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Title: Intersections of Buddhist Philosophy and Psychological Science: An Exploration of Common and Differential Effects of Meditation

Abstract Approved:

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Interweaving perspectives from both social cognitive psychology and Tibetan Buddhism, the present study examined common and differential effects of two styles of meditation: Loving-kindness meditation (LKM) and mindfulness meditation (MM). Psychological theories of construct accessibility postulate that cognitive constructs activated frequently are more readily available for processing stimuli. Researchers in the present experiment propose that individuals practicing LKM chronically activate constructs of a prosocial and compassionate nature. These constructs then become more accessible for processing interpersonal and situational stimuli, thus providing a cognitive mechanism by which the effects of LKM are experienced.

Secondarily, researchers sought to investigate the effects of a meditation intervention on individual differences in coping with interpersonal conflict. Conflict coping tends to occur in patterned responses that develop early in life and pervades through adulthood, much like that of attachment styles (Ben-Ari & Hirschberg, 2009). In impact interpersonal conflict coping styles. Researchers hypothesized the effects of LKM specifically would cause meditators to shift to more positive and proactive styles of coping with conflict.

Oregon State University (OSU) students participated in an eight-week meditation intervention, where students were randomly assigned to practice LKM or MM. Baseline, during-, and post-intervention self-report and cognitive measures were collected. Hypotheses regarding prosocial construct activation, working memory capacity, interpersonal conflict coping were explored, as well as a battery of self-report measures examining psychological well-being and life satisfaction.

Intersections of Buddhist Philosophy and Psychological Science: An Exploration of

Common and Differential Effects of Meditation

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Victoria A. Braun, Author

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CHAPTER 1: INTRODUCTION

The present study examined common and differential effects of different styles of meditation, Loving-kindness meditation (LKM) and mindfulness meditation (MM). Embracing an interdisciplinary perspective, the researchers draw from Indo-Tibetan Buddhist philosophy and western psychological research to propose a cognitive mechanism by which meditators experience the positive effects of Loving-kindness meditation (LKM).

Mahayana Buddhism heavily emphasizes the idea of 'emptiness,' or that all objects, people, and situations lack an inherent, self-existing nature. The mind, instead, projects meaning and separateness of self from others, causing attachment and pervasive suffering to the unenlightened. These philosophical ideas closely parallel social cognitive psychological research on chronic construct accessibility, such that the way in which people perceive stimuli is heavily influenced by constructs that are activated frequently (Bruner, 1975). Accessible constructs are readily available and employed over less activated ones, and the accessibility of a construct is largely determined by prior personal experience. Social situations are often relatively ambiguous and lack inherent qualities; it is the perception of the person experiencing them that colors them with meaning and emotion. An ambiguous interaction with a stranger experienced by someone who frequently activates negative, depressed constructs will be perceived differently than the same situation experienced by someone with frequently activated constructs of positivity and prosociality.

The following experiment sought to replicate the methods of Falkenstein (2013), who examined chronic prosocial construct activation by employing a unique classroom-

based meditation intervention paradigm. The present study addressed several limitations of Falkenstein (2013), while investigating several other gaps in meditation literature. Researchers investigated specific hypotheses regarding the effects of meditation on interpersonal conflict coping, working memory capacity, personality correlates with regards to receptivity to particular styles of meditation, and perceived life outcomes.

In the following chapter, I outline relevant Buddhist philosophy regarding meditation, mindfulness, compassion, and emptiness. In chapter three I explore social and cognitive psychological theory concerning construct accessibility, conflict coping, working memory capacity, and the present state of psychological research on meditation. In chapters four and five I outline the specific hypotheses regarding the dependent variables and design of the meditation intervention employed. Finally, in chapters six and seven I explore the results of the study and discuss conclusions to be drawn, limitations of the study, and future directions opened up for potential research.

CHAPTER 2: BUDDHIST PHILOSOPHY AND MEDITATION

Over 2,500 years ago, tradition records that the Buddha became enlightened and postulated the Four Noble Truths, crafting the core framework of Buddhist philosophy and guiding a path to enlightenment, accessible to all. Based in the basic, instinctive understanding that all people wish to cultivate happiness and diminish suffering in their lives, the Buddha offered insight into the nature of suffering and a path to cessation of suffering (Getlin, 1998). The final aim of this path in Buddhism is to achieve enlightenment, or liberation - to experience reality as it truly is.

The four noble truths pervade all traditions of Buddhism, but a coherent and consistent delineation of Buddhist history and traditions after the death of the historical Buddha is complicated to trace. Although there are several ways to outline the schisms in tenet systems, the present review will focus on distinctions between Mahayana and Theravada traditions, with specific attention paid to Mahayana Buddhism. Aside from geographical differentiation, the Mahayana tradition places heavier emphasis on the emptiness of all things and the wisdom that is derived when this realization is made, while Theravada Buddhism is more concerned with liberation and a narrower understanding of the lack of a self-nature to phenomena (Getlin, 1998). Emptiness, defined here as the lack of a self-existent nature to all things, will be discussed in more detail later in the chapter.

Central to all schools of Buddhism are the Four Noble Truths. The first noble truth posited by the Buddha is the "Truth of Suffering." Life is filled with *dukkha*, sometimes called suffering or unsatisfactoriness. This truth explains that we experience

suffering when our perceived reality does not match our expectations about reality (Sedlmeir et al., 2012).

The second noble truth is the "Truth of Cause;" it is the noble truth of the origin of suffering. The Buddha, explaining the second noble truth, postulates the cause of all suffering is craving, desire, and attachment. The things we believe will give us happiness and take away our suffering are, in fact, the things that cause it. *Anitya*, or impermanence, is a fundamental Buddhist notion that all things change. This applies specifically to all things mental or physical; however, it does not include ideas considered facts, such as emptiness and suffering. Inability to understand and embrace *anitya* is said to be one of the roots of our suffering. Alongside this, *anatman*, or the idea that there is no inherently existing 'self' nature, is intricately tied to suffering and impermanence. Failure to see the reality of *anatman* is the cause of suffering, not the *anatman* itself. Nothing can have an uncaused, unchanging essence if things by definition change, or are impermanent (Tsering, 2005).

More detailed distinctions between these two philosophical branches of Buddhism exist about the idea of a person's lack of a self-existent nature. All sentient beings, in both their mental and physical states, lack a stable or unchanging nature, and are not capable of existing on their own. In other words, single entities are composed of fundamental parts that are brought about entirely from prior causes and conditions. Mahayana, often simplistically divided into the "Mind Only School," and the "Middle Way School," expand upon Theravada notions of the lack of a persons' self-nature. Numerous other schools of Mahayana Buddhism exist, which Tibetans will distinguish between "higher" and "lower" schools. The present thesis will not address these

relatively capricious distinctions. The Mind Only School posits the labels themselves that we project upon objects do not exist by definition, in that they only exist when we focus on them within our minds. No categorizations and labels we put upon external objects exist apart from our mental processing of them. The Middle Way School accepts these claims of the Mind Only School, while adding that the objects themselves, and not just the labels projected on to them, lack an inherent existence or qualities as well.

Our suffering occurs at different levels, according to the Buddha: the suffering of suffering, the suffering of change, and pervasive suffering (Tsering, 2005). The suffering of suffering is a straightforward concept - all beings, humans and animals alike, seek to eliminate unpleasant stimuli in the world around us and within ourselves. The subtle suffering of change is rooted in *anitya* (Tsering, 2005). Buddhism insists that all phenomena are of impermanent nature: all physical and mental things constantly change, including people and circumstances. Our attachment to these things causes us to suffer and not see the deep interconnectedness of the world. The impermanent and ever-changing nature of all things does not directly cause suffering, but our attachment and perceptions of possession and permanence does.

The third suffering, pervasive suffering, is the most vital in understanding Buddhism because it directly relates to the overall goal or aim of the practice-enlightenment. All things in the eternal cycle of suffering, or *samsara*, are brought into existence due to ignorance about the true nature of the world (Tsering, 2005). Pervasive suffering is our unenlightenment at its core, and the unsatisfactory state that pervades our entire existence. When we break from the cycle of *samsara,* we can be free of all suffering and ignorance.

The third noble truth is the truth that our suffering can be eliminated and abolished forever. And finally, the fourth noble truth is the path the Buddha lays out that leads to the eradication of suffering. This path, or the noble eightfold path, is the guide to enlightenment, and an infallible map to the cessation of the constant cycle of suffering in which we are entrapped.

The noble eightfold path outlines the path to the cessation of suffering and is designed to provide insight into the true nature of world. While there are numerous corruptions of the mind, like greed, hatred, and delusion, the Buddha was principally interested in developing and cultivating wholesome qualities of the mind that exist as opposites to mental defilements, such as loving-kindness and wisdom (Getlin, 1998). The eightfold path is offered as a pragmatic solution for bringing about the cessation of suffering. The eight items on the path are not to be seen as sequential steps that one builds upon, but rather a multi-dimensional, interdependent structure involving human behavior, thoughts, speech, and body that inspires change in a gradual and cumulative fashion (Getlin, 1998).

The first item is right understanding, which refers to the understanding of the four noble truths and the nature of suffering. Points two through six are denoting matters of conduct and morality, including right thought, right speech, right action, right livelihood, and right effort. The final two items concern meditation, being right mindfulness and right concentration.

Right mindfulness and right concentration are of primary interest to the present study, as they are both inherently involved in meditation. The Buddhist practice of meditation, while coming in many flavors based in different philosophical and theoretical

intentions and ideas, is rooted in the idea that active, daily practice of meditation will train the mind to cultivate particular qualities relevant to one day obtaining enlightenment (Chodron, 2001). From a Buddhist standpoint, expected outcomes of meditation would include the ability to see reality as it truly is, with regards to the transient nature of all things, and the suffering associated with attachment to these empty or impermanent relationships or material objects. Practicing meditation would also be associated with decreased occurrence or duration of distressing or afflictive emotional states (Sedlmeier, 2012).

The highest value of studying the Four Noble Truths and the Noble Eightfold Path is the development of bodhichitta (Tsering, 2005). Derived from the Sanskrit words *bodhi*, or awakened, and *chitta* meaning mind, or heart, bodhichitta is a mind that desires enlightenment or wishes to be awakened to the true nature of reality (Harderwijk, 2012). The potential for bodhichitta lives within every conscious being, and is related to the Bodhisattvas, or individuals who possess bodhichitta and strive for the enlightenment and wellbeing of all. A significant distinction lies here regarding differences between Mahayana and Theravada Buddhist traditions, such that Mahayana Buddhists strive for the *Bodhisattva ideal* where exceptional emphasis is placed on compassion. A Bodhisattva is fueled by bodhichitta and the motivation to help all individuals recognize their potential to achieve a fully open and dedicated heart. Theravada Buddhism, however, places less emphasis on the compassionate aspect of guiding others to enlightenment, and strives for *arhatship*, where an *arhat*, or a "worthy one," breaks the cycle of *samsara* permanently (Thanissaro, 2000).

Emptiness

The concept of emptiness, or the notion that all things lacking a self-existent nature, is a densely complicated, but integral notion in foundational Mahayana Buddhist thought. Emptiness, or *shunyata*, is described in early Buddhist texts in terms of negatives (i.e. things neither exist, nor do they not exist), and perhaps does not quite disambiguate the philosophical implications of the idea. At its core, emptiness assumes that all things lack a self-existent nature, but develop and occur interdependently, including momentary subject-object perceptual experiences (Rosch, 2007). The absence of a self-existent nature includes all people, and traits we attribute to them and assume are inherent within them. Emptiness suggests these qualities we attribute do not, in fact, exist at all outside our perceptual projections, and that there is no true separation between self and others. Understanding the lack of separateness of all gives way to what Buddhists consider a kind of freedom in the recognition that ego-based differentiation between self and others is nonexistent (Rosch, 2007). Consequently, compassion and an almost irrational open-heartedness develop naturally; we learn to care for and love all others indiscriminately as we would family or ourselves because there is no distinction between others and ourselves.

In part, the significance of emptiness within certain branches of Buddhism stems from a Buddhist monk named Nagarajuna. Nagarajuna is best known for his work called the *Madhyamika-Shastra,* or Treatise on the Middle Way, as well as the Perfection of Wisdom sutras, or *Prajnaparamita.*. The Middle Way is a middle ground between the extremes of self-indulgence and self-mortification. Nagarajuna proposed that the source of human suffering arises from a belief in a self-existent nature, but that it is equally

ignorant to believe that nothing exists or subscribe to an idea of extreme nihilism. Emptiness is the true nature of the world, but it does not mean a lack of existence but a lack of intrinsic existence.

Five Aggregates

Buddhists understand that what comprises the self is the body and the mind, which can be outlined in totality by the Five Aggregates. The summation of these five aggregates or categories is the self or self-concept in its entirety- form, feeling, discrimination, compositional factors, and consciousness. Form is the body and all physical aspects involving our bodies, while the remaining four aggregates comprise the mind. Feeling, the second aggregate, is our perceptual sensations in their most raw forms, our immediate emotional response or feeling upon observing an object. This aggregate is broken into discrimination and compositional factors. Discrimination is more strictly based in the perceptual processes, the act of perceiving stimuli, and distinguishing one object or quality of an object from another. Compositional factors are best described as mental processes, ranging from vanity to desire to doubt or concern. Finally, the fifth aggregate, consciousness, is the mental awareness associated with each of the six senses- sight, hearing, smell, taste, touch, and thought. Thought, or awareness in this context, refers to the capacity individuals have for an experience.

Outside these five aggregates, there is nothing left to label "self," and these five mental and physical aggregates are essential in understanding suffering and emptiness. Suffering, both fundamental to our existence and resulting from attachment, occurs due to our attachment to this self-concept or the five aggregates, which is subject to change like all things in the world (Tsering, 2005). Attachment to self is a cause of suffering, and

Buddhists posit that this self is contaminated as a result of the ignorance and delusion in which we live, in our unenlightened state.

Mindfulness in Buddhism

In Pali, mindfulness translates to *sati*, which literally means recollection, or non-forgetfulness (Harderjwijk, 2012). Mindfulness is thought to be a crucial ingredient in attaining an accurate view of reality. Buddhists believe the mind to be a fundamentally clear entity, but it is subject to defilements that stain this clarity. Mindfulness restores clarity and stillness to the mind through mindful meditation practice. A simile of the mind as a bowl of clear water is often used by Buddhists- when stained red, muddied, or shaken, you can no longer see the true and clear reflection of the self. An uncontaminated bowl, however, will provide a clear reflection (Getlin, 1998).

Cultivation of mindfulness is achieved through mindfulness meditation (MM). MM involves paying deliberate attention, non-judgmentally and without elaboration, to moment-by-moment bodily sensations, emotions, cognitions, and/or external stimuli (Kabat-Zin, 2003). There is a distinction between mindfulness and normal consciousness, such that there is a metacognitive awareness and assessment of an individual's immediate experience, with careful cultivation of an attitude of openness, non-judgmental kindness, curiosity and patience (Brown, Ryan, & Creswell, 2007). Mindfulness allows for the flow of consciousness to be observed as it ebbs and flows, actively developing mind-body awareness and the ability to objectively discern emotional and cognitive states.

MM first requires practitioners to concentrate on the breath, using this observable, easily detectable, and always accessible physical stimulus as a mechanism to calm physiological processes within the body. Slow, even breaths lower the heart rate and

bring about a sense of tranquility, until the meditator is ready to use the breath as a gateway into observing mind-body awareness (Hofmann, Grossman & Hinton, 2011). As the breath slows and deepens, meditators observe the flow of consciousness slowing and shifting to a more volition-driven concentration, raising awareness of the present moment. MM aims to develop verve, stillness and quietude of mind (called *shamatha*) and equanimity (Seldmeir, 2012).

Compassion in Buddhism

Brahma-vihara, or the Four Immeasurables*,* are the four divine virtues cultivated by Mahayana Buddhists, and the specific meditation practices to cultivate these virtues. Meditating upon these sublime states is said to develop right conduct toward all, leveling social barriers and promoting harmony and brotherhood across all sentient beings (Thera, 1994). Described in *The Path to Purification* (Buddhaghosa, 5 C.E.), the first immeasurable is *metta*, or love, followed by *karuna,* or compassion, and then emphatic or sympathetic joy, *mudita*, and finally equanimity, called *upekkha* in Pali (Chodron, 2001). His Holiness, the XIV Dalai Lama states, "Compassion and love are not mere luxuries. As the source of both of inner and external peace, they are fundamental to the continued survival of our species," (Harderwijk, 2012). These sublime, or immeasurable states are of the utmost importance in striving to develop and embody bodhichitta.

It is pertinent in Buddhism to draw clear distinctions between love and compassion. While semantically similar and occasionally used interchangeably in western contexts, both terms have specific pragmatic differences through the lens of Buddhism. Love is the simple act of wishing someone happiness, nothing more. It is not attachment, it is not lust; rather, it is a very simple, unassuming, and beautiful emotion or

intention. To underline the significance of love, Namka Pel says in *King of Concentration*,

> Suppose you travelled to a galaxy crowded with billions on billions of pure
>
> paradises and took an infinite number of different offerings and sat forever
>
> presenting them all ways to those highest of beings; Never could it equal a
>
> fraction of the good of thoughts of love (Roach, p. 11).

The significance of love and compassion within Buddhism cannot be overstated. Compassion, *karuna*, or the desire for all sentient beings to be relieved of suffering, embodies the highest scope of motivation for Buddhists (Gyatso, 2011). Genuine compassion stems from acknowledging the existence of suffering, understanding that an end to suffering is possible, and that all sentient beings in the world are trying to escape suffering (Tsering, 2005). When one makes his or herself aware of the suffering everyone feels and sincerely aspires to eliminate it, compassion arises naturally and indiscriminately.

Rosenzweig (2013), in describing the foundational nature of these virtues, quotes a story about the Buddha being asked by his personal attendant, Ananda, if it was true that the cultivation of loving-kindness and compassion was important in their practice. The Buddha is said to have replied, "No. It would not be true to say that the cultivation of loving-kindness and compassion is a part of our practice. It would be true to say that the cultivation of loving-kindness and compassion is *all* of our practice." (Rosenzweig, 2013). The densely interconnected nature of human beings makes it impossible to live in isolation, and for this reason we absolutely must find a way to live together and do it with an attitude of compassion and emphatic concern for one another (Gyatso, 2011). A

classic Buddhist adage outlines the necessity of this kind of reactionary and instinctive form of compassion, "When an arrow hits, there is no time to ask who shot it or what kind of arrow it was." We must respond to human suffering with the instinctive compassion that is inherent within us all, and since existence is suffering, compassion is vital in crafting our understanding of the world (Gyatso, 2011; Tsering, 2005). Developing love and compassion are essential in, and result from, understanding the world as it truly is.

The third divine value is emphatic joy, the act of rejoicing in the happiness, wellbeing, and fortune of others. Emphatic or sympathetic joy is not the primary goal of these core values, but celebrating the happiness and prosperity of others allows us to share this joy, and experience the potential for infinite bliss of all sentient beings to become Buddhas and embody Bodhichitta. Emphatic joy is key in remaining vigilant against the potential for laziness that transpires out of completely undirected bliss within a meditative state (Harderwijk, 2012).

Equanimity, or *upekkha,* is the virtue that comes from the power of observation, and one translation of *upekkha* is, "to see with understanding," meaning to see the world without the distinction between self and others. Thich Nhat Hanh defines equanimity as "Nonattachment, nondiscrimination, even-mindedness, or letting go. . . You climb over the mountain to be able to look over the whole situation, not bound by one side or the other," (1998, p. 161). Understanding equanimity is essential to understanding the nature of emptiness and thereby the rich interconnectedness of the world. When we assume that people have inherent qualities that make them different from us, and more or less valuable to us, we fail to see the role of our perception in this valuation and hierarchical

thinking. It ascribes qualities and connotations to things that are, in fact, empty of inherent qualities, or empty of an inherent nature (Harderwijk, 2012). Right understanding of emptiness leads us to understand that this is not true, and the barriers of self-versus-others dissolve and equanimity flourishes- everyone deserves the same treatment, the same happiness, and the same relief from suffering with no exceptions.

The role of the four sublime virtues, or immeasurables, is deeply intertwined with the basis of suffering and understanding the world as it truly is. The cultivation of these four virtues is through corresponding meditations. Specific to the present study and literature review, Loving-kindness meditation (LKM) techniques and outcomes from a Buddhist perspective will be discussed.

LKM first entails practitioners focusing attention on their breath, much like MM, employing a readily available stimulus to enhance and inwardly observe the mind-body connection. Meditators, after spending about five minutes with attention on the breath, are guided by recordings or Buddhist teachers to select an individual in their lives who is in some kind of pain. Practitioners just beginning this kind of meditation are instructed to envision someone their heart already opens naturally to. Theoretically, with more practice and time one would practice extending loving-kindness and compassion toward individuals to whom they feel neutral or even have negative feelings toward. The final stage of this practice would be, with diligent practice, to extend loving-kindness to the entire universe. Following the progression of where to direct loving-kindness is important, as each stage progressively increases in intensity and emotional resources required to practice it (Hofman, Grossman & Hinton, 2011).

LKM allows practitioners to cultivate feelings of interconnectedness and unconditional kindness for all mankind by meditating on the suffering that all experience, as posited by the first noble truth. The object of attention in this kind of meditation is the imaginative exploration of the emotional states of others and exploring what happens when one attempts to generate compassion and loving-kindness toward others. Through this, insight can be gained about the nature of emotions and one's personal relationship to them (Hofmann, Grossman & Hinton, 2011).

Tonglen meditation

The present study elected to use a combination general loving-kindness meditations and a specific style of Tibetan Buddhist style called Tonglen meditation. Tonglen places emphasis on getting in touch with the essence of humanity, which are considered loving-kindness and compassion (Chodron, 2001). Tonglen is a contemplative practice rooted in the act of sending happiness and taking on the suffering of others in time with the breath. This type of LKM is meant to change an individual's tendency to see oneself as more important than others, and value the happiness of others more than his or her own, thus awakening bodhichitta. The essence of Tonglen practice comes from the following prayer:

May all sentient beings enjoy happiness and the root of happiness.

May they be free from suffering and the root of suffering.

May they not be separated from the great happiness devoid of suffering.

May they dwell in the great equanimity free from passion, aggression, and

prejudice (Chodron, 2001; p. v).

Loving-kindness, allows for insight into the destructive nature of negative emotions, and the pervasive suffering that exists in each and every sentient being.

Similar to a typical loving-kindness meditation, the practitioner of a Tonglen meditation begins with awareness and focus on the breath, turning attention inward on the constant and rhythmic pattern of the breath. If one were practicing Tonglen for a close friend, one would imagine this person sitting in front of them, working to get a clear and distinct visual of this person. One then imagines the pain and suffering this person has, as all people have, as a thick black smoke within their chest. At the center of the meditator's chest near where the heart would be is a white diamond. After clearly establishing these mental images, the meditator is instructed to breathe in and imagine the smoke travelling upward from the target's chest and out into the surrounding air between the two. The meditator then breathes in the black smoke of the pain and suffering of this other individual, observing it entering their own body and hitting the white diamond in the center of his or her chest. Meditators are clearly instructed that this practice does not involve them taking on the suffering and burden of others, but eliminating it completely. As the black smoke hits the white diamond, white light erupts throughout the body, completely decimating the suffering of the other person. These rays of white light then extend beyond the confines of the body and reach outward, touching all others and providing happiness and relief of woe and worry. Finally, the white light recedes slowly back into the body and the meditator reflects on the experience, warmly congratulating his or herself on the goodness they have brought into the world by this practice.

CHAPTER 3: SOCIAL COGNITIVE PSYCHOLOGICAL THEORY

Based on theory and methods proposed by Falkenstein (2013), the present study sought to further investigate the effects of a meditation intervention as a form of chronic cognitive construct activation.

Perceptual Categorization

In his seminal work, Bruner (1957) argued that human perception is dependent on pre-existing ideas, governed by constructs and categories from past knowledge. Perception, a process in which information is stored in a multitude of domains of memory, is best thought of as an act of categorization. It is a constant interaction between the selection and intake of environmental stimuli to be synthesized, and the categorization of such into preexisting mental representations in the memory (Marcel, 1983). The mental representations allow for individuals to quickly and efficiently categorize and understand the mass amount of perceptual stimuli in any given social or environmental situation.

While subject to some debate within the psychological community, mental representations can be defined as encoded and stored information existing in the memory (Smith, 1998). Mental representations are imperative in understanding general cognitive functioning, as they provide cognitive structures that reflect a wealth of acquired knowledge and experience, and provide the fundamental structure in which cognitive processes can operate (Carlston, 2010). Mental representations can be of objects or ideas, semantic characteristics, mental scripts, procedural knowledge, or specific events, people, etc. (Sedikides & Skowronski, 1991).

The present research and thesis has been largely modeled after the paradigm and social cognitive presented by Falkenstein (2013). To provide continuity between the two, mental representations will be referred to here as cognitive constructs. However, within the body of cognitive psychological literature, constructs may be also referred to as schemas or cognitive categories. Constructs, for the purpose of the present thesis and work by Falkenstein (2013) are formally defined as "a collection of ideas, attitudes, memories, stereotypes, goals, and scripts that are closely related in content."

Concepts, collections of similar or connected concepts are commonly referred to in theories of memory retrieval as nodes (Wyer, 2007). Nodes connect related concepts through neural pathways in a complex series of associative networks within the memory. The number of pathways and strength of these pathways within the associative network indicates the strength of the association between concepts. The activation of a particular node indicates the activation of other relevant, associated concepts. The associative network is one of three major types of memory retrieval theories, alongside retrieval cue models, and reconstructive memory models, all of which are relevant to the present study with regards to construct activation (Wyer, 2007).

Retrieval cues speak to information retrieval, or the activation of a construct. In essence, this model suggests that when information is needed, a collage of concepts and cues arise to help an individual activate a particular construct. These can be cues that activate the most similar construct, or the simultaneous activation of all relevant content, with weighted emphasis on features higher in similarity (Wyer, 2007). Finally, reconstructive models of memory retrieval suggest that the manner and material in the recall process is likely to be affected by highly subjective biases. When the full content of

a memory or content cannot be fully retrieved, knowledge gaps are filled in with information from similar past experience (Wyer, 2007).

Cognitive Construct Activation

As discussed, interpretation and understanding of new stimuli is primarily determined by past knowledge. According to laws of cognitive structure activation, this previously acquired knowledge is organized into cognitive structures, which can be thought of as mental representations, or schemas (Sedikides & Skowronski, 1991). Cognitive structures can be activated to varying degrees. Constructs that become activated are more likely to be used in the interpretation, organization, and storing of new stimuli- therefore are strengthened and become more easily activated when encountering novel stimuli or that of a similar categorization. Specifically, the formal law of construct activation is such:

When a stimulus is ambiguous enough to be encodable as an instance of multiple cognitive structures, the stimulus will be most likely encoded as an instance of that cognitive structure that is most activated in memory and is the most semantically similar to the stimulus. This encoding will, in turn, affect structure-relevant judgmental and behavioral processes (Sedikides & Skowronski, p. 170).

In pursuit of the most effective and efficient mechanism of stimuli processing and organization, the construct-oriented mind relates new stimuli to the most semantically similar and easily activated constructs. These constructs simultaneously can activate the aforementioned rich associative networks of related constructs and nodes.

Categories vary in their accessibility at any given time. Accessibility of a construct, in this context, refers to how likely it is to become activated at this moment in

time, or how likely it is to come to mind and be utilized in the act of perception. The applicability of the construct to the stimuli on hand in part determines how accessible a construct will be. Alongside applicability, the other foundations of construct accessibility, as outlined by Bruner (1957), are the frequency of activation of the construct, and how recently the construct has been activated.

To provide an example of recently activated constructs determining the accessibility of construct, conceptual priming has been proven in hundreds of psychological studies. Priming, while often applied to a variety of experimental procedures, is linked by a common definition of, "The [procedure] of activating a structure and observing the consequences of the activation on some aspect of information processing," (Sedikides & Skowronski, 1991). In a priming study, participants are primed with a particular cue or construct and then asked to interpret the stimuli of a different construct. These recently primed constructs will lead to a different conceptualization of the target task due to interpretation being skewed by the construct.

Primes can be subliminal to the participant. Mussweiler (2006) performed a series of priming experiments demonstrating construct activation through stereotypic movements activating corresponding stereotypes. In one experiment, participants were asked to wear large vests and cuffs around their ankles, while walking as if on a boat. These stimuli emulate the stereotypic movements of an obese person and were meant to subconsciously prime this stereotype. Participants demonstrated the activation of this stereotype by responding faster to word stimuli of a fat or obesity construct afterwards on a lexical decision task. The same results occurred when participants were subliminally primed with elderly-stereotypic movements.

Frequent activation of a construct also serves to influence the accessibility of this construct at a given time. Repetition facilitating heightened activation level has been demonstrated in a host of experimental paradigms. Specifically, assigning an individual a prime over ten times has been lead to find long-term heightened activation of a construct (Sedikides & Skowronski, 1991).

Personal experience, to a large degree, determines the chronic accessibility of constructs. These chronically activated constructs are more heavily weighted in the interpretation of environmental and social information. In other words, chronically activated constructs are colored largely by an individual's prior experiences and are more readily available for use in the interpretation of new stimuli. Chronically activated constructs will be employed more frequently and easily than that of seldom activated constructs.

Ambiguity of Constructs

The malleable nature of the constructs in which people categorize their world, coupled with the multitude of constructs that any stimuli could possibly be placed in at a given time, contributes to the idea that perhaps all stimuli in the world are ambiguous. Ambiguity, in the context of this thesis, is defined as a situation in which a stimulus can be interpreted in more than one way. Constructs, stereotypes, schemas- these all serve to attempt to disambiguate the world in which individuals live. Perception is entirely colored by the past experiences and perceptions of the individuals perceiving. In this way, all stimuli, and the world itself is an inherently ambiguous place.

It is at this juncture that the critical overlap between western cognitive psychology and Tibetan Buddhist philosophy can be observed. Buddhist notions of emptiness deeply

intertwine with ideas of construct activation and the inherent ambiguity of stimuli. Particular Buddhist schools, as outlined in the previous chapter, believe that all actions, objects, and stimuli gather meaning at the mercy of the unenlightened perceiver. Suffering, according to Buddhists, is in large part a function of ignorance about the true nature of the world- that all things are empty of inherent meaning. The concept of emptiness is the key link between these traditions. Emptiness is, in it's essence, ambiguity, or the notion that all things are available to multiple interpretations.

From this western psychological standpoint, we can see that interpretation and understanding of the world is also at the hands of the perceiver. An accumulation of past knowledge and activated constructs dictate the meaning placed on all stimuli perceived, processed, and stored in the mind. An individual frequently activating constructs of a depressed, negative, and self-deprecating nature will make this categories more readily available and easily accessible. When presented with what is inherently a completely ambiguous situation, such as not having a hello returned by an acquaintance, the constructs most readily available are that of a negative and self-deprecating nature. Therefore, this ambiguous situation may be interpreted as the acquaintance being rude or a function of them being hateful and cruel. However, an individual who activates constructs of a happy, kind, and compassionate construct may interpret this exact situation with a different set of perceptual assumptions. This person, perhaps, might be more willing to categorize this acquaintance's unreturned hello as a function of this person having not heard you, or being tired and not at all ill-intentioned.

Meditation can be thought of as an act of mind-training in both disciplines of psychology and Buddhist philosophy. Frequently training the mind to become aware of

the thoughts and feelings one has about people and situations can allow an individual to become more observant and immediately aware of the inherent emptiness or ambiguity of all stimuli. The frequent practice of meditation allows for the construct specific to the meditation to be activated frequently and heighten its accessibility. If, for example, one were frequently practicing a directed, compassionate meditation, one would expect the practitioner to have a compassionate construct more readily available and accessible to him or her.

Interpersonal Conflict Coping

Strategies employed to cope with interpersonal stressors and conflicts have been studied since the 1960s. Initially, coping strategies were conceptualized as non-conscious defense mechanisms, purely reactionary in nature and out of control of the individual. Early conceptualizations, alongside interpreting coping to be an entirely unconscious process, proposed simplistic dichotomies to describe methods of coping. Deutsch (1973) made distinctions along an axis of competition versus cooperation. Theorists have argued that conflict concern for self versus concern for others are the two main distinctions in which conflict coping styles should be based (Rahim 1968; Rahim and Bonoma, 1979). Folkman and Lazarus identified the two general ways in which individuals cope with stress and conflict to be problem-focused coping and emotion-focused coping (1980). Psychometric evaluations of measures following these coping style distinctions prove a vast majority of coping strategy measurements to lack basic empirical validation, often being based on face validity alone, lacking construct validity, and tend to have low internal reliability (Parker & Endler, 1992). Further, major problems exist within factor structures of a vast majority of coping scales, rendering them psychometrically unsound.

Within the last 30 years, development in conflict and conflict coping theory has led for the conflict coping to be thought of as a more dynamic, conscious response to external stressful events (Parker & Endler, 1992).

Conflict in the context of the present study is defined as the dynamic process of responding to external events that are stressful or negative. The present study focused on conflicts of an interpersonal nature, highlighting smaller, day-to-day conflicts and stressors as the area of interest (e.g. an argument with a roommate over whose turn it is to do the dishes, or negative experience with a customer service provider).

A gap in the literature exists with regards to interpersonal conflict coping strategies and meditation intervention. Meditation, frequently shown to decrease stress, anxiety, and have a multitude of intrapersonal benefits, may impact intrapersonal strategies to dealing with conflict. Coping strategies, likened to attachment styles, are thought to be relatively stable throughout a lifetime, so it was through an exploratory lens with which researchers in the present study chose to examine this concept. It was unclear at the outset whether or not a meditation could or would impact the basic strategies to coping with conflict. Intuitively, it seems feasible that frequently activating constructs of, for example, empathy and compassion in LKM and thus making these constructs more easily accessible, might cause one to practice more empathy or understanding in an instance of interpersonal conflict.

Working Memory Capacity

Mindfulness meditation has been found to have specific effects on attention control. The practice of mindful meditation is thought to train skills of sustaining and focusing attention, as well as detecting and disengaging from distractions. Attention,

when distracted, must also redirected to the intended object of focus. These are all skills inherently involved in basic attentional processes, and attention practices has been found to see improvements in concentration and selective attention tasks, such as the binocular rivalry task, digit span backward task, Wilkins' Counting Test, and so forth (Sedlmeier, et al., 2012).

Meditation interventions of various lengths (from approximately four days in length to years in length) have been found to see improvements in concentration, selective attention, and working memory tasks. Working memory, specifically, has been examined in several studies (vanVugt & Jha, 2011; Josefsson & Broberg, 2011) and was found to be improved by mindfulness meditation interventions. However, these studies are subject to several limitations, most concerning of which are the lack of adequate control groups. The present study added a measure of working memory capacity, the Symmetry Span task, to replicate the results of other studies that have found these effects, as well as assess whether meditation in general, or specifically MM as opposed to LKM creates these effects (for further hypotheses regarding WM capacity and meditation style reference Hypotheses).

CHAPTER 4: VARIABLE OPERALIZATION

The present study employed a 2(Groups: mindfulness or loving-kindness meditation) X 2(Pre-test and post-test measurement) mixed experimental design. The following chapter will address the justification behind the styles of chosen meditations, as well as researchers of the present study's justification to forgo standard, flawed control groups common in meditation research. Dependent variables will then be discussed. The

choice of these variables was guided by the overall goal of examining common and differential effects of the two meditation techniques. More specific hypotheses and expected outcomes will be discussed at the end of this chapter.

Selection of the Independent Variable

The chosen experimental meditation conditions were selected in accordance with the same psychological and philosophical theories that guided Falkenstein (2013) in the creation of her study. Based on the methods of Fredrickson, Cohn, Coffey, Pek & Finkel (2008), which compared LKM with a waitlist control, Falkenstein elected to study the novel effects of LKM by contrasting it with MM and exploring post-intervention group differences (2013). Frederickson (2008) proposed a model called the broaden-and-build theory of positive emotions to explain the mechanisms by which positive affect influences life outcomes. Broaden-and-build postulates that increases in positive emotions foster the building of individual personal resources that, in turn, create more positive emotions. Researchers hypothesized that practicing LKM would increase participants' overall daily experiences of positive emotions, thus building a variety of personal resources of positive consequence for cognitive and emotional well-being, as well as overall life satisfaction.

Frederickson and colleagues (2008) focused on the mediating role of affect and did not investigate the possibility that cognitive processes could be a confound for her broaden-and-build findings. Falkenstein (2013) proposed that chronic construct activation was a potential mediator of the effect of LKM on life outcomes (For more on construct activation see Chapter 3). Specifically, Falkenstein (2013) measured the accessibility of prosocial cognitive constructs via the lexical decision task (LDT) and Stroop task. In the

LDT, participants' reaction times to word and non-word stimuli were assessed. Word stimuli were either of a prosocial construct, or an antisocial construct. It was hypothesized that meditators in the LKM group, as opposed to the MM group, would respond more quickly at time three versus time one in their reaction times (in ms) to words relevant to the prosocial construct over antisocial words. This would indicate that these terms were more easily accessible due to the frequent activation of constructs involving compassion, warmth, and prosociality.

Results of the study, however, failed to confirm this hypothesis. A design flaw due to both the LDT and Stroop Tasks being employed rendered the baseline and post-intervention reaction times incomparable. Additionally, the LKM group seemed to respond more quickly to not only prosocial word stimuli, but the antisocial word stimuli as well. Researchers of the current study theorized this might have been the result of nature of construct of sociality. Sociality lies on a spectrum, with anti- and pro-social polarity. Heightened ability to recognize one extreme may, in fact, heighten one's ability to detect situations of the other extreme with regards to picking up contrasts. To test this possibility, the present study added a category of neutral word stimuli to parse out the effects of the spectrum nature of sociality. Without the neutral word category, it is hard to tell what the effect of sociality actually is, greater prosocial construct activation, greater antisocial construct activation, or a simple practice effect. The LKM group is hypothesized to react more quickly to prosocial and antisocial words when compared to the MM group and baseline reaction times at post-intervention, but not significantly differ in reaction times to neutral word stimuli.

Differential Effects of Meditation

Despite the massive accumulation of studies within the past decade outlining the effects of meditation, research comparing different styles of meditation is sparse. It is seldom considered that the effects of one specific practice of meditation may not, in fact, be generalizable across all styles of meditation. Buddhist philosophy regarding meditation (as outlined in Chapter 2) delineates differential purposes and effects of each style of meditation. Specific meditations are, in fact, often prescribed in Buddhist literature, as a kind of antidote to specific cognitive or emotional afflictions ailing the practitioner. Furthermore, the cognitive faculties involved across styles of meditation vary greatly. The approaches employed in different meditations differ in cognitive faculties used (e.g. active, passive, or effortful). How the faculties are used (e.g. attention, feeling, visualization, etc.) and where cognitive efforts are directed (e.g. toward others, specific images, thoughts, love, God, etc.) (Seldmeier, 2012). Meditating in a mindful way involves employing attentional focus and control. One practices cultivating an attitude of non-judgment toward the emotions and thoughts that arise naturally within the mind. This allows for a present and cognizant, but calm and open, flow of consciousness. A loving-kindness meditation involves visualization and an examination of the struggles and pain of others. The objects of attention, direction of cognitive energy, and the way in which these faculties are employed are fundamentally distinct. Given the vast cognitive differences involved in these practices, the present study sought to examine common and differential effects of LKM and MM. Using these markedly different styles of meditation allowed researchers to examine group differences at the end of the longitudinal study, thus negating the need for a standard control group.

The present state of psychological research on meditation is often lacking with regards to experimental control. Meditative control groups are subject to various confounds stemming from the differences between the control group and experimental group. These control groups can take the form of waitlist controls, in which participants who have elected to be a part of the study are told they can wait to be involved and still fill out pre- and post-test measures. Another form of meditation control group is having participants to close their eyes and sit quietly, with no real instruction on meditation techniques. Potential confounds exist within these styles of control; major differences exist between the control group and the meditation group, suggesting that observed effects of meditation could be due to multitude of reasons, not just the intervention. For example, extra social support from regular meetings and meeting new people, consistent time set aside away from daily chores, or expectancy effects could influence these results.

In lieu of insufficient control, researchers of the present study followed the model from Falkenstein (2013) by allowing the MM group to serve as a comparison for the LKM group. Group differences were examined before and after an eight-week meditation intervention.

As further justification for looking at group differences and not employing a control group, many of the measures employed in the present study are found to be reliable and would not be expected to change over time unless participants were subjected to some kind of intervention (e.g. measures of personality or emotional intelligence). Finding changes in these measures over time indicates that the meditation intervention was responsible for these changes.

Furthermore, the present study employs a reaction-time task where participants' responses are measure in milliseconds. As this task assesses unconscious construct activation, there is no reason to expect that participants would change in their response times to stimuli of certain categories. Differences at baseline and post-test reaction times of the target stimuli but not neutral stimuli would suggest that these changes were caused by the meditation intervention.

Hypotheses

This study was created to explore several hypotheses regarding interpersonal conflict coping, personality, and working memory across meditation styles, as well as provide follow-up to research performed by Falkenstein (2013). The goal of both the present study, and in the work by Falkenstein (2013), was to examine whether loving-kindness and mindfulness meditation differentially affect prosocial construct accessibility. Loving-kindness meditators spend the bulk of their meditation visualizing the struggle and burdens of specific others or humanity as a whole, and practice cultivating an attitude of empathy and compassion towards these individuals. Frequent activation of constructs, in theory, predicts the greater accessibility of this construct (Bruner, 1957). One hypothesis investigated in the current study was that through frequent and repeated activation of a loving-kindness construct, the LKM group will respond more quickly on a lexical decision task regarding words within this construct than will the MM group. This indicates that the prosocial construct is more readily available, suggesting that it might be the cognitive mechanism by which the positive effects of LKM are experienced.

The researcher in the present study sought primarily to investigate interpersonal conflict coping and the effects of a meditation intervention on such. Strategies employed when coping with interpersonal conflict are developed early in life and are often considered stable over the course of a lifetime, similar to attachment styles (Ben-Ari & Hirschberg, 2009). It was unclear, in part due to the exploratory nature of this research, whether meditation would cause any change in individual conflict coping at all. However, the basis of LKM is imagining the suffering of others and considering proactive solutions to the problems of others one could take, thereby lending itself to considering more positive and proactive means of coping with conflict with others. The daily practice in perspective-taking and the cultivation of empathy and compassion involved in LKM led researchers to expect group-difference in strategies employed to cope with interpersonal conflict, such that the LKM group would report more positive and proactive coping mechanisms (Operationalization of coping mechanisms was addressed in earlier in the chapter).

Another goal of this work was to explore the receptivity of specific personality types to the different styles of meditations. A large body of research delineating the effects of meditation exists within the clinical field of psychology, examining the efficacy of meditation as a therapeutic intervention (Sedlmeier et al., 2012). One conclusion to be drawn from the considerable number of studies that exist in the therapeutic context is the potential risk for adverse effects in meditation-based therapies for those prone to psychosis or other psychological disorders. Individuals with trauma in their history may have a more difficult time fighting off the negative effects of rumination or intrusive thoughts while meditating, indicating that meditation is not a universal solution for all

psychological afflictions (Seldmeier, et al., 2012). Intuitively, it makes sense that certain meditation styles may speak to individual personality differences, rendering the effects of said meditation more or less pronounced. Traditionally, in fact, Buddhist teachers will often give students different sorts of meditations to perform depending on the teacher's assessment of the student's needs or personality. This implies that Buddhist teachers are implicitly aware of the idea that individual differences matter for the outcomes of the meditation.

Researchers in the present study were looking for interactions between the Big-Five personality dimensions and meditation on perceived general life outcome measures. Exploratory in nature, tentative hypotheses were made regarding agreeableness, neuroticism, and openness. People who are high in agreeableness tend to be perceived as kind, warm, and with stronger feelings of social harmony and feelings that people are, in general, honest and trustworthy (Goldberg, 1992). Low scores on agreeableness indicate stronger feelings of mistrust for mankind, report having less empathy and feelings of social connectedness, as well as more competitive tendencies as opposed to cooperative (Goldberg, 1992). Intuitively, due to the other-oriented and empathetic nature of LKM, researchers hypothesized that individuals who score lower on agreeableness would find the other-focused nature of LKM taxing and more difficult and therefore experience fewer benefits than people who are high in agreeableness on life outcome measures such as perceived satisfaction with life. Keeping in mind that these are exploratory hypotheses, one might predict the opposite – that the highly agreeable individuals will see little effect of LKM because they are already so high on prosocial qualities, thus experiencing a

ceiling effect. The lows, in this case, would experience more effects of LKM because they have more room to grow.

Regarding neuroticism, researchers hypothesized that an interaction would be found between level of neuroticism and time, such that individuals who score high in this dimension would lead to more favorable results over time regardless of meditation. It is also possible, however, for an interaction to occur, such that high neuroticism may dampen the effect of LKM relative to lows, but would have little effect on the results of MM due to the guilt that some experience practicing LKM. Individuals high in trait neuroticism tend to experience greater levels of anxiety, depression, jealousy, and guilt (Goldberg, 1992). LKM, while often eliciting feelings of social-connectedness and compassion for others, can elicit effects more akin to guilt; imagining and experiencing concern for specific individuals or all beings can serve to exaggerate feelings of anxiety and shame, or more specifically, exaggerate a person's perceived deficits in prosocial behavior. Individuals who experience more negative affect and guilt might respond less to LKM.

Researchers made a tentative hypothesis with regards to openness, such that researchers predicted stronger effects for both LKM and MM groups for people higher on openness. Trait openness is associated with curiosity, imagination, and attentiveness to inner feelings (Goldberg, 1992). Having an open mind to new experiences likely makes individuals who score high in this dimension more open and receptive to meditation regardless of group, such that they possibly put more effort into the meditations.

It was hypothesized that conscientious individuals would put forth a more diligent effort in meditations and would therefore experience more significant effects of

meditation, regardless of group. The Noble Eightfold Path posits that "right effort" is crucial in developing right qualities of mind through meditation. Conscientiousness, as defined in the Big-Five personality literature, involves self-discipline, and a desire to complete tasks at hand thoroughly. Intuitively, individuals scoring high in conscientiousness would likely put more effort into their meditations thus experiencing more benefits from their practice.

Situational appraisal, or the tendency to perceive situations as having qualities or traits similar to human personality traits, was tested in the present study (Edwards & Templeton, 2005). Similar to the Big-five personality index, people tend to view situations as having certain dimensional traits. When perceiving a situation, people form organized impressions and dispositional inferences about the situation. Edwards and Templeton (2005) explored comprehensive lists of descriptors used to describe situations, finding four factors, or dimensions, that situations tend to be rated on: positivity, negativity, productivity, and ease of negotiation. It was hypothesized that a meditation intervention, due to the large body of research indicating the positive effects on general well-being, decreases in anxiety, and increases in emotional reappraisal, would lead to higher ratings of positivity in all situations (Kabat-Zinn, 2003). It was also hypothesized that regardless of meditation intervention, situations would be rated, on average, as less negative, and participants would find easier perceived ease of negotiation. Neither meditation was specifically hypothesized to rate more highly on this because inherent qualities of the meditations do not lend themselves to strong differences on these qualities.

Another dependent variable examined in the current study was Working Memory Capacity (WMC). WMC is considered the contents of the short-term memory, coupled with the attention-controlled central executive functions, or more simply, the number of things one can hold in mind at a given time (Engle, Tuholski, Laughlin, & Conway, 1999). The capacity of the WM has also been considered a fundamental aspect of intelligence. The number of items held in the WM dictates how much information a brain can work with at any given time. If one has the ability to hold a higher number of items in the WM, there are more stimuli for the brain to process and manipulate, thus creating a greater intellectual capacity. The capacity of the WM has been found to be increased as a consequence of meditation interventions, but the literature thus far falls prey to limitations that plague much of this research (Josefsson & Broberg, 2001; Colzato, Hommel, van der Wildenberg & Hseih, 2010; van Vugt & Jha, 2011). Research involving meditation interventions on cognitive capacity, specifically regarding increases in WMC, are often short in terms of length of intervention and do a poor job of properly defining and distinguishing key concepts in mindfulness, meditation, and mindfulness meditation. Each of these are concepts or practices distinct from each other (for a further review in mindfulness and mindfulness meditation see chapters 2 and 3). A gap in the WMC literature also exists regarding styles of meditation, with most interventions only looking at mindfulness meditation. The present study sought to examine the effects of different styles of meditation on WMC.

MM includes elements of metacognition, of nonjudgmental assessment, and of attentional control, so it is proposed that the MM group would experience larger increases than the LKM group in working memory capacity. However, virtually no meditative

practices are mutually exclusive in technique. All involve a combination of approaches, sampling techniques from different styles, including breathing techniques or direction of concentration (Sedlemeier et al., 2012). Breath awareness is used in both LKM and MM, but is only emphasized in the first several minutes of LKM, and continually reinforced throughout MM. Attending to breath, focusing on the sensation as it enters and exits the nostrils, is used to employ a constant, easily perceptible physical stimulus as a simple starting point to begin relaxation, investigate the mind-body connection, and begin contemplation of more complex awareness.

The current study hypothesized that both groups would experience increases in WM capacity, but the MM group would experience greater working memory capacity than that of the LKM group because MM involves a longer experience practicing mindfulness by self-regulating attention (Hofmann, Grossman, & Hinton, 2011).

Falkenstein (2013) measured emotional intelligence and management in an exploratory fashion via the self-report measures STEM and STEU. Specific hypotheses regarding these were not made, however it was found that the LKM group found greater gains in emotional understanding and intelligence. These measures were added in an attempt to replicate the results of Falkenstein (2013). Higher scores of emotional understanding and management on the aforementioned scales were theorized to be elicited from the LKM group, due to the emphatic concern and compassion practiced through this type of meditation.

Finally, researchers addressed follow-up questions regarding general well-being and the common and differential effects of meditation style on such. Falkenstein (2013) included measures (for a more detailed explanation, see Chapter 4: Variable

Operalization) that attempted to get a well-rounded look at general life outcomes, including scales that measured satisfaction with life, interpersonal reactivity, health symptoms, depression, anxiety, and mindfulness (See Appendices B-R). This battery of self-report measures was administered in the hopes of replicating the results of that study indicating the rich wealth of cognitive, emotional and physical resources that were experienced as a result of practicing LKM. Specific hypotheses were made with regards to each scale. The main differences from Fredrickson and colleagues' research (2008) were that the work of Falkenstein (2013) and the present study propose chronic construct accessibility as the cognitive mechanism by which the positive effects of LKM are experienced and MM was also studied.

The LKM group specifically was hypothesized to find greater increases in satisfaction with life, emphatic concern, perspective taking, and emotional regulation than the MM group. Tendencies to seek revenge or be avoidant in the face of transgressions were expected to decrease for the LKM group as a result of the compassion and other-focused nature of LKM. Both groups were predicted to see decreases in illness symptoms, depression, anxiety, and perceived stress. These were predicted to be effects common to both meditation styles because none of these self-report measures involve emotional or cognitive mechanisms specific to any one kind of meditation. Researchers in the current study predicted that the MM group would experience greater increases in mindful awareness over the LKM group over the course of the intervention due to the MM group spending more time practicing this skill.

Measures

Prosocial construct activation was measured by the aforementioned modified lexical decision task, where reaction times indicate the cognitive accessibility of constructs such that cues of repeatedly activated constructs should prompt easier accessibility and faster reaction times (in milliseconds).

Lexical Decision Task

The modified lexical decision task (LDT) used in the present study was an altered version of the task created by Falkenstein (2013). The LDT is a task where participants are presented with a randomized combination of words and nonsense words that resemble the phonotactic rules of the English language. A fixation point (an asterisk) is presented on the screen to provide a focal point for participants to expect the next stimuli. Words are then flashed briefly on the screen and participants are asked to quickly and accurately assess whether the stimuli presented is a word or a non-word. Reaction times to the stimuli are measured in milliseconds (ms) as well as error rates. In the LDT used in the present study, there was an inadvertent 300ms blank screen between the fixation point and the word stimuli. Potential error associated with this will be examined Chapter 7: Discussion.

Word stimuli in both studies, were of a prosocial or antisocial construct. Pro- and antisocial words from Falkenstein (2013) were used (Refer to Appendix A for a full list of word stimuli). The present study added two neutral word categories (positive and negative) from a wordbank pretest for valence created by Kosta, Vinson, and Vigliocco (2009). All word stimuli, including the newly created neutral word category were matched across groups on average word length and concreteness. Valence, or the positive/negative emotional attractiveness or aversiveness, was equivalent across

categories (i.e. prosocial, antisocial, or neutral words) (Bradley & Lang, 1999; Clark & Paivio, 2004; Toglia & Battig, 1978). It is important to note that neutral in this context does not mean neutral or void of any emotion or meaning, but rather, were found to not elicit meaning in a *sociality* context, as in did not elicit prosocial or antisocial valence.

Self-Report Measures

A battery of self-report measures were administered at three points during the course of the study, which were included to replicate the methods in Falkenstein (2013), check manipulations, and investigate new hypotheses not explored by Falkenstein (2013).

Measures intended to replicate the methods of Falkenstein (2013) included scales that attempted to address the construct of prosociality. Positive relations with others, emphatic concern, and perspective taking were identified as facets of compassion and altruism inherent in a prosocial construct.

The Attentional Control Scale (ACS; Derryberry & Reed, 2002; See Appendix B) measures attentional control, which is broken down into subscales examining attentional focus and the ability to effectively shift attention. Attentional focus is the ability to attend to selected stimulus in the environment and effectively ignore or disengage attention from the rest of the stimuli in the environment. The attentional shifting subscale examines one's ability to change the attentional focus from one stimuli and effectively redirect attention to another. Participants rated the extent to which items applied to them, "When I need to concentrate and solve a problem, I have trouble focusing my attention," (1= *Almost never*, 4 = *Always*). Scale items were reverse scored and summed for each subscale (Attentional focus and attentional shifting). Subscales were analyzed separately for significance on attention.

The Beck Anxiety Index (BAI; Beck, Epstein, Brown & Steer, 1988) inventories symptoms common in anxiety. Participants are asked to rate how often they have experienced each of the listed symptoms in the last week (0 = *Not at all*, 3 = *Severely – I could barely stand it*). Items involved physiological and psychological responses to anxiety including, "Scared," "Fear of the worst happening," "Hands trembling," and "Sweating (not due to heat)." Items were summed, with higher scores indicating more anxiety symptoms. As depression and anxiety are disorders with high comorbidity, hallmark symptoms of one might also occur in the other. For example, difficulty sleeping is a common symptom of both depression and anxiety (Bener, Al-Kazaz, Ftouni, Al-Harthy, & Dafeeah, 2012). The BAI was designed to specifically tap symptoms of anxiety distinct from depression.

Personality was measured the Big Five Inventory (BFI; Goldberg, 1992), which assesses the Big-Five subscales of openness, neuroticism, conscientiousness, extraversion, and agreeableness. Participants were asked to rate the extent to which they believed the 44 listed characteristics applied to them, "I am someone who…." Characteristics included options like, "…Is talkative," "…Can be tense," "…is easily distracted," "…has a forgiving nature," (See Appendix D for all scale items). Each subscale had items tapping the construct, and the opposite. Questions examining extraversion include, "…Is outgoing, sociable," and "…Is sometimes shy, inhibited," where the latter would be reverse scored. Items in each subscale were summed and properly reverse scored separately (Goldberg, 1992).

Depression, also examined in the Falkenstein (2013) study, was included for replication purposes. Theoretically, the scale was included due to the large body of

research suggesting that meditation reduces depressive symptoms in both clinical and non-depressed populations (Shahar, Britton, Sbarra, Figueredo, & Bootzin, 2010). The Center for Epidemiologic Studies Depression scale (CES-D; Radloff, 1977) asks participants how often they have experienced the depressive symptoms in the past week, with statements such as, "I felt that I could not shake off the blues even with help from my family or friends," or "I had crying spells." (0 = *Rarely or none of the time [less than 1 day]*, 1 = *Some or a little of the time [1-2 days]*, 2 = *Occasionally or a moderate amount of time [3-4 days]*, 3 = *Most or all of the time [5-7 days]*). Items were reverse scored and summed, with higher scores indicating more depressive symptoms being present in the last week (See Appendix E for all scale items).

Health symptoms were catalogued by the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983), to both replicate the methods of Falkenstein (2013) and measure the extent of negative health symptoms experienced by participants over the course of the meditation intervention. Studies have suggested that mindfulness meditation can decrease the physical symptoms associated with illness and have positive effects on immune system function (Arias, Steinberg, Banga, & Trestman, 2006). Participants are asked to rate how much each symptom had bothered or distressed them within the last two weeks, including today (0 = Have never been bothered by the problem, 4 = The problem has been an extreme bother). Symptoms included items like, "Headache," "Feeling low in energy," "Severe aches and pains," (For the comprehensive list of symptoms see Appendix F). Scores were summed and higher scores indicated more problematic illness symptoms.

Compassionate love was measured in the present study to see if group differences exist after the meditation intervention, such that LKM would exhibit higher levels of compassionate love. This was examined with the Compassionate Love Scale for Close Others (CLS; Sprecher & Fehr, 2005). Compassionate love is defined as an attitude toward close others that combines feelings, behaviors, and thoughts focused on caring, kind, and supportive orientations for others, specifically when others are in need (Sprecher & Fehr, 2005). Respondents rate each statement on a 7-point likert scale (1 = *Not at all true of me*, to 7 = *Very true of me*), for items like, "I tend to feel compassion for people who are close to me," and "If a family member or close friend is troubled, I usually feel extreme tenderness and caring." See Appendix G for all scaled items.

Causal uncertainty is the extent to which individuals understand the causes and originations of things that happen in their life, good or bad. Pioneered by Weary and Edwards (1994), the Causal Uncertainty Scale (CUS) asks participants to rate how much they agree or disagree with statements such as, "When I see something good happen to others, I often do not know why it happened," or "It is important to know the causes of a person's behavior," (1 = *Strongly Agree*, 7 = *Strongly Agree*). Items are reverse scored and totaled, with higher scores indicating higher levels of causal uncertainty, or worse ability to determine causes of things happening in life.

The Ego Resilience Scale (ERS; Block & Kremen, 1996) measures individual differences in adaptive behavior and thought processes to a dynamic environment. Ego resilience is the reliable, systematic ability to effectively adjust to changing situational and inter/intrapersonal contexts (Block & Kremen, 1996). The ERS includes items such as "I like to do new and different things," and "I would be willing to describe myself as a

'pretty strong personality,'" asking participants to rate the extent to which items apply to their self-image (1= *Does not apply at all*, 4= *Applies very strongly*). For full list of items, see Appendix I.

Emotional regulation involves the ability to reevaluate emotional states and respond appropriately to subjective feelings, cognitions, or behaviors. It involves inhibition and modulation of emotional states in a variety of situations, and was measured in the present study with the Emotional Regulation Questionnaire (ERQ; Gross & John, 2003), which is broken down into expressive suppression and cognitive reappraisal. Emotional suppression involves regulating and concealing one's emotional state, while cognitive reappraisal is an adaptive strategy to reconsider and reevaluate the present situation, thus altering the emotions experienced. Respondents respond on a seven-point likert scale (1 = *Strongly disagree*, 7 = *Strongly agree*) to statements such as "I keep my emotions to myself," "I control my emotions by *changing the way I think* about the situation I'm in," and "When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation." Scores are summed on both subscales, all items are located in Appendix J.

The Interpersonal Reactivity Index (IRI; Davis, 1980; Scale items located in Appendix K) measured a construct of particular interest to the present study and Falkenstein (2013) regarding empathy. The IRI breaks down into two subscales, emphatic concern and perspective taking. Emphatic concern, or feelings of warmth and compassionate concern for close others, was measured with test items such as, ""I often have tender, concerned feelings for people less fortunate than me," and reverse scored items like, "When I see someone being treated unfairly, I sometimes don't feel much pity

for them." Items on the perspective taking subscale included, "Before criticizing someone, I try to imagine how I would feel if I were in their shoes," and "I try to look at everybody's side of a disagreement before I make a decision." See Appendix J for full scale. Participants were asked to react to how well they thought items described them (1 = *Does not describe me well*, 5 = *Describes me very well*).

Mindful awareness was measured as a dependent variable using the Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003). The MAAS was added as a manipulation check in the present study. Respondents are asked to rate frequently or infrequently they experience situations of mindful actions or thoughts, "I could be experiencing some emotion and not be conscious of it until some time later," (1 = *Almost always*, 6 = *Almost never*). To see all items on the MAAS, refer to Appendix K.

Social desirability is a common concern in psychological research, as responses on measures like self-report measures can be biased toward more socially desirable answers. The present study employed many self-report measures. As a manipulation check, participants' tendency toward socially desirable responses was measured using the Marlowe-Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960). This scale was designed to measure social desirability independent of psychopathology. Using a true/false response format, participants are asked to respond whether each item pertains to their personality. Questions are designed to be traits and actions that are considered socially desirable, but are generally not followed or believed in (e.g. "I like to gossip at times," "Before voting I thoroughly investigate the qualifications of all the candidates"). All items are located in Appendix L.

One of the primary hypotheses in the present study was examining interpersonal conflict coping. Coping with small, day-to-day conflicts that arise as a result of having so many interpersonal interactions within in a day can be measured through many different scales. The present study chose to employ the Responses to Stress Questionnaire. Connor-Smith, Compas, Wadsworth, Thomsen, and Saltzman (RSQ; 2000) identify five main domains in which individuals tend to pattern responses to stressful situations: Primary Engagement Control, Secondary Engagement Control, Disengagement Coping, Involuntary Engagement, and Involuntary Disengagement.

Primary and Secondary Engagement Coping are identified as productive and positive coping strategies. An individual prone to Primary Engagement Control will respond highly to items measuring problem solving, emotion regulation, and emotional expression. Secondary Control involves acceptance, distraction, cognitive restructuring and positive thinking as patterned coping responses to conflict. Disengagement coping, involuntary engagement, and involuntary disengagement are considered unproductive and negative coping mechanisms. Disengagement would be considered denial, avoidance, or wishful thinking. Individuals who tend to involuntarily engage experience high levels of rumination, intrusive thoughts, emotional and physiological arousal, and impulsive action. Conversely, when an individual frequently involuntarily disengages, her or she tends to experience emotional numbing and inaction, feelings of a need to escape, and cognitive interference (Connor-Smith, Compas, Wadsworth, Thomsen & Saltzman, 2000).

Perceived stress was added to examine differential effects across meditation styles. The Perceived Stress Scale (PSS; Cohen, Kamarck, Mermelstein, 1983) is

designed as a global measure of perceived stress. Respondents indicate how often they have felt or thought a certain way (1 = *Never*, 5 = *Very often*) with regards to stress (e.g. "In the last month, how often have you felt that you were unable to control the important things in your life?"). All items on the PSS are found in Appendix M.

Participants were asked to think about problems they had with others within the last two weeks and consider how often they feel or do each item (0 = *Never*, 3 = *A lot*). Each type of coping strategy was assessed; an example of primary engagement coping would be "I think about the things I'm learning from the situation, or something good that will come from it," while questions tapping Involuntary Disengagement would look like "I just *have* to get away when I have problems with other people, I can't stop myself," (See Appendix N for full item list). Several items allow participants to fill in the blank to extrapolate on certain answers, or circle all items that apply alongside rating the item on the *Never – A lot* scaling, for example: "'I let someone know how I feel' Circle all that apply: *Parent, Friend, Brother/sister, Advisor/professor, God*." Items that included extraneous information past scaled responses were not used for the purpose of the present study.

Situational Appraisal was addressed in the present study utilizing the Situational Appraisal Scale, adapted from work by Edwards and Templeton (2005). Participants are instructed to rate the extent to which 24 adjectives apply to a series of ten different situations (1 = *Not at all applicable*, 9 = *Extremely applicable*). Examples of situations rated include, "Walking to class with a group of friends," and "Listening to a lecture in class." The 24 adjectives were words that Edwards and Templeton found to be most representative of the four dimensions through which people appraise a situation:

positivity, negativity, ease of negotiation, and productivity (2005). The situations that were rated came from a pre-existing pool of situations identified in Battistich and Thomas' (1980) work examining situational perception of college students. For a full list of situations and adjectives, please refer to Appendix P. Ratings for each subscale are individually totaled and collapsed across situations.

Emotion management and understanding were measured using the Situational Test of Emotion Management and Situational Test of Emotional Understanding, respectively (STEM & STEU; MacCann & Roberts, 2008). Emotional understanding and management are thought to be facets of emotional intelligence, or a group of intelligence-relevant factors that process emotional stimuli (MacCann & Roberts, 2008). Emotional intelligence, an arguable facet of general intelligence, is thought to be relatively stable. These measures of emotion management and understanding were included in the present study to replicate the exploratory results of Falkenstein (2013).

The STEM (Appendix P) asks participants to choose the most effective course of action to manage the emotional situation presented. "Lee's workmate fails to deliver an important piece of information on time, causing Lee to fall behind schedule also. *What action would be the most effective for Lee*?" followed by four choices of action. The STEU, similar to the forced-choice response format of the STEM, presents participants with an emotional situation and asks them to choose which of five listed emotions one would feel in the situation. "Phil's workmate Bart asks Phil to lie for him about money Bart has been stealing from the company. Phil does not agree. *Phil is most likely to feel*?" (See Appendix Q for full item list).

Satisfaction with life was measured in the present study for the purpose of replicating prior results by Falkenstein (2013) and Frederickson et al., (2008). The Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) presents items that participants are asked to rate the extent to which they agreed or disagreed, "If I could live my life over, I would change almost nothing," (1 = *Strongly disagree*, 7 = *Strongly agree*). Full scale listed in Appendix R.

The extent to which participants felt motivated to forgive in times of conflict was measured using the Transgression-Related Interpersonal Motivations scale (TRIM; McCullough, et al., 1998). The TRIM includes two subscales measuring revenge and avoidance motivations in interpersonal conflict, and respondents rate their agreement (1 = *Strongly disagree*, 5 = *Strongly agree*) to phrases relating to these constructs. An example of a revenge statement is "I want to see him/her hurt and miserable." Subscales were totaled separately.

Working Memory Task

Working memory capacity (WMC) is defined by Engle, Tuolski, Laughlin, and Conway (1999) as the "Contents of the short term memory (STM) plus the limited-capacity controlled-attention processes associated with the central executive that can be used to maintain some set of those STM units as the focus of attention." Simply put, the working memory capacity is the number of items an individual can hold in his or her mind at any one given time. Integral in daily tasks such as language and reading comprehension, and problem solving, WMC involves concurrently storing and processing information. Individual differences in this process predict reasoning ability

and both higher and lower-order cognitive processes (Unsworth, Redick, Heitz, Broadway & Engle, 2009).

Many complex span tasks measure the capacity of the working memory (e.g. Ospan, Rspan, Symmetry Span), all of which are variations measuring the same or similar storage-processing mechanisms. Participants are presented with items to remember, followed by a simple, unrelated cognitive task or activity, and participants are then required to recall the earlier items. These tasks are collectively considered complex span tasks, not to be confused with simple span tasks, which involve only memorization and do not add the interrupting cognitive activity.

The current study employed the complex symmetry span task using E-prime software (Schneider, Eschman, & Zuccolotto, 2002). Participants are presented with a blank 4x4 grid, where they are told between two and five red squares will appear, one at a time, and are asked to memorize the location of each square in the order in which it appeared. After the presentation of each square, a picture appears on the screen and participants are asked to judge whether or not it is vertically symmetrical. The symmetry task acts as the distractor between memorizing the location of the squares. Participants are asked to work quickly and accurately, as times, symmetrical accuracy, and square placement accuracy are monitored in the upper right-hand corner of the screen in the form of a percentage. Participants are told to keep their accuracy at or above 85% at all times. For full instructions and graphics, see Appendix V.

Behavioral Measure

The present study employed The Centipede Game as an exploratory behavioral measure of cooperation. The Centipede Game is an economic game created by Rosenthal

(1982) in which two players pass a pot of money that incrementally increases at each player's turn. Each player can choose, on his or her turn, to pass the pot and increase the total value of the pot, or take large portion of the pot's value, leaving the opponent with a smaller amount of money and thus ending the game (Broome & Rabinowicz, 2003). Traditionally, the game can go for up to 100 rounds, hence the title of Centipede. The game presents each player with the decision to act on his or her own self-interest, or to cooperate with the opponent and raise the pot of money's value.

The Centipede Game in the present study was designed using DirectRT v2010 ("Media Lab and DirectRT Psychology Software," 2011). Participants were told they would be playing against other students in another psychological research lab on the OSU campus, but they were, in fact, playing against the computer, which was programmed to always pass the pot back and "cooperate." Had participants been playing against each other, an accurate number of passes a participant would have made could not have been achieved if and when his or her opponent had chosen to stop the game.

Each time a participant would pass the pot, the total value would increase by ten cents. Upon passing, participants would encounter a wait screen that instructed them to wait while their opponent was taking their turn. Wait times varied and increased slowly as the number of passes increased, to provide an illusion that the opponent was taking their time to deliberate whether or not to pass. The program would, however, always pass the pot back to the participant. The game was played once at the end of the term to investigate if there were group differences with regards to average number of passes.

CHAPTER 5: EXPERIMENTAL DESIGN

The design of Falkenstein (2013) and the current study was modeled after LKM and positive emotion research performed by Frederickson et al. (2008). This method section will delineate the replicated portions of Falkenstein (2013) research, followed by any alterations or extrapolations tailored to the present study and why these were chosen.

Method

Participants

Participants were Oregon State University (OSU) undergraduates (*n*=69; 36 male). Most were psychology majors or minors, and were predominantly of average undergraduate age, however ranged from 18-55 years old. Participants signed up for a course titled "Research Methods Workshop" in which they would receive four upper-division elective credits. Attrition was extraordinarily low, overall only two participants dropped from the study. In both instances, these students dropped within the first weeks of the course and their data was excluded from analyses. Participants were unaware of the nature of the class activities pertaining to meditation until the first day of class. Commonly, meditation research is subject to expectancy effects and biased sampling. By advertising a study as involving meditation, the population of individuals agreeing to be studied is likely to have prior experience and/or interest in meditation. It is possible this population of people will be more receptive to the effects of meditation, or there is something inherently different about them not generalizable to the public. Regardless, this sample cannot be considered truly random and the effects of studies thereafter cannot be considered generalizable. The present study did not inform

Participants were required to meet with the instructor prior to enrollment, and gave a verbal agreement indicating he or she understood the essential nature of daily class attendance and participation. Students were aware that failure on their part to attend class regularly or participate in daily activities would result in their inability to pass the course.

Design and Procedure

The present study utilized a mixed repeated-measures, between-groups design to investigate the effects of different styles of meditation on several dependent variables. Enrollment in the study took the form of an upper-division four-credit university course at OSU through the psychology department. Participants were not required to enroll in the study to be in the class; a student who did not enroll was indicating that he or she did not want his or her data from the class used for research purposes. All students, however, consented. Academic course credit was independent of enrollment in the study, as students were asked to participate in activities regardless of providing informed consent to release data obtained during the course. Students were graded on a pass/fail scale where failure occurred in the event of having more than the allowed number of absences, which was made clear prior to, and throughout the term. Participants were also aware that they were subject to fail for not participating in the daily activities including meditations and psychological testing, regardless of enrollment in the study. After each daily meditation, students were instructed on basic research methods in psychology.

This course was held through the entirety of a 10-week academic term. The first and last weeks of the term were used for scale administration and psychological testing, creating an eight-week meditation intervention. The study spanned four academic terms (that is, there were four classes).

A typical day during the 8-week intervention after the pre-testing began with roll call, followed by splitting the class up into their randomly assigned groups, known to students as 'Group A' or 'Group B.' The separate groups were guided to different locations where they could each have a quiet environment to perform their specific meditation- MM and LKM, respectively. Students were given meditation cushions to utilize in an effort to maintain proper meditation posture, although they were allowed to sit in a chair if injuries or pain prevented them from meditating in the usual fashion. Groups were unaware they were performing different styles of meditation, and were instructed separately about meditation techniques specific to their style. Participants received instruction on proper meditation posture and technique, but were not given extraneous information about philosophical or psychological components underlying meditation. This was done in an attempt to isolate the effects of meditation throughout the intervention. There was little down time between meditations and the rejoining of the groups for the remainder of the class period, to avoid excessive comingling and potential discussion of different activities occurring during group separation.

Meditations were led daily by the author and the PI, each taking one group to their allotted meditation space. The researchers were counter-balanced between groups to avoid experimenter effects, as were the rooms in which participants meditated to avoid any confounds based on the location of meditation.

Meditations were short in length (around 10 minutes) for the first few weeks of the term, and grew longer in duration throughout the course of the term (around 20 minutes). A new meditation was introduced weekly, and students were asked to perform it the four days they were in class that week, and once on their own over the weekend.

Meditations took the form of guided recordings performed by known expert teachers in the area. The loving-kindness meditators listened to recordings by Evan Oshero or Dr. Winston McCullough, Oregon-based Buddhist teachers that are available online. Mindfulness meditations were primarily guided by CD, taught by Jon Kabat-Zinn, a renowned researcher in the area of meditation and psychology. The MM group listened to these instructional CD's, or often listened to silence with bells in five-minute intervals that acted as reminders to students to bring their attention and focus back to their breath. Other meditations of this variety were bodyscan meditations, where intentional and mindful focus are brought inward, paying attention to sensations beginning at the feet and slowly working up toward the head.

After the daily meditation, students spent the remainder of the 50-minute class period being instructed in basic research methods and fundamental psychometrics. Lectures were designed to be accessible and of value to students regardless of background in psychological research methods or year in school. After the third administration of scales and tests, students were no longer required to practice meditation and were given an in-depth explanation of meditation, and the hypotheses guiding the creation of the meditation study.

Data collection took the form of handwritten scales, while the modified lexical decision task and the 'Centipede Game' were administered by computer using DirectRT v2010 ("Media Lab and DirectRT Psychology Software," 2011). The Symmetry Span task was computer administrated using E-Prime (Schneider, Eschman, & Zuccolotto, 2002). For a full description of these tasks, see Chapter 4. All self-report scales were administered three times throughout the course of the intervention: at baseline, in the

fourth week, and post-intervention. All computer-based psychological testing was only taken at pre- and post-intervention, except for the 'Centipede Game,' which was administered once after the meditation intervention to examine only between-group differences. The 'Centipede Game' involves minor deception, so the number of times it can be played was limited to one.

CHAPTER 6: RESULTS

General Linear Modeling (GLM) was the primary method of analysis for data from the present study. Multiple imputation was performed for any missing data points in the self-report data. One baseline administration of the PSS was missing from 14 participants' during one of the academic terms in which this study was performed due to administration error. Furthermore, the CLS was missing from the first and second administrations of 16 participants. This scale was added late to the study.

Aside from these administration errors, the amount of missing self-report data was insignificant (.013%). All self-report data missing, aside from the aforementioned, were missing with no systematic differences between observed and missing values.

Prosocial Construct Activation

The present study used LDT reaction times (in ms) to measure construct accessibility, such that faster reaction times would indicate a more accessible construct. Due to software malfunction leading to the overwriting of several data points on one of the computers in which this task was run, data from nine participants were excluded from the first two terms of administration. This led for a smaller sample size than the self-report measures for this task ($n = 40$).

Participants were exposed to four categories of word stimuli – antisocial words, prosocial words, neutral negative words, and neutral positive words. The neutral categories were selected to be unrelated to concepts associated to sociality, in order to isolate the effects of the prosocial and antisocial words.

Each category of words had 10 words, including the nonword category. Participants saw all 50 word stimuli twice, for a total of 100 words seen per task. To eliminate outliers, participants who's response times were less than 300ms, or greater than 2000ms, were not included in analyses. These cutoffs are established general cutoffs for reaction time data (Ratcliff, 1993). No participants responded to any word stimuli faster than 300ms, which would have indicated that the participant was not responding to the stimuli so much as pushing buttons. One participant demonstrated consistent reaction times faster than 2000ms, which indicates a lack of focus on the task, and was eliminated from the analyses.

Data from the LDT is only included in analyses if participants have correctly identified the stimuli as a word or nonword. An insignificant number of trials were dropped ($< 8\%$) due to incorrect identification a word.

A 2x2 ANOVA was initially run for each word type alone. For tables listing all means and standard deviations of the following lexical decision data, please refer to Table 1 at the end of this chapter. The LDT yielded an nonsignificant main effect for time for antisocial words ($F_{(1, 38)} = 2.76, p = .105$). The effect of group was also found to be nonsignificant in this category of word stimuli ($F_{(1, 38)} = .307, p = .583$). The interaction term between time and group was also not significant ($F_{(1, 38)} = 2.23, p = .144$).

Participants did not change in reaction time speed over the course of the study to words of an antisocial construct.

For prosocial words, a marginally significant main effect for time was found ($F_{(1, 38)} = 3.82$, $p = .058$, $d = .281$). The main effect for group was not significant, nor was the interaction term ($F_{(1, 38)} = .607$, $p = .827$; $F_{(1, 38)} = .268$, $p = .607$, respectively). Participants, on average, tended to respond faster to words of a prosocial construct over time, regardless of meditation group.

Two categories of neutral words were assessed, negative and positive. Words were selected to be neutral with regards to sociality. Negative neutral words produced an insignificant time effect ($F_{(1, 38)} = 3.12$, $p = .085$), group effect ($F_{(1, 38)} = .632$, $p = .432$), and interaction term of time X group ($F_{(1, 38)} = .491$, $p = .488$). Participants did not, generally speaking, change in their reaction times to the neutral negative word stimuli. This aligns with the hypotheses of the present study, as participants were not expected to change in their response to neutral negative words.

Neutral positive words, however, were found to produce a significant main effect for time ($F_{(1, 38)} = 5.38$, $p = .026$, $d = .305$), such that participants responded faster to neutral positive words post-intervention. No effects for group were found ($F_{(1, 38)} = .628$, $p = .433$), nor was there a significant interaction between time and group ($F_{(1, 38)} = .946$, $p = .337$).

After the primary analyses, two control analyses were performed in which antisocial words were compared with neutral negative words, and prosocial words were compared with neutral positive words in two separate multivariate analyses. The analysis in which antisocial words were compared with neutral negative words yielded no

significant effects or interactions. Prosocial words, when compared with neutral positive words, yielded no significant interactions, however, a significant main effect for wordtype was seen ($F_{(1, 38)}$ = 10.18, p = .003), such that participants were responding to prosocial words were responded to more quickly than that of neutral positive words (Prosocial T1: M = 784.30, SD = 227.01; T2: M = 721.09, SD = 213.91; Neutral Positive T1: M = 861.36, SD = 321.83; T2: M = 767.02, SD = 311.58). This suggests that the prosocial word stimuli were more accessible than the controls.

These results indicate that participants, overall, became more positive as a result of the meditation intervention, regardless of group or the social valence of the word type seen. Because participants did not decrease in their response times to words of a negative or antisocial construct, it can be concluded that the significant decreases in prosocial and positive reaction times were not due to prior exposure to the task or simply performing the task more effectively with practice.

Interpersonal Conflict Coping

Interpersonal conflict coping strategies were measured with the RSS, which outlines five methods of coping with interpersonal stressors. For a list of means and standard deviations for coping styles please refer to Table 4 at the end of this chapter. Primary control engagement and secondary control engagement were identified to be positive and proactive strategies that individuals could utilize in order to deal with conflict. For primary control engagement no significant effects were observed for time ($F_{(1, 60)}$ = .1.99, p = .146), or experimental group ($F_{(1, 60)}$ = .005, p = .945), nor their interaction ($F_{(1, 60)}$ = .1.16, p = .320). Secondary control engagement produced similarly nonsignificant results regarding the main effects of time or group ($F_{(1, 60)}$ = .408, p = .667;

$F_{(1, 60)} = 2.55$, $p = .116$, respectively). The interaction term for this coping strategy was also found to not be significant ($F_{(1, 60)} = 2.42$, $p = .097$). This indicates that a meditation intervention does not seem to garner more positive or proactive means of dealing with interpersonal conflict.

The results indicated that there was no main effect for time with regards to disengagement coping ($F_{(1, 60)} = 1.00$, $p = .373$), and no main effect for group was found ($F_{(1, 60)} = .238$, $p = .628$). This style of coping also produced an insignificant interaction term ($F_{(1, 60)} = .039$, $p = .962$). Involuntary engagement, also identified as a more negative and unproductive strategy for managing interpersonal conflict, produced a significant time effect ($F_{(1, 60)} = 6.22$, $p = .004$, $d = .316$), and an insignificant main effect for group ($F_{(1, 60)} = 1.13$, $p = .292$). The interaction term for this style of conflict coping was not significant ($F_{(1, 60)} = .692$, $p = .505$). The tendency to engage in conflict involuntarily decreased over time regardless of experimental group in this study.

Finally, involuntary disengagement produced no significant main effects for time or group ($F_{(1, 60)} = 1.83$, $p = .170$; $F_{(1, 60)} = .020$, $p = .889$, respectively). The interaction term for this style of interpersonal coping was also not found to be significant ($F_{(1, 60)} = 1.90$, $p = .158$). Participants in both groups did not demonstrate any change in the tendency to involuntarily disengage from conflict with others.

Big-Five Personality Traits

The BFI measures individuals on five dimensions of personality – neuroticism, conscientiousness, agreeableness, openness, and extraversion. The purpose of including the BFI in the present research was to assess how personality influences the effect meditation has on various outcome measures.

First, the BFI was explored as a dependent variable to examine whether people experience changes in personality over time due to a meditation intervention. No group effects or interactions for any of the dimensions of the BFI were statistically significant and will not be reported here. Participants reported a significant decrease in neuroticism over time ($F_{(1, 60)} = 7.94$, $p = .001$, $d = .323$). A significant increase in reported extraversion was also seen ($F_{(1, 60)} = 3.48$, $p = .034$, $d = -.134$). Refer to Table 5 at the end of this chapter for overall administration means of the BFI.

Tentative predictions were made for the roles of neuroticism, agreeableness, conscientiousness, and openness. Individuals who score high on neuroticism were predicted to experience more effects of meditation given the known effects of meditation on depressive and anxious symptoms, which are associated with neuroticism. These individuals were predicted to respond better to a MM instead of LKM due to feelings of guilt that are sometimes associated with LKM. High conscientiousness was expected to be associated with greater effects of meditation overall. Finally, individuals low in agreeableness and openness were hypothesized to experience fewer or less effects of meditation on general life outcome measures. For a more in depth explanation of these predictions, refer to the hypotheses in Chapter 4: Variable Operalization.

Median splits were performed on each BFI factor. BFI scores were collected at all three administrations with other self-report measures, but only the time one was used in covariate analyses to maintain an accurate assessment of baseline personality. In the following analyses, the BFI median split for each dimension was added as an independent variable along with group. Interactions that are unreported in the present thesis are to be assumed by the reader as tested but not significant.

Regarding depression (CESD), a significant interaction between neuroticism and time was found ($F_{(1, 58)} = 8.08$, $p = .016$). Bonferonni post-hoc analyses suggested that participants high in trait neuroticism decreased in depressive symptoms more significantly over time than individuals low in neuroticism. Trait neuroticism is often highly correlated with depression, suggesting that the low neuroticism participants were likely experiencing a floor effect. That is, these participants are low in depression to start with, and it is not feasible for these participants to get significantly less depressed. This speculation is supported based on the main effect of neuroticism on depression ($F_{(1, 59)} = 10.75$, $p = .002$), that demonstrates the lower level of depreAnxietyssion for individuals low in neuroticism.

A marginally significant interaction between time, group, and neuroticism was found with ego-resilience (ERS) ($F_{(1, 58)} = 2.50$, $p = .087$). This interaction was driven by the level of neuroticism interacting with time in the MM group, not the LKM group. In the MM group, individuals with low levels of neuroticism experienced a significant increase ($F_{(1, 13)} = 5.52$, $p = .010$) in ego-resiliency over time (T1: $M = 43.47$, $SD = 5.50$; T2: $M = 44.67$, $SD = 6.38$; T3: $M = 46.40$, $SD = 7.05$), while individuals with high neuroticism did not change significantly over time. Theoretically, this finding makes sense, as individuals who are ego-resilient are considered resourceful and competent in controlling anxiety (Pervin & John, 1999). Interestingly, however, the present study did not find significant effects of neuroticism on anxiety (BAI).

Level of neuroticism was compared with group as an independent variable with each dimension of the RSS, measuring interpersonal conflict coping. A marginal interaction was found with time and level of neuroticism for secondary control

engagement responses to stress, which is considered a proactive conflict coping strategy ($F_{(1, 58)} = 2.76$, $p = .067$). Post-hoc analyses indicate that this interaction is driven by individuals with high neuroticism exhibiting marginally significant increases in this coping style over time ($F_{(1, 33)} = 2.89$, $p = .075$) (T1: $M = 24.06$, $SD = 4.60$; T2: $M = 23.80$, $SD = 4.62$; T3: $M = 25.20$, $SD = 5.04$). Lows showed no significant changes over time. Disengagement coping strategies exhibited a significant interaction between time, group, and neuroticism ($F_{(1, 58)} = 5.02$, $p = .008$). This three-way interaction suggested that participants with high neuroticism in the MM group experienced a significant decrease in disengagement coping strategies over time ($F_{(1, 12)} = 10.60$, $p = .000$) (T1: $M = 29.21$, $SD = 6.39$; T2: $M = 28.36$, $SD = 5.18$; T3: $M = 26.36$, $SD = 5.85$). No significant changes occurred in the LKM group, nor for individuals low in neuroticism. This implies that individuals high in neuroticism will respond more favorably to a mindfulness meditation intervention than a loving-kindness meditation regarding negative interpersonal conflict coping strategies.

Finally, a two-way interaction between time and neuroticism on revenge motivation was seen, such that participants high in neuroticism experienced a significant decrease in revenge motivations in times of conflict, regardless of meditation group ($F_{(1, 33)} = 3.37$, $p = .040$). No significant changes were found for participants low in neuroticism.

Conscientiousness was found to produce a marginal two-way interaction on depression ($F_{(1, 58)} = 2.47$, $p = .089$). Post-hoc analyses indicate that highly conscientious individuals experienced a significant decrease in depression over time ($F_{(1, 30)} = 10.97$, p

= .000) (T1: $M = 13.48$, $SD = 9.69$; T2: $M = 12.30$, $SD = 9.34$; T3: $M = 12.12$, $SD =$

7.94), but individuals low in trait conscientiousness did not.

Cognitive reappraisal in emotion regulation (ERQ) was found to have a two-way

interaction between time and conscientiousness ($F_{(1, 58)} = 2.96$, $p = .056$). Post-hoc

analyses indicate that participants low in conscientiousness were found to have a decrease

in cognitive reappraisal from T1 to T2, but then a significant increase in cognitive

reappraisal from the second administration of self-report measures to the final

administration ($p < .05$) (T1: $M = 31.52$, $SD = 5.80$; T2: $M = 29.58$, $SD = 7.41$; T3: $M =$

31.94, $SD = 5.12$). Highly conscientious participants, however, were found to have a

significant linear increase from the baseline administrations of scales to the final

administration ($p < .05$) (T1: $M = 30.94$, $SD = 5.70$; T2: $M = 32.13$, $SD = 5.31$; T3: $M =$

33.31, $SD = 4.90$). This suggests that the effect of meditation is faster for highly

conscientious individuals.

Involuntary disengagement as a strategy to cope with interpersonal conflict was

found to exhibit a significant three-way interaction between time, group, and openness

($F_{(1, 58)} = 6.17$, $p = .003$). For the MM group, less open individuals experienced a

significant time main effect ($F_{(1, 13)} = 4.05$, $p = .029$) (T1: $M = 24.47$, $SD = 6.65$; T2: $M =$

21.53, $SD = 5.42$; T3: $M = 22.87$, $SD = 5.66$), and highly open individuals did not. In the

LKM group, individuals lower in openness also experienced a time effect ($F_{(1, 13)} = 3.33$,

$p = .051$) (T1: $M = 21.20$, $SD = 6.55$; T2: $M = 22.60$, $SD = 6.54$; T3: $M = 19.93$, $SD =$

4.97), while highly open individuals did not significantly change over time. Individuals

low in openness in the MM group experienced the most significant change from time one

to time two ($p < .06$), while in the LKM group the change from time two to three was driving the time effect ($p < .08$).

Emotional understanding (STEU) produced a significant two-way interaction of time and openness ($F_{(1, 58)} = 3.11$, $p = .048$). This interaction, upon post-hoc analysis, was found to be due to low openness participants experiencing a significant increase in emotional understanding ($F_{(1, 28)} = 9.03$, $p = .000$) (T1: $M = 26.63$, $SD = 5.10$; T2: $M = 28.87$, $SD = 4.67$; T3: $M = 28.83$, $SD = 4.89$), while highly open individuals did not experience a significant increase (T1: $M = 28.70$, $SD = 4.34$; T2: $M = 29.15$, $SD = 4.06$; T3: $M = 29.09$, $SD = 4.73$). People who exhibit higher levels of openness have been found in past research to be more emotionally intelligent, so theoretically, results of the present study align with this notion (Hurlic, 2009). A ceiling effect for more open individuals possibly occurs because they cannot demonstrate more significant emotional understanding. Less open individuals have more room for improvement in this skill and thus experience more significant effects through a longitudinal meditation intervention.

Agreeableness interacted significantly with the STEU as well, displaying a significant two-way interaction between time and level of agreeableness, as well as a three-way interaction between time, group, and agreeableness ($F_{(1, 58)} = 3.87$, $p = .024$). This interaction appears to be driven by the LKM group. Participants in the LKM group who were lower in agreeableness showed a significant time effect ($F_{(1, 13)} = 5.90$, $p = .007$), but this was not found to be a linear increase over all three administrations (T1: $M = 28.73$, $SD = 4.43$; T2: $M = 31.33$, $SD = 4.13$; T3: $M = 28.73$, $SD = 4.25$). These participants experienced an increase in emotional understanding from time one to time two ($p < .06$), but, in fact, decreased in emotional understanding from time two to time

three ($p < .05$). However, in the LKM group, individuals who were highly agreeable experienced a significant linear increase in emotional understanding and intelligence over time ($F_{(1, 17)} = 5.24$, $p = .010$) (T1: $M = 28.32$, $SD = 4.53$; T2: $M = 28.37$, $SD = 3.54$; T3: $M = 30.37$, $SD = 5.12$). These results imply that being lower in agreeableness leads to some, albeit less significant or lasting, changes in emotional intelligence when performing a loving-kindness meditation. More agreeable participants, however, appear to respond well to LKM with regards to increasing their emotional intelligence.

Agreeableness also demonstrated a significant three-way interaction with satisfaction with life (SWLS) ($F_{(1, 58)} = 3.87$, $p = .025$). Post-hoc analyses specify that in the MM group, participants with lower agreeableness did not have any significant increases in satisfaction with life over time, but individuals who were highly agreeable significantly increased in this measure ($F_{(1, 16)} = 4.40$, $p = .020$) (T1: $M = 24.17$, $SD = 5.80$; T2: $M = 26.22$, $SD = 5.13$; T3: $M = 26.17$, $SD = 6.16$). Interestingly, in the LKM group, these results are flipped, such that highly agreeable individuals do not improve in satisfaction with life, while less agreeable individuals marginally increase in their satisfaction with life ($F_{(1, 13)} = 2.99$, $p = .067$) (T1: $M = 23.87$, $SD = 4.74$; T2: $M = 26.20$, $SD = 5.07$; T3: $M = 26.60$, $SD = 4.50$). So, perhaps if an individual's goal from meditating is to increase their overall satisfaction with life, how agreeable they are should be taken into account when deciding what kind of meditation to pursue. As agreeableness is related to getting along with others, it is possible that less agreeable individuals will benefit more from practicing an other-focused meditation like LKM.

Finally, regarding agreeableness, for revenge motivations (TRIM) a two-way interaction between time and agreeableness was observed. Post hoc analyses indicate that

this interaction is driven by highly agreeable people significantly decreasing over time

($F_{(1, 35)}$ = 4.02, p = .022) (T1: M = 10.47, SD = 4.23; T2: M = 9.26, SD = 4.13; T3: M =

8.84, SD = 3.61), while no significant changes were found in less agreeable people.

Situational Appraisal

Situational appraisal is composed of four distinct dimensions that were analyzed

separately. For a complete list of total situational appraisal means and standard

deviations, please refer to Table 5 at the end of this chapter. The extent to which

participants rate situations positively did not present a significant time effect ($F_{(1, 60)}$ =

.173, p = .785), but did show a marginal group effect ($F_{(1, 60)}$ = 3.27, p = .076). The

interaction term of group and time was not significant ($F_{(1, 60)}$ = .071, p = .907). This

indicates that groups differed marginally in their positive ratings of situations, but this did

not change over time.

The second major dimension in situational appraisal is negativity, or the extent to

which an individual rates a given situation as being negative. There did not appear to be

significant main effects for group or time ($F_{(1, 60)}$ = .307, p = .736; $F_{(1, 60)}$ = .015, p = .904,

respectively). The interaction term was also not significant ($F_{(1, 60)}$ =1.49, p = .230).

The extent to which a participant rates a situation as productive or useful

produced a significant main effect of time ($F_{(1, 60)}$ = 4.86, p = .011, d = -.225). There was

not a significant interaction between time and group, but group also produced a

significant main effect ($F_{(1, 60)}$ = 6.25, p = .015, d = -.615). This indicates that over time,

participants found situations to be more productive. There were differences between the

MM group and the LKM group, such that the MM group tended to rate situations more

productive at baseline and post-test than the LKM group.

The final dimension of situational appraisal is ease of negotiation, or the extent to which an individual finds a situation easily navigable or controllable. A significant main effect of time was observed ($F_{(1, 60)} = 6.44$, $p = .003$, $d = -.303$), such that participants rated situations more easy to negotiate over time. A marginal group main effect was seen ($F_{(1, 60)} = 2.94$, $p = .092$), but the interaction term was not significant ($F_{(1, 60)} = .420$, $p = .659$). The MM group tended to rate situations as more easily negotiable at the end of the eight-week meditation intervention.

Prosocial and Emotion-Based Self-Report Measures

A battery of self-report measures was collected concerning general well-being and life outcomes. For a full list of means and standard deviations, please refer to Table 6 at the end of this chapter. Regarding compassionate love for close others, results indicated that there were no significant main effects for group or time ($F_{(1, 44)} = 1.02$, $p = .366$; $F_{(1, 44)} = .000$, $p = .307$). The CLS also failed to produce a significant interaction term ($F_{(1, 44)} = 1.23$, $p = .296$). These results imply that neither group increased in compassionate love, however, the sample size for this particular scale was smaller due to administration errors.

Ego resiliency was assessed in the present study. This was found to increase over time regardless of group, meaning a main effect of time was found, but no significant group effect was found ($F_{(1, 60)} = 5.15$, $p = .007$, $d = -.252$; $F_{(1, 60)} = .020$, $p = .887$, respectively). The results of the ERS did not demonstrate a time X group interaction ($F_{(1, 60)} = .398$, $p = .673$).

Emotion regulation, when measured by the ERQ, is broken down into subscales measuring expressive suppression and cognitive reappraisal. Participants demonstrated

nonsignificant time effect for expressive suppression ($F_{(1, 60)}$ = 2.31, p = .104). However, a significant group effect was found ($F_{(1, 60)}$ = 6.61, p = .013, d = .549). The interaction term was not found to be significant ($F_{(1, 60)}$ = .055, p = .947). Cognitive reappraisal increased significantly over time ($F_{(1, 60)}$ = 4.87, p = .009, d = -.275), but no main effect for group was found ($F_{(1, 60)}$ = 2.08, p = .154). The interaction of time and group for cognitive reappraisal also did not appear to be significant ($F_{(1, 60)}$ = .895, p = .414).

Empathic concern, as measured by the IRI, demonstrated a marginally significant main effect for time ($F_{(1, 60)}$ = 3.04, p = .055), and a marginally significant group effect ($F_{(1, 60)}$ = 3.56, p = .064). Evidently, both groups decreased in their ability to experience emphatic concern for others, but the MM decreased slightly more so. The Interpersonal Reactivity Index also measures perspective taking, which produced no statistically significant main effects of either time or group ($F_{(1, 60)}$ = 1.36, p = .261; $F_{(1, 60)}$ = 1.24, p = .275). The interaction term for this subscale was also found to be insignificant ($F_{(1, 60)}$ = .221, p = .802).

Participants who began in and remained in a relationship throughout the course of the intervention (i.e. did not break up) were asked to respond on their levels of satisfaction with their relationship. While this sample size was much smaller than the overall sample of participants, a significant time effect was found ($F_{(1, 26)}$ = 3.46, p = .033, d = -.203) but not that of group ($F_{(1, 26)}$ = .188, p = .668), indicating that individuals tended to find more satisfaction in their relationship over time regardless of the randomly assigned meditation group. The interaction term was found to be insignificant ($F_{(1, 26)}$ = .589, p = .559).

Emotional management and understanding were measured using the STEM and STEU, respectively. Participants revealed a significant increase, as measured by the STEM, in the ability to manage emotions over time ($F_{(1, 60)} = 9.43$, $p = .000$, $d = -.475$). The main effect of group was not significant ($F_{(1, 60)} = .020$, $p = .887$). However, the interaction term was significant ($F_{(1, 60)} = 4.29$, $p = .016$, $d = -.271$). In the case of emotional management, it appears that the mindfulness group demonstrated a large increase from the first administration of measures to the second administration, while the LKM group barely increased in emotion management from the first to second administration, but increased significantly by the third administration ($p < .05$). With regards to emotional understanding, a significant main effect of time was seen, such that participants increased in their emotional understanding, but no group effects were seen ($F_{(1, 60)} = 6.15$, $p = .003$; $F_{(1, 60)} = 2.66$, $p = .108$). The interaction term for the STEU was also not significant ($F_{(1, 60)} = .118$, $p = .889$).

Satisfaction with life was found to increase over time regardless of meditation group ($F_{(1, 60)} = 6.08$, $p = .003$, $d = -.392$). The group effect was not significant ($F_{(1, 60)} = .189$, $p = .665$). The interaction between time and group was insignificant as well, ($F_{(1, 60)} = .601$, $p = .550$).

Finally, the results for the TRIM, which measures avoidance motivations and revenge motivations, indicated that a main effect for time regarding revenge exists ($F_{(1, 60)} = 3.71$, $p = .030$, $d = .180$), but there was no effect for group, nor was there a time X group interaction ($F_{(1, 60)} = 1.01$, $p = .319$; $F_{(1, 60)} = .351$, $p = .705$). It would appear that participants tended to report less revenge motivation over time regardless of meditation group. The tendency to be motivated to avoid conflict did not appear to have a significant

time or group effect ($F_{(1, 60)}$ = .154, p = .857; $F_{(1, 60)}$ = .394, p = .532, respectively). The interaction term for avoidance motivations was also not significant ($F_{(1, 60)}$ = .204, p = .816).

Additional Self-Report Measures

The remainder of the self-report measures reported here represent effects commonly associated with meditation and were added to the present study to compare common and differential effects of LKM and MM. Attentional control, measured by the ACS, is broken down into attention shifting and attentional focus subscales. Within attentional focus, main effects were found for time, but not group ($F_{(1,60)}$ = 4.89, p = .009, d = -.261). The attentional focus subscale also failed to produce a significant time X group interaction term ($F_{(1, 60)}$ = .418, p = .659). Attention shifting did not show a significant time effect ($F_{(1, 60)}$ = 1.89, p = .155), nor a significant group or interaction term ($F_{(1, 60)}$ = .038, p = .963).

The BAI, measuring anxiety, demonstrated a significant time main effect ($F_{(1, 60)}$ = 14.46, p = .000, d = .641), but an insignificant effect of group ($F_{(1, 60)}$ = .124, p = .726). The BAI also failed to indicate that there was an interaction between group and time ($F_{(1, 60)}$ = .040, p = .961). This shows that both groups reported significantly decreased anxiety symptoms.

Depression was assessed using the CESD. A significant time effect was seen, but not with group ($F_{(1, 60)}$ = 7.72, p = .001, d = .379; $F_{(1, 60)}$ = 1.06, p = .307, respectively), indicating that participants reported less depressive symptoms throughout the course of the meditation intervention regardless of meditation group. The CESD failed to produce a statistically significant interaction term ($F_{(1, 60)}$ = .048, p = .953).

Illness symptoms were indexed using CHIPS, which demonstrated that participants experienced less illness symptoms over the course of the intervention regardless of group. The main effect for time was found to be significant ($F_{(1, 60)} = 6.50$, $p = .002$, $d = .353$), but the group effect was not significant ($F_{(1, 60)} = .274$, $p = .603$). The interaction between group and time was also found to be insignificant ($F_{(1, 60)} = 1.24$, p = .294).

Participants' mindful awareness produced a significant main effect for time ($F_{(1, 60)} = 4.59$, $p = .014$, $d = -.330$). The main effect for group was not significant, nor was the interaction term between time and group ($F_{(1, 60)} = .248$, $p = .620$; $F_{(1, 60)} = 1.07$, $p = .349$, respectively). This indicates that regardless of group, participants tended to be more mindful over time throughout the meditation intervention.

Perceived stress, when measured by the PSS, did not show any significant main effects or interactions. The main effect for time ($F_{(1, 47)} = 1.28$, $p = .282$) was not significant, nor was the main effect for group ($F_{(1, 47)} = .399$, $p = .531$), or the interaction between the two ($F_{(1, 47)} = .758$, $p = .471$). While this indicates that participants did not experience any changes in their perceived life stress regardless of group, it is of importance to note that this did not include the full sample size due to administration errors.

The CUS measures causal uncertainty, and was primarily added for the purposes of class discussion. The results of the present study indicate that participants, regardless of group, reported decreases in experiences of causal uncertainty. There was a significant effect of time ($F_{(1, 60)} = 4.59$, $p = .012$, $d = .308$), but no effect of group on causal

uncertainty ($F_{(1, 60)} = .010$, $p = .919$), nor was there a significant interaction between time and group ($F_{(1, 60)} = .180$, $p = .836$).

Symmetry Span

The symmetry span task assesses working memory capacity. Participants were exposed to this task at baseline and post-intervention. The main effect for time was not found to be significant ($F_{(1, 37)} = 2.84$, $p = .101$), nor was the main effect of group ($F_{(1, 37)} = .001$, $p = .976$). The interaction term was also found to be insignificant ($F_{(1, 37)} = .179$, $p = .675$).

Centipede Game

The Centipede Game used the number of passes a participant made as the dependent variable, such that more passes indicated more cooperative behavior. There appeared to be no significant differences between groups for this behavior ($F_{(1, 45)} = .607$, $p = .440$).

Table 1.

Total LDT Reaction Time Means and Standard Deviations (ms) by Administration

Word Type	Pre-test		Post-test	
	Mean	Std. Dev.	Mean	Std. Dev.
Antisocial	807.56	220.11	744.50	202.46
Prosocial	764.05	220.60	708.39	172.98
Neutral (-)	779.22	245.43	720.17	197.97
Neutral (+)	809.60	246.65	739.53	211.85

Table 2.

Total RSS Coping Style Means and Standard Deviations by Administration

Coping Style	Pre-test		During		Post-test	
	Mean	SD	Mean	SD	Mean	SD
Primary	27.46	4.12	26.95	5.47	27.78	4.32
Secondary	25.19	4.41	25.13	4.72	25.56	4.86
Disengagement	26.19	5.23	26.00	4.59	25.52	4.91
Invol. Engage	35.41	9.02	34.46	9.26	32.67	8.33
Invol. Disengage	21.93	6.86	20.93	5.90	20.98	5.47

Table 3.

Total BFI Means and Standard Deviations by Administration

BFI Dimension	Pre-test		During		Post-test	
	Mean	SD	Mean	SD	Mean	SD
Neuroticism	24.43	6.07	22.87	6.36	22.49	5.95
Conscientiousness	34.22	5.98	33.87	6.26	33.78	6.37
Agreeableness	35.46	4.76	35.35	4.91	35.43	5.24
Openness	36.73	5.78	36.18	6.31	36.33	6.78
Extraversion	25.57	6.66	26.51	6.87	26.46	6.66

Table 4.

Self-Report Measure Means and Standard Deviations by Group

	Pre-Test				During				Post-Test			
	Mindfulness		LKM		Mindfulness		LKM		Mindfulness		LKM	
Measure	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Attentional Focus	22.21	4.16	21	3.70	22.83	4.79	21.11	4.05	23.69	5.57	21.82	4.13
Attention Shifting	27.97	2.24	28.03	2.24	28.07	1.83	28.24	2.30	28.45	1.89	28.68	2.52
Anxiety	39.59	10.85	38.68	9.38	36.83	10.18	35.38	6.71	34.14	7.33	32.91	6.93
Illness Symptoms	60.24	16.70	59.15	14.94	60.62	17.39	56.18	12.88	54.24	14.41	54.50	14.11
Compassionate Love	114.23	21.17	117	21.21	116.59	19.63	115.08	23.59	116.86	19.67	113.32	23.93
Causal Uncertainty	36.24	10.99	37.73.	9.33	34.83	11.49	34.56	8.57	34.68	9.94	33.71	10.47
Ego Resilience	42.41	6.21	43.09	4.90	43.27	7.13	43.12	4.89	44.21	7.58	44.29	5.07
Emotional Reappraisal	31.69	5.86	30.82	5.79	32.24	4.41	29.71	7.75	33.79	3.86	31.65	5.68
Emotional Suppression	17.34	4.39	13.88	6.21	16.17	5.79	12.85	5.64	16.38	5.35	13.26	5.98
Empathic Concern	27.21	4.59	29.15	4.08	26.45	5.14	28.59	3.90	26.93	5.34	29.03	4.09
Perspective Taking	26.34	4.39	27.50	4.38	26.48	5.40	27.50	4.13	26.72	5.39	28.21	4.35
Mindful Awareness	3.77	.731	3.98	.522	3.88	.864	3.95	.701	4.13	.871	4.09	.663
Social Desirability	14.41	5.36	13.82	4.43	14.79	6.07	14.68	5.12	14.31	6.18	15.50	9.44
Perceived Stress	41.03	5.80	42.32	5.46	41.35	5.73	41.81	5.45	40.39	5.98	40.81	4.87
Relationship Satisfaction	152.64	12.05	150.81	12.64	150.60	19.12	153.65	13.82	155.07	14.77	154.68	15.03
Emotion Management	28.48	4.92	29.71	2.83	30.93	3.82	29.79	3.16	31.03	3.36	30.62	3.32
Emotional Understanding	26.79	5.11	28.50	4.43	28.00	4.57	29.88	3.98	28.17	4.30	29.65	4.76
Satisfaction with Life	23.97	5.56	24.26	4.96	24.90	5.43	24.97	5.91	25.38	5.72	26.56	4.13
Avoidance Motivation	25.38	7.64	26.71	5.39	25.66	6.99	26.56	5.36	25.51	7.68	26.03	5.68
Revenge Motivation	11.62	5.79	10.79	4.10	11.48	5.55	10.26	4.39	11.03	5.72	9.62	3.75

Note: For Compassionate Love $n = 51$ and for Perceived Stress $n = 53$. For the remainder of measures $n = 67$.

Table 5.

Total Situational Appraisal Means and Standard Deviations by Administration

Measure	Pre-Test		During		Post-Test	
	Mean	SD	Mean	SD	Mean	SD
Positivity	287.38	74.79	286.17	75.02	288.81	82.35
Negativity	130.44	49.02	131.97	49.70	133.14	47.67
Ease Neg.	299.44	69.66	313.95	71.41	321.46	75.78
Productivity	270.22	75.15	283.98	70.56	287.13	75.18

CHAPTER 7: DISCUSSION

The present study incorporated western psychological theory and Tibetan Buddhist philosophy as the basis for an experimental examination of different styles of meditation. The primary goal in the present study was to examine common and differential effects of meditation styles. Two distinctly different meditations were assessed, loving-kindness meditation and mindfulness meditation. Several hypotheses were tested regarding interpersonal conflict coping, personality, prosocial construct activation, and perceived life outcomes.

Summary of Findings

Interpersonal Conflict Coping

A primary goal in the present study was to examine if a meditation intervention would affect the way individuals respond to interpersonal conflict. Conflict coping occurs in a patterned response that is generally developed early in life and is pervasive through a lifetime. It was unclear whether styles of coping with conflict can be changed through a meditation intervention. Researchers tentatively predicted that if changes occurred, participants would report more proactive and positive methods of coping with interpersonal conflict, and decrease in reports of negative and reactionary coping tendencies.

The present study found that participants did not significantly change in their use of primary or secondary engagement coping, which were defined as proactive, positive coping strategies. Over time, regardless of meditation group, there did not appear to be significant changes in these coping styles.

However, participants did significantly decrease over time in their tendency to involuntarily engage in conflict. Involuntary engagement is considered responding to interpersonal stressors with rumination, intrusive thoughts, emotional arousal, physiological arousal, and impulsive actions. Both LKM and MM groups saw significant decreases in these forms of conflict coping over the course of the 8-week meditation intervention. Furthermore, meditators, regardless of group, also marginally decreased in their tendency to involuntarily disengage from conflict. Involuntary disengagement is considered responding to interpersonal conflict with feelings of emotional numbing, inability to act or respond, feelings of desire to escape, or cognitive interference.

The results of this study indicate that well-adjusted responses to conflict do not significantly change due to a meditation intervention. However, participants saw decreases in their tendencies to involuntarily engage and disengage from conflict, which are less effective coping styles. This could indicate that participants reported more feelings of control in situations of conflict, which is a novel effect not yet reported in the previous body of meditation research.

Prosocial Construct Activation

The present study proposed that prosocial cognitive construct activation is the cognitive mechanism by which the effects of LKM are experienced. In a lexical decision task, participants in the present study were exposed at baseline and post-intervention to word stimuli of antisocial, prosocial, neutral negative, and neutral positive categories. Participants in the LKM group were hypothesized to respond more quickly to prosocial words than that of antisocial or either category of neutral words. This was theorized to occur because loving-kindness meditators were frequently activating constructs of

prosociality during their meditations, thus making this construct more accessible in the lexical decision task. Participants in the MM group were hypothesized not to respond significantly faster over time to words of any specific category.

It was found that over time, participants, regardless of group, responded more quickly to all positive word stimuli. In other words, participants in both the LKM group and the MM group responded faster after the meditation intervention to words in both the prosocial and neutral positive categories. Participants did not significantly differ in their response times to antisocial or neutral negative words over time. While results do not indicate that prosocial construct activation is conclusively the cognitive mechanism by which the effects of LKM are experienced, participants overall seem to be activating more positive constructs, making these more readily available and accessible over time. This may be why participants were experiencing some of the positive effects on perceived life outcome measures, although it is unclear from the results of the present study whether the construct accessibility is a cause, or a result of this.

<u>Personality</u>

The present study hypothesized that personality would interact with the effects of a meditation intervention, such that participants high in specific Big-Five personality traits would respond more or less favorably to particular meditations. Specifically, it was predicted that participants high in trait neuroticism would respond more favorably to meditation in general. These individuals were hypothesized to show less positive effects, however, when practicing LKM due to feelings of guilt that are occasional reported when practicing this kind of meditation. Participants high in conscientiousness were expected to experience more dramatic effects from meditation in general. These individuals were

expected to, on average, put forth a more concentrated effort and thus experience more effects of meditation. Individuals low in agreeableness and openness were predicted to experience fewer effects of meditation overall.

It was found that participants high in neuroticism experienced a more significant decrease in depressive symptoms over time, regardless of meditation group. High trait neuroticism was also found to interact with disengagement coping mechanisms, such that these individuals responded more favorably to a mindfulness meditation intervention. Neurotic participants in the MM group reported significantly less disengagement coping strategies over time. Finally, highly neurotic individuals were found to decrease significantly in revenge motivations following transgressions over time.

Participants low in conscientiousness were found to significantly increase in their emotional regulation skills, specifically with regards to cognitive reappraisal. Low conscientiousness was associated with a significant increase in cognitive reappraisal from the second to third administration of self-report measures. Individuals high in conscientiousness made significant increases in reappraisal skills over the course of the entire meditation intervention. As conscientiousness can be related to effort, it makes sense that participants high in this trait would demonstrate consistent improvements in this skill. Participants low in conscientiousness, perhaps, take longer to experience this effect of meditation due to simply less effort put forth in meditation.

Being low in trait agreeableness was found to produce a significant increase in emotional understanding and intelligence from the first to second administration of scales, but then decrease significantly from the second to third administration of scales. However, individuals high in agreeableness significantly increased in their emotional

understanding over time. This indicates to researchers that being low in agreeableness may, in fact, prevent an individual from experiencing more lasting effects of meditation, at least regarding emotional intelligence. Individuals high in agreeableness also found significant increases in satisfaction with life over time, but only in the MM group. In the LKM group, highly agreeable individuals do not significantly change in satisfaction with life over time, while the less agreeable individuals significantly increase.

How open an individual is appears to predict effects on emotional intelligence and conflict coping. Involuntarily disengaging from interpersonal conflict is an unproductive strategy that indicates a lack of intrapersonal control. Individuals who were low in openness in both the MM group and the LKM group reported less involuntary disengagement in conflict over time. Highly open individuals did not change significantly in their tendency for this coping strategy over time. Individuals lower in openness also exhibited more significant increases in emotional understanding and intelligence over time, while highly open individuals did not significantly change in this skill. It appears that individuals who are low in openness experience certain effects of meditation more significantly than do highly open individuals. This could theoretically be due to highly open participants experiencing a ceiling effect on how much they can increase in these skills, while less open individuals have more room for improvement.

Situational Appraisal

Regarding situational appraisal, researchers hypothesized that a meditation intervention would increase participants' assessment of situations as more positive, less negative, more easily navigable, and more productive. No significant changes were found for ratings of positivity or negativity regardless of meditation group.

Participants rated situations overall as more productive over time. The loving-kindness group rated situations on average less productive than the mindfulness group, but no interaction between group and time was shown, thus indicating that regardless of meditation style, ratings of situational productivity increase over time.

Ratings of the ease of negotiation within situations also significantly increased over time, which was found in both the LKM group and the MM group. These results suggest that over time, a meditation intervention, regardless of the type of meditation, will increase the extent to which people find a situation navigable or accessible. It is possible that increased feelings of situational productivity and ease of negotiation were increased in the present study simply because meditation makes people better able to deal with situations. The effects of meditation on emotional understanding and management, ego-resiliency, emotional regulation, and so forth would support this claim.

Self-Report Measures of Interest

While a multitude of self-report measures were administered to participants pre-, during, and post-meditation intervention, the following section will outline unique effects of interest to the study.

Ego-resilience and emotional regulation, specifically cognitive reappraisal, were found to significantly increase across groups over time. Specific group predictions were not made for these scales, as both groups were expected to increase over time. Emphatic concern, which was hypothesized to increase more significantly in the LKM group, increased in both meditation groups over time.

Individuals who were in a relationship at the beginning of the intervention and remained in the relationship experienced significant increases in relationship satisfaction

over time across both groups. It is relevant to note that the number of participants that remained in a relationship is much lower than total sample ($n = 29$).

Overall, increases in emotion management and understanding, which are directly related to emotional intelligence, were observed in the present study, regardless of group. Satisfaction with life was found to increase significantly over time regardless of group as well. Revenge motivations in times of transgression decreased over the course of the study.

The present study predicted decreases in anxiety, depression, and illness symptoms over time, all of which are well-established effects of meditation. Significant decreases in anxiety and depression were observed across groups over time, as well as decreases in illness symptoms. While not unique to the present study, it is of interest to note that throughout the course of an academic quarter, one might expect anxiety levels to increase for students nearing the end of the term due to finals. One might also expect illness symptoms to be more prevalent in winter, when illness is more prevalent, or at times of elevated stress and anxiety, like during finals week. However, the present study spanned over the course of four academic terms, and in this time, reports of illness symptoms and anxiety symptoms decreased.

Many of the measures reported were used in part to replicate the methods of Falkenstein (2013). Decreases in depression and illness symptoms were found in the study by Falkenstein (2013) and were replicated were in the present study. Furthermore, increases in mindfulness, attentional focus, emotional reappraisal, emotion management and understanding, and satisfaction with life were all results demonstrated across both studies. However, the present study did not find results of significance regarding

empathic concern, perspective taking, or emotional suppression, which were effects found in the Falkenstein (2013) study.

Behavioral Measures

The present study employed a measure of working memory capacity, the Symmetry Span task, pre- and post-intervention. Participants were expected to increase in their working memory capacity over time, more significantly so in the MM group. Previous research has suggested a link between mindfulness and increased working memory capacity. This task, however, yielded no significant changes for participants over time.

The Centipede Game, an economic game similar in nature to the Prisoner's Dilemma, was administered for three of the four academic terms in which this study spanned. Participants were only exposed to this behavioral measure of cooperation post-intervention. The LKM group was expected to cooperate more in this game, however, no results of significance were yielded. This could have happened for several reasons. The game was programmed to automatically pass the pot of money back. Tit-for-tat, a common social psychology game strategy, is when the first participant begins by cooperating (i.e. passing the pot of money), and then mimics the response of the other player for the remainder of the game. Were this the strategy of any participants, the computer would automatically cooperate every time, and the participant would mimic this, thus making it easier for him or her to make it to the final round of the game. Several participants expressed suspicion that they were not, in fact, playing against another student, and that the pot of money would always be passed back to them. It is possible that general suspicion of the game could have kept them "cooperating" until the end.

It is also possible, in the case of economic games, that the Centipede Game is not an adequate measure of behavioral cooperation. It has been argued that economic games in general cannot be paralleled to human behavior, and have been found in several instances to not be an accurate predictor of behavior (Vogt, Efferson, & Fehr, 2013).

Limitations

The unique classroom paradigm for the present study benefitted researchers in several ways, namely in allowing for a sample of novice undergraduates to participate in a meditation intervention without being made aware beforehand. However, student apathy became a minor, albeit evident problem. Students who were not motivated to meditate could have put lower levels of effort into meditations. The ability to control or monitor whether or not a participant was truly meditating or just sitting with their eyes closed was far beyond the scope of the present study. It would have been beneficial to collect measures of overall effort to see if this impacted participants' responses to meditation. Effort measures, however, can be subject to socially desirable responses, especially in a situation where students are concerned about their grades. Perhaps a weekly check-in and self-assessed measure of effort by the participants could have aided these issues.

Participants practicing a loving-kindness meditation were expected to differentially respond to certain measures of prosociality. Few group effects, however, were seen in this study. It is possible that participants in the LKM group grew bored of the repetitive nature of the guided meditations to which they were subjected. However, new meditations were introduced at the beginning of the week for this group, and were done every day for the remainder of the week. Students were encouraged to change to

whom their personal meditation was directed toward over the course of the week, but it is possible that participants still experienced boredom with the repetitive nature of this task. Participants may have benefitted from meditations guided by a meditation teacher in person, rather than a recording, but this was not feasible in the context of the present study. At the very least, a pre-selected series of recordings allowed for increased internal validity for this experimental design.

When analyzing Big-Five personality traits on responses to meditation, median splits were performed on each dimension of the BFI. The median split is just one way of turning a continuous variable into a categorical variable, and it has been associated with several problems – loss of power. The present study would have benefited from splitting each personality trait into high, medium, and low categories, and dropping the medium group to allow for separation between highs and lows.

The lexical decision task was subject to several limitations. Due to administration and data errors, the sample size for the LDT was lower than the total sample of the study ($n = 40$). It also became apparent that the task itself was inherently flawed. In a lexical decision task, a fixation point is presented on a computer screen, immediately followed by the word stimulus, where the participant then indicates with a keystroke whether the stimulus was a word or not. In the modified lexical decision task employed in the present study, a fixation point (an asterisk) was presented, but was followed by a 300ms delay of blank screen before the presentation of the word stimuli. The fixation point followed by the immediate word stimuli is critical in the lexical decision task, as it serves as a focal point for participants, and could have introduced extra error into the observed results of this study.

The lexical decision task was adapted from the work of Falkenstein (2013). In her task, participants responded to word stimuli of only two categories – prosocial and antisocial words, as well as the requisite nonword stimuli. The present study added two categories of neutral words, along with the prosocial and antisocial words. Categories had 10 words each, meaning participants were exposed to 50 word stimuli, and saw all stimuli twice, for a total of 100 words. Coupled with the excessive lag between the fixation point and the word stimuli, this task took over 20 minutes to complete. Fatigue effects and boredom were anecdotally reported by many participants, and likely had an impact on the results collected. However, if fatigue was a factor, both the overall response times and the number of incorrect responses would have most likely been higher that is generally seen in the literature.

When analyzing results, it was beyond the ability of the researcher in the present study to reorganize data in a way that would allow for researchers to see patterns in fatigue effects. DirectRT, the program used to collect response times for the LDT, randomized all 50 word stimuli between two blocks of trials. This means the ability to see nested effects of the first time seeing all word stimuli versus the second time of seeing all word stimuli was not feasible. Had participants seen all 50 words for the first trial and then all 50 words again for the second trial, fatigue effects could have been tracked and reported. Yet with randomization between trials, the reorganization of data was not realistic in the context of the present study.

Furthermore, the LDT is a task that is highly noise-sensitive and while this was kept at a minimum, it is possible that there was outside noise interference in the

performance of some participants, due to the nature and location of the lab in which these tasks were implemented.

Future Directions

Future meditation research could greatly benefit from the classroom model used in this study, to observe the effects of meditation on novices. It would be highly constructive to incorporate a measure of student effort in the form of a weekly or even daily student check-in. This could serve as a reminder of the importance of effort to students, as well as allow for researchers to track chronically low-effort respondents and see how this impacts the extent to which participants experience effects of meditation.

The researcher of the current study observed fascinating and novel interactions of personality and responses to meditation styles. Furthermore, a larger scope of meditation styles should be researched, rather than just mindfulness meditation and loving-kindness meditation, as individuals high in certain personality traits may respond more favorably to any of the other large number of meditations that exist.

Despite the aforementioned justifications for the lack of a formal control group in this research, future research will benefit from innovating a form of control that utilizes the classroom paradigm employed in this study, while forgoing the standard waitlist control procedure or otherwise flawed measures of control.

Conclusion

The present study examined western psychological theories of cognition and sociality through the lens of Tibetan Buddhist philosophy. Intersections of Buddhist notions of emptiness and cognitive construct accessibility were discussed. Participants in this study were randomly assigned to perform loving-kindness meditation or mindfulness

meditation for the course of an eight-week intervention. In this time, researchers assessed common and differential effects of both kinds of meditation, as well other hypotheses regarding personality, conflict coping, situational appraisal, working memory capacity, and behavior.

Primary hypotheses pertaining to prosocial construct activation were not fully supported by the research. However, participants demonstrated more easily accessible constructs of positivity by the end of the meditation intervention across groups. Hypotheses regarding interpersonal conflict coping were partially supported as well. While participants did not report more proactive, primary coping strategies, significant decreases in more negative and uncontrolled responses to conflict were reported. Furthermore, personality was found to partially moderate some effects of meditation. Individuals high in trait neuroticism, conscientiousness, openness, and agreeableness responded differentially to certain meditations over time than did individuals low in these traits. Several hypotheses were made about situational appraisal, which were partially supported by results of this study. Participants did not change significantly in the extent to which they rated situations positively or negatively, but did consistently rate situations as more productive and easily negotiable. Hypotheses about working memory capacity and behavioral effects of meditation were not supported by the results of this study.

Further examination of the nature of personality, and how these traits impact the experience and effects of meditation should be considered. The preliminary results reported here indicate that this is a valuable and fruitful area of research warranting further inquiry.

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APPENDICES

Appendix A. Word Stimuli Used in the Lexical Decision Task

Prosocial words:

Assist, comfort, cure, guide, heal, nurse, save, teach, trust, warmth.

Antisocial words:

Anger, assault, attack, crime, hate, hurt, menace, quarrel, shoot.

Neutral Positive words:

Strong, wonder, rare, esteem poetic, mystic, serene, clean, health, win.

Neutral Negative words:

Trash, trouble, pain, slow, infect, hunger, accident, fatigue, poison, debt.

Nonwords:

Aivs, bleuf, doles, lorled, numphs, reet, snarfy, tarkle, vint, yolbs.

Appendix B: The Affective Control Scale (Derryberry & Reed, 2002)

Instructions to Participants:

Please indicate the extent to which an item below applies to you.

Response Scale:

Almost Never	Sometimes	Often	Always
1	2	3	4

Scale Items:
1. It takes me a while to get really involved in a new task.
2. When concentrating, I ignore feelings of hunger or thirst
3. When I am working hard on something, I still get distracted by evens around me.
4. My concentration is good even if there is music in the room around me.
5. When concentrating, I can focus my attention so that I become unaware of what's going on in the room around me.
6. When I am reading or studying, I am easily distracted if there are people talking in the same room.
7. When trying to focus my attention on something, I have difficulty blocking out distracting thoughts.
8. I have a hard time concentrating when I'm excited about something.
9. It is easy for me to read or write while I'm also talking on the phone.
10. It is very easy for me to concentrate on a difficult task when there are noises around.
11. When I need to concentrate and solve a problem, I have trouble focusing my attention.
12. I can quickly switch from one task to another.
13. I have trouble carrying two conversations at once.
14. When a distracting thought comes to mind, it is easy for me to switch my attention away from it.
15. I tis easy for me to alternate between two different tasks.
16. It is difficult for me to coordinate my attention between the listening and writing required when taking notes during lecture.
17. After being interrupted or distracted, I can easily shift my attention back to what I was doing before.
18. It is hard for me to break from one way of thinking and look at it from another point of view.
19. I can become interested in a new topic very quickly when I ned to.
20. I have a hard time coming up with new ideas quickly.

Appendix C. The Beck Anxiety Index (Beck, Epstein, Brown & Steer, 1988)

Instructions to Participants:

Please rate how much you have experienced each of the following have occurred to you over the past week. Please be as honest as possible. Your responses are anonymous and confidential.

Response Scale:

Not at all			Severe – I could barely stand it
0	1	2	3

Scale Items:
1. Numbness or tingling
2. Feeling hot
3. Wobbliness in legs
4. Unable to relax
5. Fear of the worst happening
6. Dizzy or lightheaded
7. Heart pounding or racing
8. Unsteady
9. Terrified
10. Nervous
11. Feelings of Choking
12. Hands trembling
13. Shaky
14. Fear of losing control
15. Difficulty breathing
16. Fear of dying
17. Scared
18. Indigestion or discomfort
19. Faint
20. Face flushed
21. Sweating (not due to heat)

Appendix D. The Big-Five Inventory

Instructions to Participants:

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.** I am someone who…

Response Scale:

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

Scale Items:

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 someone 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. Preserves 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

Appendix E. The Center for Epidemiologic Studies Depression Scale (Radloff, 1977)

Instructions to Participants:

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

Response Scale:

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1	2	3	4

Scale Items:

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

Appendix F. The Cohen-Hoberman Inventory of Physical Symptoms (Cohen & Hoberman, 1983)

Instructions to Participants:

Mark the number for each statement that best describes how much that problem has bothered or distressed you during the past two weeks including today. Mark only one number for each item. At one extreme, 0 means that you have not been bothered by the problem. At the other extreme, 4 means that the problem has been an extreme bother.

Scale Items:

1. Sleep problems (can't fall asleep, wake up in the middle of the night or early in the morning)
2. Weight Change (gain or loss of 5lbs or more)
3. Back pain
4. Constipation
5. Dizziness
6. Diarrhea
7. Faintness
8. Constant Fatigue
9. Headache
10. Migraine headache
11. Nausea and/or vomiting
12. Acid stomach or indigestion
13. Stomach pain (e.g., cramps)
14. Hot or cold spells
15. Hands trembling
16. Heart pounding or racing
17. Poor appetite
18. Shortness of breath when not exercising or working hard
19. Numbness or tingling in parts of your body
20. Felt weak all over
21. Pains in heart or chest
22. Feeling low in energy
23. Stuffy head or nose
24. Blurred vision
25. Muscle tension or soreness
26. Muscle cramps
27. Severe aches and pains
28. Acne
29. Bruises
30. Nosebleed
31. Pulled (strained) muscles
32. Pulled (strained) ligaments
33. Cold or cough

Appendix G. The Compassionate Love of Close Others Scale (Sprecher & Fehr, 2005)

Instructions to Participants:

Please rate the extent to which you agree or disagree with the following statements.

Response Scale:

Not true at all of me						Very true of me
1	2	3	4	5	6	7

Scale Items:

1. When I see family members or friends feeling sad, I feel a need to reach out to them.
2. I spend a lot of time concerned about the well-being of those people close to me.
3. When I hear about a friend or family member going through a difficult time, I feel a great deal of compassion for him or her.
4. It is easy for me to feel the pain (and joy) experienced by my loved ones
5. If a person close to me needs help, I would do almost anything I could to help him or her.
6. I feel considerable compassionate love for those people important in my life.
7. I would rather suffer myself than see someone close to me suffer.
8. If given the opportunity, I am willing to sacrifice in order to let the people important to me achieve their goals in life.
9. I tend to feel compassion for people who are close to me.
10. One of the activities that provides me with the most meaning in my life is helping others with whom I have a close relationship.
11. I would rather engage in actions that help my intimate others than engage in actions that would help me.
12. I often have tender feelings toward friends and family members when they seem to be in need.
13. I feel a selfless caring for my friends and family.
14. I accept friends and family members even when they do things I think are wrong.
15. If a family member or close friend is troubled, I usually feel extreme tenderness and caring.
16. I try to understand rather than judge people who are close to me.
17. I try to put myself in my friend's shoes when he or she is in trouble.
18. I feel happy when I see that loved ones are happy.
19. Those whom I love can trust that I will be there for them if they need me.
20. I want to spend time with close others so that I can find ways to help enrich their lives.
21. I very much wish to be kind and good to my friends and family members.

Appendix H. The Causal Uncertainty Scale

Instructions to Participants:

Circle the response under each statement that best expresses how much you agree or disagree with the statement.

Response Scaling:

Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

Scale Items:

1. I do not know what it takes to get along well with others.
2. When I receive good grades, I usually do not understand why I did so well.
3. I do not understand what causes most of the problems that I have with others.
4. When I see something good happen to gothers, I often do not know why it happened.
5. When I receive poor grades, I usually od not understand why I did so poorly.
6. When someone I know receives a poor grade, I often cannot determine if they could have done anything to prevent it.
7. I do not understand what causes most of the good things that happen to me.
8. When things go right, I generally do not know what to do to keep them that way.
9. When bad things happen, I generally do not know why.
10. When there is more than one possible reason for a person's action it is difficult to determine which one is the actual reason.
11. I often feel like I don't have enough information to come to a conclusion why things happen to other people.
12. When I see something bad happen to others, I often do not know why it happened.
13. I often feel like I do not have enough information to come to a conclusion about why things happen to me.
14. When I think about why someone does something, there are usually so many possible reasons for it that I cannot determine which one was the cause.
15. Understanding what causes different events in my life is not crucial for my success and happiness.
16. I feel like it is important to be able to determine the actual cause or causes of events in my life.
17. It would benefit me greatly if I could better understand the cause of events in my life.
18. It is important to know the causes of a person's behavior.
19. When something good happens to me, it is important to know why it happened.
20. When something bad happens to me, it is important to know why it happened.

Appendix I. The Ego Resiliency Scale (Block & Kremen, 1996)

Instructions to Participants:

Please read the below statements about yourself and indicate how well it applies to you by circling the answer to the right from 1 (*does not apply at all*) to 4 (*applies very strongly*). Let me know how true the following characteristics are as they apply to you generally:

Response Scale:

Does not apply at all	Applies slightly, if at all	Applies somewhat	Applies very strongly
1	2	3	4

Scale Items:

1. I am generous with my friends.
2. I quickly get over and recover from being startled.
3. I enjoy dealing with new and unusual situations.
4. I usually succeed in making favorable impressions on people.
5. I enjoy trying new foods I have never tasted before.
6. I am regarded as a very energetic person.
7. I like different paths to familiar places.
8. I am more curious than most people.
9. Most of the people I meet are likeable.
10. I usually think carefully about something before acting.
11. I like to do new and different things
12. My daily life is full of things that keep me interested.
13. I would be willing to describe myself as a "pretty strong personality"
14. I get over my anger at someone reasonably quick.

Appendix J. The Emotion Regulation Questionnaire (Gross & John, 2003)

Instructions to Participants:

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

Response Scale:

Strongly Disagree			Neutral			Strongly Agree
1	2	3	4	5	6	7

Scale Items:

1. When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about.*
2. I keep my emotions to myself.
3. When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about.*
4. When I am feeling *positive* emotions, I am careful not to express them.
5. When I am faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.
6. I control my emotions by *not expressing them.*
7. When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.
8. I control my emotions by *changing the way I think* about the situation I'm in.
9. When I'm feeling *negative* emotions, I make sure not to express them.
10. When I want to feel less *negative* emotion, I *change the way I'm thinking about the situation.*

Appendix K. The Interpersonal Reactivity Index (Davis, 1980)

Instructions to Participants:

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate number on the scale at the top of the page: 1, 2, 3, 4, or 5. When you have decided on your answer, fill in the letter on the answer sheet next to the item number. Read each item carefully before responding. Answer as honestly as you can. Thank you.

Response Scale:

Does Not Describe Me Well				Describes Me Very Well
1	2	3	4	5

Scale Items:
1. I daydream and fantasize, with some regularity, about things that might happen to me.
2. I often have tender, concerned feelings for people less fortunate than me.
3. I sometimes find it difficult to see things from the "other guy's" point of view.
4. Sometimes I don't feel very sorry for other people when they are having problems.
5. I really get involved with the feelings of the characters in a novel.
6. In emergency situations, I feel apprehensive and ill-at-ease.
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.
8. I try to look at everybody's side of a disagreement before I make a decision.
9. When I see someone being taken advantage of, I feel kind of protective towards them
10. I sometimes feel helpless when I am in the middle of a very emotional situation.
11. I sometimes try to understand my friends better by imagining how things look from their perspective.
12. Becoming extremely involved in a good book or movie is somewhat rare for me.
13. When I see someone get hurt, I tend to remain calm.
14. Other people's misfortunes do not usually disturb me a great deal.
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.
16. After seeing a play or movie, I have felt as though I were one of the characters.
17. Being in a tense emotional situation scares me.
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.
19. I am usually pretty effective in dealing with emergencies.
20. I am often quite touched by things that I see happen.
21. I believe that there are two sides to every question and try to look at them both.

22. I would describe myself as a pretty soft-hearted person.
23. When I watch a good movie, I can very easily put myself in the place of a leading character.
24. I tend to lose control during emergencies.
25. When I am upset at someone, I usually try to "put myself in his shoes" for a while.
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.
27. When I see someone who badly needs help in an emergency, I go to pieces.
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.

Appendix L. The Mindful Attention and Awareness Scale (Brown & Ryan, 2000)

Instructions to Participants

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.

Response Scale:

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

Scale Items:

1. I could be experiencing some emotion and not be conscious of it until some time later.
2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
3. I find it difficult to stay focused on what's happening in the present.
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
6. I forget a person's name almost as soon as I've been told it for the first time.
7. It seems I am "running on automatic," without much awareness of what I'm doing.
8. I rush through activities without being really attentive to them.
9. 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.
10. I do jobs or tasks automatically, without being aware of what I'm doing.
11. I find myself listening to someone with one ear, doing something else at the same time.
12. I drive places on "automatic pilot" and then wonder why I went there.
13. I find myself preoccupied with the future or the past. I find myself doing things without paying attention. I snack without being aware that I'm eating.

Appendix M. The Marlowe-Crowne Social-Desireability Scale (Crowne & Marlowe, 1960)

Instruction to Participants:

Listed below are a number of statements concerning personal attitudes and traits. Read each item and circle whether the statement is **true or false** as it pertains to you personally.

Scale Items:

1. Before voting I thoroughly investigate the qualifications of all the candidates.
2. I never hesitate to go out of my way to help someone in trouble.
3. It is sometimes hard for me to go on with my work if I am not encouraged.
4. I have never intensely disliked anyone.
5. On occasion I have had doubts about my ability to succeed in life.
6. I sometimes feel resentful when I don't get my way.
7. I am always careful about my manner of dress.
8. My table manners at home are as good as when I eat out in a restaurant.
9. If I could get into a movie without paying and be sure that I was not seen I would probably do it.
10. On a few occasions, I have given up doing something because I thought too little of my ability.
11. I like to gossip at times.
12. There have been times when I felt like rebelling against people in authority even though I knew they were right.
13. No matter who I'm talking to, I'm always a good listener.
14. I can remember "playing sick" to get out of something.
15. There have been occasions when I took advantage of someone.
16. I am always willing to admit it when I made a mistake.
17. I always try to practice what I preach.
18. I don't find it particularly difficult to get along with loud mouthed, obnoxious people.
19. I sometimes try to get even rather than forgive and forget.
20. When I don't know something I don't at all mind admitting it.
21. I am always courteous, even to people who are disagreeable.
22. At times I have really insisted on having things my own way.
23. There have been occasions when I felt like smashing things.
24. I would never think of letting someone else be punished for my wrongdoings.
25. I never resent being asked to return a favor.
26. I have never been irked when people expressed ideas very different from my own.
27. I never make a long trip without checking the safety of my car.
28. There have been times when I was quite jealous of the good fortune of others.
29. I have almost never felt the urge to tell someone off.
30. I am sometimes irritated by people who ask favors of me.
31. I have never felt that I was punished without cause.

32. I sometimes think when people have misfortune they only got what they deserved.
33. I have never deliberately said something that hurt someone's feelings.

Appendix N. The Perceived Stress Scale (Cohen, Kamarack, Mermelstein, 1983)

Instructions to Participants:

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, you will be asked to indicate your response by placing an "X" over the circle representing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

Response Scale:

Never	Almost Never	Sometimes	Fairly Often	Very Often
1	2	3	4	5

Scale Items:

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you dealt successfully with day to day problems and annoyances?
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?
6. In the last month, how often have you felt confident about your ability to handle your personal problems?
7. In the last month, how often have you felt that things were going your way?
8. In the last month, how often have you found that you could not cope with all the things that you had to do?
9. In the last month, how often have you been able to control irritations in your life?
10. In the last month, how often have you felt that you were on top of things?
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
12. In the last month, how often have you found yourself thinking aboutthins that you have to accomplish?
13. In the last month, how often have you been able to control the way you spend your time?
14. In the last month how often have you felt difficulties were piling up so high that you could not overcome them?

Appendix O. The Responses to Stress Questionnaire (Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000)

Instructions to Participants:

This is a list of things that people sometimes do, think, or feel when something stressful happens. Everybody deals with problems in their own way – some people do a lot of the things on this or have a bunch of feelings, other people just do or think a few things. **Think about problems you've had with other people over the last two weeks.** For each item on the list below, circle <u>one</u> number from 0 (never) to 3 (a lot) that shows how much you do or feel these when you have had **problems with other people** over the last two weeks. Please let us know about everything you do, think, and feel, even if you don't think it helps make things better.

Response Scale:

Never	A little	Some	A lot
0	1	2	3

Scale Items:
1. I **try** not to feel anything.
2. When I have problems with other people I feel sick to my stomach or get headaches.
3. I try to think of different ways to change the problem or fix the situation.
4. When problems with other people happen I odn't feel anything at all, it's like I have no feelings.
5. I wish that I were stronger, smarter, or more popular so that things would be different.
6. I **keep remembering** what happened with the other people or **can't stop thinking** about what **might** happen.
7. I let someone know how I feel.
8. I decide I'm okay the way I am, even though I'm not perfect.
9. When I'm around other people I act like the problems never happen.
10. I just **have** to get away when I have problems with other people, I can't stop myself.
11. I deal with the problem by wishing it would go away, that everything would work itself out.
12. I get really jumpy when I'm having problems getting along with other people.
13. I realize that I just have to live with things the way they are.
14. When I have problems with other people, I just **can't** be near anything that reminds me of the situation.
15. I **try** not to think about it, to forget all about it.
16. When problems with other people come up I really don't know what I feel.
17. I ask other people for help or for ideas about how to make the problem better.

18. When I'm having problems getting along with other people, I **can't stop** thinking about them when I try to sleep, or I have bad dreams about them.
19. I tell myself that I can get through this, or that I'll do better next time.
20. I let my feelings out.
21. I get help from other people when I'm trying to figure out how to deal with my feelings.
22. I **just can't** get myself to face the person I'm having problems with or the situation.
23. I wish that someone would just come and get me out of the mess.
24. I do something to try to fix the problem or take action to change things.
25. Thouhts about the problem with other people just pop into my head.
26. When I have problems with other people, I feel it in my body.
27. I **try** to stay away from people and things that make me feel upset or remind me of the problem.
28. I don't feel like myself when I have problems with other people, it's like I'm far away from everything.
29. I just take things as they are, I go with the flow.
30. I think about happy things to take my mind off the problem or how I'm feeling.
31. When problems with other people come up, I **can't stop** thinking about how I am **feeling**.
32. I get sympathy, understanding, or support from someone.
33. When problems with other people happen, I **can't** always control what I do.
34. I tell myself that things could be worse.
35. My mind just goes blank when I have problems with other people, I can't think at all.
36. I tell myself that it doesn't matter, that it isn't a big deal.
37. When I have problems with other people **right way** I feel really angry/sad/scared/worried/anxious.
38. It's really hard for me to concentrate or pay attention when I have problems with other people.
39. I think about the things I'm learning form the situation, or something good that will come from it.
40. When I have problems with other people I **can't stop** thinking about what I **did or said**.
41. When something goes wrong with other people, I say to myself "This isn't real."
42. When I'm having problems with other people I end up just lying around or sleeping a lot.
43. I keep my mind off problems with other people by distracting myself.
44. When problems with other people come up, I get upset by things that don't usually bother me.
45. I do something to calm myself down when I'm having problems with other people.
46. I just freeze when I have a problem with other people, I **can't** do anything.
47. When I'm having a problem with other people, sometimes I act without thinking.
48. I keep my feelings under control when I have to, then let them out when they won't make things worse.

49. When problems with other people happen I can't seem to get around to doing things I'm supposed to.
50. I tell myself that everything will be alright.
51. When I have problems with other people, I **can't stop** thinking about **why** they happened to me.
52. I think of ways to laugh about it so that it won't seem so bad.
53. My thoughts start racing when I'm having a tough time with other people.
54. I imagine something really fun or exciting happening in my life.
55. When a rough situation with other people happens, I can get so upset that I can't remember what happened or what I did.
56. I try to believe it never happened.
57. When I have problems with other people, sometimes I **can't** control what I do or say.

Appendix P. The Situational Appraisal Scale (Edwards & Templeton, 2005)

Instructions to Participants:

On the following pages, we will be describing common situations to you. We would like for you to imagine yourself in the situation and then rate how applicable each term is to the situation. If you aren't sure, just give it your best guess. This booklet is double-sided, so be sure to do the front and back of each page.

Response Scale:

Not at all Applicable								Extremely Applicable
1	2	3	4	5	6	7	8	9

Scale Items:

Situations:
1. Watching an athletic event with a group of friends.
2. Studying or doing homework in the library (alone).
3. Socializing in your room/house with a friend.
4. Walking to class with a group of friends.
5. At a party with a group of friends.
6. Engaging in athletic activities alone.
7. Listening to a lecture in class.
8. At a party with a group of people you don't know very well.
9. Shopping with a group of friends.
10. Eating a meal with a boy/girlfriend.

Adjectives:
1. Pleasurable
2. Bad
3. Workable
4. Simple
5. Outstanding
6. Maddening
7. Productive
8. Effortless
9. Awesome
10. Unstable
11. Professional
12. Manageable
13. Sensational
14. Screwy
15. Intelligent
16. Predictable

17. Exciting
18. Idiotic
19. Constructive
20. Easy
21. Dreamy
22. Intolerable
23. Helpful
24. Gentle

Appendix Q. The Situational Test of Emotion Management (MacCann & Roberts, 2008)

Instructions to Participant:

In this test, you will be presented with a few brief details about an emotional situation and asked to choose from four responses the most effective course of action to manage both the emotions the person is feeling and the problems they face in that situation. Although more than one course of action might be acceptable, you are asked to choose what you think the most effective response for that person in that situation would be. Remember, you are not necessarily choosing what you would do, or the nicest thing to do, but choosing the most effective response for that situation.

Scale Items:

1. Lee's workmate fails to deliver an important piece of information on time, causing Lee to fall behind schedule also. *What action would be the most effective for Lee?*
(a) Work harder to compensate.
(b) Get angry with the workmate.
(c) Explain the urgency of the situation to the workmate.
(d) Never rely on that workmate again.

2. Rhea has left her job to be a full-time mother, which she loves, but she misses the company and companionship of her workmates. *What action would be the most effective for Rhea?*
(a) Enjoy being a full-time mom.
(b) Try to see her old workmates socially, inviting them out.
(c) Join a playgroup or social group of new mothers.
(d) See if she can find part time work.

3. Pete has specific skills that his workmates do not and he feels that his workload is higher because of it. *What action would be the most effective for Pete?*
(a) Speak to his boss about this.
(b) Start looking for a new job.
(c) Be very proud of his unique skills.
(d) Speak to his workmates about this.

4. Mario is showing Min, a new employee, how the system works. Mario's boss walks by and announces Mario is wrong about several points, as changes have been made. Mario gets on well with his boss, although they don't normally have much to do with each other. *What action would be the most effective for Mario?*
(a) Make a joke to Min, explaining he didn't know about the changes.
(b) Not worry about it, just ignore the interruption.
(c) Learn the new changes.
(d) Tell the boss that such criticism was inappropriate.

5. Wai-Hin and Connie have shared an office for years but Wai-Hin gets a new job and Connie loses contact with her. *What action would be the most effective for Connie?*
(a) Just accept that she is gone and the friendship is over.
(b) Ring Wai-Hin an ask her out for lunch or coffee to catch up.
(c) Contact Wai-Hin and arrange to catch up but also make friends with her replacement.
(d) Spend time getting to know the other people in the office, and strike up new friendships.

6. Martina is accepted for a highly sought after contract, but has to fly to the location. Martina has a phobia of flying. *What action would be the most effective for Martina?*
(a) See a doctor about this.
(b) Don't go to the location.
(c) Just get through it.
(d) Find alternative travel arrangements.

7. Manual is only a few years from retirement when he finds out his position will no longer exist, although he will still have a job with a less prestigious role. *What action would be the most effective for Manual?*
(a) Carefully consider his options and discuss it with his family.
(b) Talk to his boss or the management about it.
(c) Accept the situation, but still feel bitter about it.
(d) Walk out of that job.

8. Alan helps Trudy, a peer he works with occasionally, with a difficult task. Trudy complains that Alan's work isn't very good, and Alan responds that Trudy should be grateful he is doing her a favor. They argue. *What action would be the most effective for Alan?*
(a) Stop helping Trudy and don't help her again.
(b) Try harder to help appropriately.
(c) Apologize to Trudy.
(d) Diffuse the argument by asking for advice.

9. Surbhi starts a new job where he doesn't know anyone and finds that no one is particularly friendly. *What action would be the most effective for Surbhi?*
(a) Have fun with his friends outside of work hours.
(b) Concentrate on doing his work well at the new job.
(c) Make an effort to talk to people and be friendly himself.
(d) Leave the job and find one with a better environment.

10. Darla is nervous about presenting her work to a group of seniors who might not understand it, as they don't know much about her area. *What action would be the most effective for Darla?*
(a) Be positive and confident, knowing it will go well.
(b) Just give the presentation.
(c) Work on her presentation, simplifying the explanations.
(d) Practice presenting to laypeople such as friends or family.

11. Andre moves away from the city his friends and family are in. He finds his friends make less effort to keep in contact than he thought they would. *What action would be the most effective for Andre?*
(a) Try to adjust to life in the new city by joining clubs and activities there.
(b) He should make the effort to contact them, but also try to meet people in his new city.
(c) Let go of his old friends, who have shown themselves to be unreliable.
(d) Tell his friends he is disappointed in them for not contacting him.

12. Helga's team has been performing very well. They receive poor-quality work from another team that they must incorporate into their own project. *What action would be the most effective for Helga?*
(a) Don't worry about it.
(b) Tell the other team they must re-do their work.
(c) Tell the project manager about the situation.
(d) Re-do the other team's work to get it up to scratch.

13. Clayton has been overseas for a long time and returns to visit his family. So much has changed that Clayton feels left out. *What action would be the most effective for Clayton?*
(a) Nothing - it will sort itself out soon enough.
(b) Tell his family he feels left out.
(c) Spend time listening and getting involved again.
(d) Reflect that relationships can change with time.

14. Katerina takes a long time to set the DVD timer. With the family watching, her sister says "You idiot, you're doing it all wrong, can't you work the video?" Katerina is quite close to her sister and family. *What action would be the most effective for Katerina?*
(a) Ignore her sister and keep at the task.
(b) Get her sister to help or to do it.
(c) Tell her sister she is being mean.
(d) Never work appliances in front of her sister or family again.

15. Benjiro's parents are in their late 80s and living interstate in a house by themselves. He is worried that they need some help but they angrily deny it any time he brings up the subject. *What action would be the most effective for Benjiro?*
(a) Visit frequently and get others to check on them.
(b) Believe his parents' claims that they are fine.
(c) Keep telling his parents his concerns, stressing their importance.
(d) Force his parents to move into a home.

16. Max prides himself on his work being of the highest quality. On a joint project, other people do a lousy job, assuming that Max will fix their mistakes. *What action would be the most effective for Max?*
(a) Forget about it.
(b) Confront the others, and tell them they must fix their mistakes.

(c) Tell the project manager about the situation.
(d) Fix the mistakes.

17. Daniel has been accepted for a prestigious position in a different country from his family, who he is close to. He and his wife decide it is worth relocating. *What action would be the most effective for Daniel?*
(a) Realize he shouldn't have applied for the job if he didn't want to leave.
(b) Set up a system for staying in touch, like weekly phone calls or emails.
(c) Think about the great opportunities this change offers.
(d) Don't take the position.

18. A junior employee making routine adjustments to some of Teo's equipment accuses Teo of causing the equipment malfunction. *What action would be the most effective for Teo?*
(a) Reprimand the employee for making such accusations.
(b) Ignore the accusation, it is not important.
(c) Explain that malfunctions were not his fault.
(d) Learn more about using the equipment so that it doesn't break.

19. Mei Ling answers the phone and hears that close relatives are in hospital critically ill. *What action would be the most effective for Mei Ling?*
(a) Let herself cry and express emotion for as long as she feels like.
(b) Speak to other family to calm herself and find out what is happening, then visit the hospital.
(c) There is nothing she can do.
(d) Visit the hospital and ask staff about their condition.

20. The woman who relieves Celia at the end of her shift is twenty minutes late without excuse or apology. *What action would be the most effective for Celia?*
(a) Forget about it unless it happens again.
(b) Tell the boss about it.
(c) Ask for an explanation of her lateness.
(d) Tell her that this is unacceptable.

21. Upon entering full-time study, Vincent cannot afford the time or money he used to spend on water-polo training, which he was quite good at. Although he enjoys full-time study, he misses training. *What action would be the most effective for Vincent?*
(a) Concentrate on studying hard, to pass his course.
(b) See if there is a local league or a less expensive and less time-consuming sport.
(c) Think deeply about whether sport or study is more important to him.
(d) Find out about sporting scholarships or bursaries.

22. Evan's housemate cooked food late at night and left a huge mess in the kitchen that Evan discovered at breakfast. *What action would be the most effective for Evan?*
(a) Tell his housemate to clean up the mess.
(b) Ask his housemate that this not happen again.
(c) Clean up the mess himself.

(d) Assume that the housemate will clean it later.

23. Greg has just gone back to university after a lapse of several years. He is surrounded by younger students who seem very confident about their ability and he is unsure whether he can compete with them. *What action would be the most effective for Greg?*
(a) Focus on his life outside the university.
(b) Study hard and attend all lectures.
(c) Talk to others in his situation.
(d) Realize he is better than the younger students as he has more life experience.

24. Gloria's housemates never buy essential non-food items when they are running low, relying on Gloria to buy them, which she resents. They know each other reasonably well, but have not yet discussed financial issues. *What action would be the most effective for Gloria?*
(a) Don't buy the items.
(b) Introduce a new system for grocery shopping and sharing costs.
(c) Tell her housemates she has a problem with this.
(d) Hide her own personal store of items from the others.

25. Shona has not spoken to her nephew for months, whereas when he was younger they were very close. She rings him but he can only talk for five minutes. *What action would be the most effective for Shona?*
(a) Realize that he is growing up and might not want to spend so much time with his family any more. (b) Make plans to drop by and visit him in person and have a good chat.
(c) Understand that relationships change, but keep calling him from time to time.
(d) Be upset about it, but realize there is nothing she can do.

26. Moshe finds out that some members of his social sports team have been saying that he is not a very good player. *What action would be the most effective for Moshe?*
(a) Although he may be bad at sport remember he is good at other things.
(b) Forget about it.
(c) Do some extra training to try and improve.
(d) Leave that sports team.

27. Joel has always dealt with one particular client but on a very complex job his boss gives the task to a co-worker instead. Joel wonders whether his boss thinks he can't handle the important jobs. *What action would be the most effective for Joel?*
(a) Believe he is performing well and will be given the next complex job.
(b) Do good work so that he will be given the complex tasks in future.
(c) Ask his boss why the co-worker was given the job.
(d) Not worry about this unless it happens again.

28. Hasina is overseas when she finds out that her father has passed away from an illness he has had for years. *What action would be the most effective for Hasina?*
(a) Contact her close relatives for information and support.
(b) Try not to think about it, going on with her daily life as best she can.

(c) Feel terrible that she left the country at such a time.
(d) Think deeply about the more profound meaning of this loss.

29. Mina and her sister-in-law normally get along quite well, and the sister-in-law regularly baby-sits for her for a small fee. Lately she has also been cleaning away cobwebs, commenting on the mess, which Mina finds insulting. *What action would be the most effective for Mina?*
(a) Tell her sister-in-law these comments upset her.
(b) Get a new babysitter.
(c) Be grateful her house is being cleaned for free.
(d) Tell her only to baby-sit, not to clean.

30. Billy is nervous about acting a scene when there are a lot of very experienced actors in the crowd. *What action would be the most effective for Billy?*
(a) Put things in perspective - it is not the end of the world.
(b) Use some acting techniques to clam his nerves.
(c) Believe in himself and know it will be fine.
(d) Practice his scenes more so that he will act well.

31. Juno is fairly sure his company is going down and his job is under threat. It is a large company and nothing official has been said. *What action would be the most effective for Juno?*
(a) Find out what is happening and discuss his concerns with his family.
(b) Try to keep the company afloat by working harder.
(c) Start applying for other jobs.
(d) Think of these events as an opportunity for a new start.

32. Mallory moves from a small company to a very large one, where there is little personal contact, which she misses. *What action would be the most effective for Mallory?*
(a) Talk to her workmates, try to create social contacts and make friends.
(b) Start looking for a new job so she can leave that environment.
(c) Just give it time, and things will be okay.
(d) Concentrate on her outside-work friends and colleagues from previous jobs.

33. A demanding client takes up a lot of Jill's time and then asks to speak to Jill's boss about her performance. Although Jill's boss assures her that her performance is fine, Jill feels upset. *What action would be the most effective for Jill?*
(a) Talk to her friends or workmates about it
(b) Ignore the incident and move on to her next task.
(c) Calm down by taking deep breaths or going for a short walk.
(d) Think that she has been successful in the past and this client being difficult is not her fault.

34. Blair and Flynn usually go to a cafe after the working week and chat about what's going on in the company. After Blair's job is moved to a different section in the

company, he stops coming to the cafe. Flynn misses these Friday talks. *What action would be the most effective for Flynn?*
(a) Go to the cafe or socialize with other workers.
(b) Don't worry about it, ignore the changes and let Blair be.
(c) Not talk to Blair again.
(d) Invite Blair again, maybe rescheduling for another time.

35. Jerry has had several short-term jobs in the same industry, but is excited about starting a job in a different industry. His father casually remarks that he will probably last six months. *What action would be the most effective for Jerry?*
(a) Tell his father he is completely wrong.
(b) Prove him wrong by working hard to succeed at the new job.
(c) Think of the positives of the new job.
(d) Ignore his father's comments.

36. Michelle's friend Dara is moving overseas to live with her partner. They have been good friends for many years and Dara is unlikely to come back. *What action would be the most effective for Michelle?*
(a) Forget about Dara.
(b) Spend time with other friends, keeping herself busy.
(c) Think that Dara and her partner will return soon.
(d) Make sure she keeps in contact through email, phone or letter writing.

37. Dorian needs to have some prostate surgery and is quite scared about the process. He has heard that it is quite painful. *What action would be the most effective for Dorian?*
(a) Find out as much as he can about the procedure and focus on calming down.
(b) Keep busy in the meantime so he doesn't think about the impending surgery.
(c) Talk to his family about his concerns.
(d) Talk to his doctor about what will happen.

38. Hannah's access to essential resources has been delayed and her work is way behind schedule. Her progress report makes no mention of the lack of resources. *What action would be the most effective for Hannah?*
(a) Explain the lack of resources to her boss or to management.
(b) Learn that she should plan ahead for next time.
(c) Document the lack of resources in her progress report.
(d) Don't worry about it.

39. Jill is given an official warning for entering a restricted area. She was never informed that the area was restricted and will lose her job if she gets two more warnings, which she thinks is unfair. *What action would be the most effective for Jill?*
(a) Think about the unfairness of the situation.
(b) Accept the warning and be careful not to go in restricted areas from now on.
(c) Explain that she didn't know it was restricted.
(d) Take a few deep breaths and calm down about it.

40. Alana has been acting in a high-ranking role for several months. A decision is made that only long-term employees can now act in these roles, and Alana has not been with the company long enough to do so. *What action would be the most effective for Alana?*
(a) Quit that position.
(b) Use that experience to get promoted when she is long term.
(c) Accept this new rule, but feel hard-done-by.
(d) Ask management if an exception can be made.

41. Reece's friend points out that her young children seem to be developing more quickly than Reece's. Reece sees that this is true. *What action would be the most effective for Reece?*
(a) Talk the issue over with another friend.
(b) Angrily confront her friend about making such statements.
(c) Realize that children develop at different rates.
(d) Talk to a doctor about what the normal rates of development are.

42. Jumah has been working at a new job part-time while he studies. His shift times for the week are changed at the last minute, without consulting him. *What action would be the most effective for Jumah?*
(a) Refuse to work the new shifts.
(b) Find out if there is some reasonable explanation for the shift changes.
(c) Tell the manager in charge of shifts that he is not happy about it.
(d) Grumpily accept the changes and do the shifts.

43. Jacob is having a large family gathering to celebrate him moving into his new home. He wants the day to go smoothly and is a little nervous about it. *What action would be the most effective for Jacob?*
(a) Talk to friends or relatives to ease his worries.
(b) Try to calm down, perhaps go for a short walk or meditate.
(c) Prepare ahead of time so he has everything he needs available.
(d) Accept that things aren't going to be perfect but the family will understand.

44. Julie hasn't seen Ka for ages and looks forward to their weekend trip away. However, Ka has changed a lot and Julie finds that she is no longer an interesting companion. *What action would be the **most** effective for Julie?*
(a) Cancel the trip and go home.
(b) Realize that it is time to give up the friendship and move on.
(c) Understand that people change, so move on, but remember the good times.
(d) Concentrate on her other, more rewarding friendships.

Appendix R. The Situational Test of Emotional Understanding (MacCann & Roberts, 2008)

Instructions to Participants:

The following questions each describe a situation, and ask you to choose which of five emotions is most likely to result from that situation.

Scale Items:

1. A pleasant experience ceases unexpectedly and there is not much that can be done about it. *The person involved is most likely to feel?*
(a) Ashamed
(b) Distressed
(c) Angry
(d) Sad
(e) Frustrated

2. Xavier completes a difficult task on time and under budget. *Xavier is most likely to feel?*
(a) Surprise
(b) Pride
(c) Relief
(d) Hope
(e) Joy

3. An irritating neighbor of Eve's moves to another state. *Eve is most likely to feel?*
(a) Regret
(b) Hope
(c) Relief
(d) Sadness
(e) Joy

4. There is great weather on the day Jill is going on an out-door picnic. *Jill is most likely to feel?*
(a) Pride
(b) Joy
(c) Relief
(d) Guilt
(e) Hope

5. Regret is most likely to occur when?
(a) Events are unexpected
(b) You have caused something you didn't want to happen and cannot change it
(c) Circumstances have caused something you didn't want to happen
(d) You have caused something you didn't want to happen and are trying to change it

(e) Events are getting beyond your control

6. Edna's workmate organizes a goodbye party for Edna, who is going on holidays. *Edna is most likely to feel?*
(a) Surprise
(b) Gratitude
(c) Pride
(d) Hope
(e) Relief

7. Something unpleasant is happening. Neither the person involved, nor anyone else can make it stop. *The person involved is most likely to feel?*
(a) Guilty
(b) Distressed
(c) Sad
(d) Scared
(e) Angry

8. If the current situation continues, Denise's employer will probably be able to move her job to a location much closer to her home, which she really wants. *Denise is most likely to feel?*
(a) Distress
(b) Joy
(c) Surprise
(d) Hope
(e) Fear

9. Song finds out that a friend of hers has borrowed money from others to pay urgent bills, but has in fact
used the money for less serious purposes. *Song is most likely to feel?*
(a) Anger
(b) Excitement
(c) Contempt
(d) Shame
(e) Horror

10. Somebody is most likely to feel surprised after?
(a) Something unexpected happens.
(b) Something unfamiliar happens.
(c) Something unusual happens.
(d) Something scary happens.
(e) Something silly happens.

11. Leya works as a trouble-shooter. She is presented with a standard looking problem but cannot work out how to solve it. *Leya is most likely to feel?*
(a) Confused

(b) Frustrated
(c) Surprised
(d) Relieved
(e) Distressed

12. Charles is meeting a friend to see a movie. The friend is very late and they are not in time to make it to the movie. *Charles is most likely to feel?*
(a) Depressed
(b) Frustrated
(c) Angry
(d) Contemptuous
(e) Distressed

13. Rashid needs to meet a quota before his performance review. There is only a small chance that he will be able to do so and there isn't much he can do to improve the outcome. *Rashid is most likely to feel?*
(a) Irritated
(b) Scared
(c) Distressed
(d) Sad
(e) Hopeful

14. Someone believes that another person harmed them on purpose. There is not a lot that can be done to make things better. *The person involved is most likely to feel?*
(a) Dislike
(b) Rage
(c) Jealousy
(d) Surprise
(e) Anxiety

15. Phil's workmate Bart asks Phil to lie for him about money Bart has been stealing from the company. Phil does not agree. *Phil is most likely to feel?*
(a) Excitement
(b) Anger
(c) Horror
(d) Contempt
(e) Shame

16. Jim enjoys spending Saturdays playing with his children in the park. This year they have sporting activities on Saturdays and cannot go to the park with him anymore. *Jim is most likely to feel?*
(a) Angry
(b) Sad
(c) Frustrated
(d) Distressed
(e) Ashamed

17. If all goes well, then it's fairly likely that Derek's house will increase in value. *Derek is most likely to feel?*
(a) Distress
(b) Fear
(c) Surprise
(d) Joy
(e) Hope

18. Sheila's workmate intentionally does not give Sheila some important information about applying for a raise. *Sheila is most likely to feel?*
(a) Depressed
(b) Contemptuous
(c) Frustrated
(d) Angry
(e) Distressed

19. Megan is looking to buy a house. Something happened and she felt regret. *What is most likely to have happened?*
(a) She didn't make an offer on a house she wanted, and now she is trying to find out if it is too late.
(b) She found a house she liked that she didn't think she would find.
(c) She couldn't make an offer on a house she liked because the bank didn't get her the money in time.
(d) She didn't make an offer on a house she liked and now someone else has bought it.
(e) She made an offer on a house and is waiting to see if it is accepted. .

20. Mary was working at her desk. Something happened that caused her to feel surprised. *What is most likely to have happened?*
(a) Her work-mate told a silly joke.
(b) She was working on a new task she hadn't dealt with before.
(c) She found some results that were different from what she thought they would be.
(d) She realized she would not be able to complete her work.
(e) She had to do a task she didn't normally do at work.

21. Garry's small business is attracting less and less clients and he can't tell why. There doesn't seem to be anything he can do to help matters. *Garry 1s most likely to feel?*
(a) Scared
(b) Angry
(c) Sad
(d) Guilty
(e) Distressed

22. Someone thinks that another person has deliberately caused something good to happen to them. *They are most likely to feel?*
(a) Hope

(b) Pride
(c) Gratitude
(d) Surprise
(e) Relief

23. Kevin has been working at his current job for a few years. Out of the blue, he finds that he will receive a promotion. *Kevin is most likely to feel?*
(a) Pride
(b) Relief
(c) Joy
(d) Hope
(e) Guilt

24. By their own actions, a person reaches a goal they wanted to reach. *The person is most likely to feel?*
(a) Joy
(b) Hope
(c) Relief
(d) Pride
(e) Surprise

25. An unwanted situation becomes less likely or stops altogether. *The person involved is most likely to feel?*
(a) Regret
(b) Hope
(c) Joy
(d) Sadness
(e) Relief

26. Hasad tries to use his new mobile phone. He has always been able to work out how to use different
appliances, but he cannot get the phone to function. *Hasad is most likely to feel?*
(a) Distressed
(b) Confused
(c) Surprised
(d) Relieved
(e) Frustrated

27. Dorian's friend is ill and coughs all over him without bothering to turn away or cover his mouth. *Dorian is most likely to feel?*
(a) Anxiety
(b) Dislike
(c) Surprise
(d) Jealousy
(e) Rage

28. Although she has been careful to avoid all risk factors, Tina has contracted cancer. There is only a small chance that the cancer will be benign and nothing Tina does now can make a difference. *Tina is most likely to feel?*
(a) Scared
(b) Distressed
(c) Irritated
(d) Sad
(e) Hopeful

29. Quan and his wife are talking about what happened to them that day. Something happened that caused Quan to feel surprised. *What is most likely to have happened?*
(a) His wife talked a lot, which did not usually happen.
(b) His wife talked about things that were different to what they usually discussed.
(c) His wife told him that she might have some bad news.
(d) His wife told Quan some news that was not what he thought it would be.
(e) His wife told a funny story.

30. An upcoming event might have bad consequences. Nothing much can be done to alter this. *The person involved would be most likely to feel?*
(a) Sad
(b) Irritated
(c) Distressed
(d) Scared
(e) Hopeful

31. It is clear that somebody will get what they want. *They are most likely to feel?*
(a) Pride
(b) Relief
(c) Joy
(d) Hope
(e) Guilt

32. By chance, a situation arises where there is the possibility that a person will get what they want. *The person is most likely to feel?*
(a) Distress
(b) Hope
(c) Surprise
(d) Joy
(e) Fear

33. A supervisor who is unpleasant to work for leaves Alfonso's work. *Alfonso is most likely to feel?*
(a) Joy
(b) Hope
(c) Regret
(d) Relief

(e) Sadness

34. The nature of Sara's job changes due to unpredictable factors and she no longer gets to do the portions of her work that she most enjoyed. *Sara is most likely to feel?*
(a) Ashamed
(b) Sad
(c) Angry
(d) Distressed
(e) Frustrated

35. Leila has been unable to sleep well lately and there are no changes in her life that might indicate why. *Leila is most likely to feel?*
(a) Angry
(b) Scared
(c) Sad
(d) Distressed
(e) Guilty

36. A person feels they have control over a situation. The situation turns out badly for no particular reason. *The person involved is most likely to feel?*
(a) Confused
(b) Relieved
(c) Surprised
(d) Frustrated
(e) Distressed

37. Someone believes another person has deliberately caused something good to stop happening to them. However, they feel they can do something about it. *They are most likely to feel?*
(a) Angry
(b) Contemptuous
(c) Distress
(d) Depressed
(e) Frustrated

38. The new manager at Enid's work changes everyone's hours to a less flexible work pattern, leaving no room for discussion. *Enid is most likely to feel?*
(a) Dislike
(b) Rage
(c) Jealousy
(d) Surprise
(e) Anxiety

39. Someone believes that another person has caused harm to them, due to that person's bad character. They think they can probably handle the situation though. *The harmed person is most likely to feel?*

(a) Contempt
(b) Anger
(c) Horror
(d) Excitement
(e) Shame

40. Pete gets home late, after his favorite TV show has ended. Pete's partner has taped the show for him. *Pete is most likely to feel?*
(a) Surprise
(b) Hope
(c) Pride
(d) Relief
(e) Gratitude

41. Matthew has been at his current job for six months. Something happened that caused him to feel regret. *What is most likely to have happened?*
(a) He did not apply for a position he wanted, and has found out that someone else less qualified got the job.
(b) He did not apply for a position he wanted, and has started looking for a similar position.
(c) He found out that opportunities for promotion have dried up.
(d) He found out that he didn't get a position he thought he would get.
(e) He didn't hear about a position he could have applied for and now it is too late.

42. Penny's hockey team trained hard and won the championship *Penny 1s most likely to feel?*
(a) Hope
(b) Pride
(c) Relief
(d) Joy
(e) Surprise

Appendix S. The Satisfaction With Life Scale (Diener et al., 1985)

Instructions to Participants:

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

Response Scale:

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree Nor Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

Scale Items:
1. In most ways my life is close to ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far I have gotten the important things I want in life.
5. If I could live my life over, I would change almost nothing.

Appendix T. The Transgression Related Interpersonal Motivations Scale (McCullough et al., 1998)

Instructions to Participants:

For the following questions, please indicate your current thoughts and feelings about the person who hurt you. Use the following scale to indicate your agreement with each of the questions.

Response Scale:

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

Scale Items:

1. I'll make him/her pay.
2. I keep as much distance between us as possible.
3. I wish that something bad would happen to him/her.
4. I live as if he/she doesn't exist, isn't around.
5. I don't trust him/her.
6. I find it difficult to act warmly toward him/her.
7. I avoid him/her.
8. I'm going to get even.
9. I cut off the relationship with him/her.
10. I want to see him/her hurt and miserable.
11. I withdraw from him/her.

Appendix U. Behavioral Measures

Instructions to Participants:

In the following game you will be presented with a pot of money that will increase by 10 cents at each player's turn. During your turn, you may choose to "PASS" the pot to your opponent and increase the total amount in the pot, or you may choose to "STOP" and collect your winnings, which will be 80% of the total pot, leaving your opponent with 20% of the money.

During your opponent's turn, they will have the opportunity to "PASS" the pot back to you and increase the total pot by 10 cents, or to "STOP" and collect 80% of the money, leaving you with the remaining 20% of the pot.

You will be playing for real money.

The Symmetry Span Task

Instructions to Participants:

In this experiment you will try to memorize the position of color squares you see on the screen while you also make judgments about other pictures.

Squares will appear on the screen one at a time. Try to remember where each square was, in the order it was presented. Your job is to select each square in the order presented.

A picture will appear on the screen and you will have to decide if it is symmetrical. A picture is symmetrical if you can fold it in half vertically and the picture on the left lines up with the picture on the right.

After the square goes away, a symmetry picture will appear, and then another square. At the end of each set of pictures and squares, a recall screen will appear. Use the mouse to select the squares that you just saw.

It is important to work QUICKLY and ACCURATELY.

It is very important to keep accuracy at 85%.