *40*, 560-567. doi:10.1016/j.jesp.2003.11.006

Appendix A

Consent Form

IRB # 0000201841

ICF Version Date: 2/28/2017

Department of Psychology
2801 West Bancroft Street
Mail Stop 948
Toledo, Ohio
Phone: 419-530-2721
Fax: 419-530-2959

ADULT RESEARCH SUBJECT - INFORMED CONSENT FORM
Mindfulness and Personality

Principal Investigator: Wesley A Bullock, PhD, Associate Professor, 419-530-2719
Joseph A. Reed, M.A., Doctoral Candidate, 419-530-2727

Purpose: You are invited to participate in the research project entitled, *Mindfulness and Mood,* which is being conducted at the University of Toledo under the direction of *Wesley A. Bullock, PhD, and Joseph A. Reed, M.A.* The purpose of this study is to examine how personality traits related to mindfulness impact mood over time.

Description of Procedures: This research study will take place on the fifth floor of University Hall in room 5070B, which is located in the suite of offices immediately across the hall from the Psychology Department's Main Office. This study will take place in one, 30 to 60-minute session. The purpose of this study is to examine how personality traits related to mindfulness impact mood over time. While participating, you will be required to complete several questionnaires and rate your mood on multiple occasions. You may be asked to engage in a variety of tasks, including viewing an educational video and playing a mental visualization computer game. You may also be asked to engage in a five-minute, guided mindful breathing exercise delivered over the computer. Mindful breathing is the practice of focusing on one's breathing, while allowing thoughts to come and go freely, without fixating on any particular thoughts.

After you have completed your participation, the research team will debrief you about the data, theory and research area under study and answer any questions you may have about the research.

Potential Risks: There are minimal risks to participation in this study, including loss of confidentiality. The questionnaires administered, as well as the tasks you may be asked to complete, e.g., a mindful breathing exercise, viewing an educational video, playing a mental visualization computer game, might cause you to feel upset, anxious, or annoyed. If so, you are free stop at any time.

Potential Benefits: You will receive one unit of Introductory Psychology Research Credit for participating. You will also learn about how psychology experiments are run and you may learn more about the practice of mindfulness. Others may benefit by learning about the results of this research.

Confidentiality: The researchers will make every effort to prevent anyone who is not on the research team from knowing that you provided this information, or what that information is. The consent forms with signatures will be kept separate from responses, which will not include names and which will be presented to others only when combined with other responses. Although we will make every effort to protect your confidentiality, there is a low risk that this might be breached.

Voluntary Participation: Your refusal to participate in this study will involve no penalty or loss of benefits to which you are otherwise entitled and will not affect your relationship with The University of Toledo or any of your classes. In addition, you may discontinue participation at any time without any

University of Toledo IRB Approved
Approval Date: 3/9/2017
Expiration Date:

penalty or loss of benefits. If you decide not to participate or wish to discontinue your participation at any point you will still receive one unit of research credit.

Contact Information: Before you decide to accept this invitation to take part in this study, you may ask any questions that you might have. If you have any questions at any time before, during, or after your participation (or if you experience any physical or psychological distress as a result of this research), please contact a member of the research team (Wesley A. Bullock, PhD, 419-530-2719; Joseph A. Reed, M.A., 419-530-2727).

If you have questions beyond those answered by the research team or your rights as a research subject or research-related injuries, the Chairperson of the SBE Institutional Review Board may be contacted through the Office of Research on the main campus at (419) 530-2844.

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

SIGNATURE SECTION – Please read carefully

You are making a decision whether or not to participate in this research study. Your signature indicates that you have read the information provided above, you have had all your questions answered, and you have decided to take part in this research.

The date you sign this document to enroll in this study, that is, today's date must fall between the dates indicated at the bottom of the page.

Name of Subject (please print)	Signature	Date
Name of Person Obtaining Consent	Signature	Date

This Adult Research Informed Consent document has been reviewed and approved by the University of Toledo Social, Behavioral and Educational IRB for the period of time specified in the box below.

Approved Number of Subjects: 70

University of Toledo IRB Approved

Approval Date: 3/9/2017

Expiration Date:

Appendix B

Demographics Form

Age ____

Gender _____

Race/Ethnicity _____

Class Standing _____

Please rate your current mood (10 being the best; 1 being the worst):

1 2 3 4 5 6 7 8 9 10

Have you ever heard of or played Cyberball? If yes, please write a description of Cyberball below. If no, please skip this question.

Do you practice mindful meditation? If yes, please write below how often you practice mindful meditation. If no, please skip this question.

Appendix C

MAAS – Trait

Day-to-Day Experiences

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what *really reflects* your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
It seems I am "running on automatic," without much awareness of what I'm doing.	1	2	3	4	5	6
I rush through activities without being really attentive to them.	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I drive places on 'automatic pilot' and then wonder why I went there.	1	2	3	4	5	6
I find myself preoccupied with the future or the past.	1	2	3	4	5	6
I find myself doing things without paying attention.	1	2	3	4	5	6
I snack without being aware that I'm eating.	1	2	3	4	5	6

Appendix D

FFMQ

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1	2	3	4	5
never or very rarely true	rarely true	sometimes true	often true	very often or always true

_____ 1. When I'm walking, I deliberately notice the sensations of my body moving.

_____ 2. I'm good at finding words to describe my feelings.

_____ 3. I criticize myself for having irrational or inappropriate emotions.

_____ 4. I perceive my feelings and emotions without having to react to them.

_____ 5. When I do things, my mind wanders off and I'm easily distracted.

_____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.

_____ 7. I can easily put my beliefs, opinions, and expectations into words.

_____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.

_____ 9. I watch my feelings without getting lost in them.

_____ 10. I tell myself I shouldn't be feeling the way I'm feeling.

_____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

_____ 12. It's hard for me to find the words to describe what I'm thinking.

_____ 13. I am easily distracted.

_____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

_____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.

_____ 16. I have trouble thinking of the right words to express how I feel about things

_____ 17. I make judgments about whether my thoughts are good or bad.

_____ 18. I find it difficult to stay focused on what's happening in the present.

_____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.

_____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

_____ 21. In difficult situations, I can pause without immediately reacting.

1	2	3	4	5
never or very rarely true	rarely true	sometimes true	often true	very often or always true

_____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

_____ 23. It seems I am "running on automatic" without much awareness of what I'm doing.

_____24. When I have distressing thoughts or images, I feel calm soon after.

_____ 25. I tell myself that I shouldn't be thinking the way I'm thinking.

_____ 26. I notice the smells and aromas of things.

_____ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.

_____ 28. I rush through activities without being really attentive to them.

_____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.

_____ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.

_____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

_____ 32. My natural tendency is to put my experiences into words.

_____ 33. When I have distressing thoughts or images, I just notice them and let them go.

_____ 34. I do jobs or tasks automatically without being aware of what I'm doing.

_____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

_____ 36. I pay attention to how my emotions affect my thoughts and behavior.

_____ 37. I can usually describe how I feel at the moment in considerable detail.

_____ 38. I find myself doing things without paying attention.

_____ 39. I disapprove of myself when I have irrational ideas.

Appendix E

BFI

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

1	2	3	4	5
Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

I see myself as someone who…

___1. Is talkative
___2. Tends to find fault with others
___3. Does a thorough job
___4. Is depressed, blue
___5. Is original, comes up with new ideas
___6. Is reserved
___7. Is helpful and unselfish with others
___8. Can be somewhat careless
___9. Is relaxed, handles stress well
___10. Is curious about many different things
___11. Is full of energy
___12. Starts quarrels with others
___13. Is a reliable worker
___14. Can be tense
___15. Is ingenious, a deep thinker
___16. Generates a lot of enthusiasm
___17. Has a forgiving nature
___18. Tends to be disorganized
___19. Worries a lot
___20. Has an active imagination
___21. Tends to be quiet
___22. Is generally trusting
___23. Tends to be lazy
___24. Is emotionally stable, not easily upset
___25. Is inventive
___26. Has an assertive personality
___27. Can be cold and aloof
___28. Perseveres until the task is finished
___29. Can be moody
___30. Values artistic, aesthetic experiences
___31. Is sometimes shy, inhibited
___32. Is considerate and kind to almost everyone
___33. Does things efficiently
___34. Remains calm in tense situations
___35. Prefers work that is routine
___36. Is outgoing, sociable
___37. Is sometimes rude to others
___38. Makes plans and follows through with them
___39. Gets nervous easily
___40. Likes to reflect, play with ideas
___41. Has few artistic interests
___42. Likes to cooperate with others
___43. Is easily distracted
___44. Is sophisticated in art, music, or literature

Please check: Did you write a number in front of each statement?

Appendix F

MAAS – State

Instructions: Using the 0 – 6 scale shown, please indicate to what degree you were having each experience described below. Please answer according to what *really reflected* your experience rather than what you think your experience should have been.

	Not at all			Somewhat			Very much
1) I was finding it difficult to stay focused on what was happening.	0	1	2	3	4	5	6
2) I was doing something without paying attention.	0	1	2	3	4	5	6
3) I was preoccupied with the future or the past.	0	1	2	3	4	5	6
4) I was doing something automatically without being aware of what I was doing.	0	1	2	3	4	5	6
5) I was rushing through something without being really attentive to it.	0	1	2	3	4	5	6

Appendix G

Mindful Breathing Exercise Transcript

Welcome to the mindful breathing meditation. You can sit upright or lie down, in a position where you can remain alert and comfortable. Take a few moments to thank yourself for taking this time out from daily busyness to do this meditation practice... And now… breathing normally… and breathing naturally... bring your awareness to the breath wherever you feel it most prominent in the body. It could be at the nose, chest, abdomen, or any other place… breathing in and being aware of the breath coming in and breathing out and just being aware of the breath coming out, as its happening… moment to moment. Simply sustaining this awareness of the breath… breathing in and breathing out… There is no need to visualize, count, or figure out the breath… but just being mindful of this natural process of the body breathing itself… without judgement, just watching the breath ebb and flow… like waves in the sea. There's no place to go… nothing else to do… just being in the here and now… noticing the breath… (long pause) From time to time, it's natural for the mind to wander from the breath. When noticing this, just acknowledging wherever the mind went, then gently bringing it back to the breath… just breathing… (long pause) And breathing… just riding the waves of the breath, moment by moment, taking this practice one inhalation and one exhalation at a time… (long pause) As you come to the end of this meditation practice, just thanking yourself for taking this time to be present, and realizing that this is an act of self-love. May all beings be at peace. (Bell toll)

Appendix H

TMS

We are interested in what you just experienced. Below is a list of things that people sometimes experience. Please read each statement. Next to each statement are five choices: "not at all," "a little," "moderately," "quite a bit," and "very much." Please indicate the extent to which you agree with each statement. In others words, how well does the statement describe what you just experienced, just now?	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Very much**
1) I experienced myself as separate from my changing thoughts and feelings.	0	1	2	3	4
2) I was more concerned with being open to my experiences than controlling or changing them.	0	1	2	3	4
3) I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations.	0	1	2	3	4
4) I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things "really" are.	0	1	2	3	4
5) I was curious to see what my mind was up to from moment to moment.	0	1	2	3	4
6) I was curious about each of the thoughts and feelings that I was having.	0	1	2	3	4
7) I was receptive to observing unpleasant thoughts and feelings without interfering with them.	0	1	2	3	4
8) I was more invested in just watching my experiences as they arose, than in figuring out what they could mean.	0	1	2	3	4
9) I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant.	0	1	2	3	4
10) I remained curious about the nature of each experience as it arose.	0	1	2	3	4
11) I was aware of my thoughts and feelings without overidentifying with them.	0	1	2	3	4
12) I was curious about my reactions to things	0	1	2	3	4
13) I was curious about what I might learn about myself by just taking notice of what my attention gets drawn to.	0	1	2	3	4

Appendix I

Need Threat Scale

For each question, please circle the number to the right that best represents the feelings you were experiencing DURING the game	**Not at all**				**Extremely**
I felt "disconnected" *	1	2	3	4	5
I felt rejected *	1	2	3	4	5
I felt like an outsider *	1	2	3	4	5
I felt I belonged to the group	1	2	3	4	5
I feel the other players would interact with me a lot	1	2	3	4	5
I felt good about myself	1	2	3	4	5
My self-esteem was high	1	2	3	4	5
I felt liked	1	2	3	4	5
I felt insecure *	1	2	3	4	5
I felt satisfied	1	2	3	4	5
I felt invisible *	1	2	3	4	5
I felt meaningless *	1	2	3	4	5
I felt non-existent *	1	2	3	4	5
I felt important	1	2	3	4	5
I felt useful	1	2	3	4	5
I felt powerful	1	2	3	4	5
I felt I had control over the course of the game	1	2	3	4	5
I felt I had the ability to significantly alter events	1	2	3	4	5
I felt I was unable to influence the action of others *	1	2	3	4	5
I felt the other players decided everything *	1	2	3	4	5
My mood was…					
Good	1	2	3	4	5
Bad	1	2	3	4	5
Friendly	1	2	3	4	5
Unfriendly	1	2	3	4	5
Angry	1	2	3	4	5
Pleasant	1	2	3	4	5
Happy	1	2	3	4	5
Sad	1	2	3	4	5
For the next three questions, please circle the number to the right (or fill in the blank) that best represents the thoughts you had during the game					
I was ignored	1	2	3	4	5
I was excluded	1	2	3	4	5
Assuming that the ball should be thrown to each person equally (33% if three people; 25% if four people), what percentage of the throws did you receive?			_____%		

Appendix J

Need Threat Scale – Delay

For each question, please circle the number to the right that best represents the feelings you are experiencing RIGHT NOW	**Not at all**				**Extremely**
I feel "disconnected" *	1	2	3	4	5
I feel rejected *	1	2	3	4	5
I feel like an outsider *	1	2	3	4	5
I feel I belonged to the group	1	2	3	4	5
I feel the other players would interact with me a lot	1	2	3	4	5
I feel good about myself	1	2	3	4	5
My self-esteem is high	1	2	3	4	5
I feel liked	1	2	3	4	5
I feel insecure *	1	2	3	4	5
I feel satisfied	1	2	3	4	5
I feel invisible *	1	2	3	4	5
I feel meaningless *	1	2	3	4	5
I feel non-existent *	1	2	3	4	5
I feel important	1	2	3	4	5
I feel useful	1	2	3	4	5
I feel powerful	1	2	3	4	5
I feel I had control over the course of events	1	2	3	4	5
I feel I had the ability to significantly alter events	1	2	3	4	5
I feel I am unable to influence the action of others *	1	2	3	4	5
I feel others decide everything *	1	2	3	4	5
My mood is…					
Good	1	2	3	4	5
Bad	1	2	3	4	5
Friendly	1	2	3	4	5
Unfriendly	1	2	3	4	5
Angry	1	2	3	4	5
Pleasant	1	2	3	4	5
Happy	1	2	3	4	5
Sad	1	2	3	4	5