

AN ABSTRACT THESIS OF

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Both Buddhist and psychological theory postulate that present actions will influence future perceptions, judgments, and behaviors in a concordant manner. While Buddhists explain these effects in the context of karmic theory, psychologists consider these effects of construct activation and chronic construct accessibility. The present study sought to apply social psychological theory to Buddhist meditation practice, specifically to examine if loving-kindness meditation (LKM) increases prosocial construct accessibility over time, as compared to mindfulness meditation. University students practiced either mindfulness meditation or LKM for eight weeks. Measures were administered at baseline and after the eight weeks of practice. Although results did not demonstrate changes in prosocial construct accessibility, all participants experienced increases in mindfulness, satisfaction with life, emotional reappraisal abilities, and emotion management. These effects were also accompanied decreases in illness symptoms over time. Analyses yielded mixed results for measures of wisdom. The current experiment failed to replicate some known effects of mindfulness meditation,

such as increases in attentional control and decreases in depressive symptoms.

Limitations of the study and future directions are discussed.

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Loving-Kindness Meditation
and Prosocial Construct Activation

by
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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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Loving-Kindness Meditation
and Prosocial Construct Activation

CHAPTER 1: INTRODUCTION

The present experiment is a project designed to investigate predictions made by Buddhist and psychological theory concerning loving-kindness meditation (LKM) practice. The project was inspired by previous research documenting effects of LKM, without providing a cognitive mechanism on which they operate (Fredrickson, Coffey, Pek, Cohn, & Finkel, 2008). Both Buddhist and psychological theory convey that present cognitions and actions produce similar events in the future. The Buddhist theory of mind states that the intentions behind our thoughts and actions essentially train our mind to produce similar perceptual and behavioral patterns in the future. They use a seed metaphor to illustrate this process, claiming, for example, that seeds of compassion planted now (by compassionate intentions) will yield fruits of compassion later.

Psychologists describe these effects with construct activation theory. They postulate that accessible thoughts and ideas are used for perception, with accessibility in part determined by recent and frequent activation. Generally speaking, personal experiences determine construct accessibility, and more accessible constructs are used over less accessible ones to disambiguate uncertain events. Social events are often subject to multiple interpretations (Bruner, 1957), meaning that accessible constructs (determined by previous experience) dictate the nature of social perception. Research findings confirm this by indicating that people perceive others on the basis of their own chronically accessible trait constructs (e.g., friendly; Higgins, King, & Mavin, 1982).

The experiment reported here applied Buddhist and psychological theory to meditation practice, hypothesizing that construct activation may be responsible for

prosocial effects of loving-kindness meditation. I review relevant Buddhist philosophy and psychological theory and findings in the next two chapters. The fourth chapter outlines variable selection and justification for the variables selected. Chapters five and six outline the methodology of the study and the observed results. The seventh chapter is a general discussion of the findings of this study, its limitations, and potential directions for future research.

CHAPTER 2: THE BUDDHIST PHILOSOPHY OF MEDITATION

Across all Buddhist traditions, meditation is necessary to reach the highest form of awareness, understanding, and personal transformation, which is known as enlightenment, or nirvana (Gyatso, 2003). Meditation is viewed as a central component of the most direct way to achieve personal transformation and obtain enlightenment (Skilton, 1994). Enlightenment is the primary goal in the Buddhist tradition, and can be described as a state of perfect understanding and compassion, which results in the elimination of suffering. Across all Buddhist traditions, four claims, known as the Four Noble Truths, describe the nature of suffering and the way to remedy it (Piyadassi, 2012). The noble truths are iterated in the *Dhammacakkappavattana Sutta*, which is considered to be the first known teaching of the Buddha.

First, the Buddha posited that life is suffering, or *dukkha* (Piyadassi, 2012). Humans are plagued by constant desires, dissatisfaction with current circumstances, anxiety, attachment to objects and ideas, and a host of afflictive emotions such as anger, causing us to suffer in one way or another. Suffering is not only experienced throughout the duration of one's life, but is also perpetuated by the cycle of death and rebirth, known as *samsara*. Second, the Buddha stated that all of the causes of suffering ultimately stem from one problem: attachment to ideas and objects. Attachment is caused by an ignorance of the true nature of reality. In other words, one holds inaccurate perceptions, which has a rippling effect of negative ramifications throughout one's life. Therefore, the way to alleviate suffering is to eliminate ignorance by cultivating understanding, which is the third noble truth. As the Dalai Lama emphasizes, "Of the many types of ignorance,

ignorance that is a misconception of true existence is the root, the power holder, so to speak. And this ignorance is the chief obstacle” (Gyatso, 2003). One can only break the cycle of *samsara* by achieving nirvana, a perfect understanding of the true nature of reality. The fourth noble truth then explains that one does this by following the Noble Eightfold Path.

The eightfold path can be described as eight necessary conditions to achieve nirvana. These are right view, right intention, right speech, right action, right livelihood, right effort, right mindfulness, and right concentration (Piyadassi, 2012). Although these characteristics are not stages that must be completed in order, right view is considered the gateway characteristic that leads to the cultivation of the other seven necessary conditions (Thanissaro, 2012). However, there are variations of the eightfold path that emphasize a cumulative nature (the *Bodhyangas*; Skilton, 1994). Buddhists employ meditation practice to make improvement along the eightfold path by generating and enhancing the positive qualities of enlightenment (Gyatso, 2003). Meditations differ by their content and outcomes, but generally cultivate at least one of the eight necessary conditions.

The Role of Mindfulness in Buddhism

As noted above, right mindfulness is one of the eight necessary factors of attaining nirvana. Because of this, the cultivation of mindfulness is common to all Buddhist traditions. Mindfulness is defined as bare, nonjudgmental attention to various aspects of the present moment (e.g., the breath, bodily sensations, noises), and is viewed as a prerequisite to achieve insight into selflessness, or the experience that there is no inherently existent or independent self (Skilton, 1994). Mindfulness is a state where the

individual can maintain single-pointed concentrated awareness on their chosen object of observation. Cognitively, one should be quiet and let go of thoughts as they arise, accepting events, sensations, and feelings as they are without judgment, approach, or aversion, indicating emotional neutrality (Kabat-Zinn, 1990). Mindfulness meditation, specifically, is practiced to cultivate mindfulness, but being mindful is important to all meditation types. A concentrated, focused, mind of awareness is critical to notice experience of any of the five hindrances, physical change, and mental change. The five hindrances are mental factors that impede progress during meditation, including sensory desire and ill will (Soma, 2010). Mindfulness when meditating allows one to notice these afflictions, and take action against them. Cognitive change (e.g., increased self-compassion) and physical change (ease of posture) indicate increasing skill, which may warrant more difficult tasks when meditating.

There are four foundations for the cultivation of mindfulness, and all are incorporated into a type of meditation called insight meditation. These foundations are the body, feelings, mind, and mental contents. As the Buddha conveyed in the *Satipatthana Sutta*, meditation on the body (e.g., breath, posture, sensations), feelings (of all valences), mind (e.g., lust, hate, delusions), and mental content (e.g., hindrances, aggregates, the four noble truths) aid the development of mindfulness, as well as insight, or *vipassana* (Soma, 2010). When Buddhists talk about insight, they are referring to insight into the true nature of reality (Gunaratana, 2009). Additionally, right meditation practice leads to the development of *shamata*, loosely translated as serenity, meaning a

calm mind. Serenity and insight are crucial for progressing down the eightfold path, as is observed in the *Kimsuka Sutta* (Thanissaro, 2010).

The Role of Compassion in Buddhism

Like mindfulness, loving-kindness and compassion are central components of the Buddhist path. Loving-kindness and compassion are similarly necessary to make progress down the eightfold path, as they are indeed dimensions of right view and right intention and are ultimately characteristics of an enlightened mind. Kamalashila, author of *Stages of Meditation*, an authoritative text concerning meditation, quoted the Buddha when explaining, “the transcendental wisdom of omniscience has its root in compassion, and arises from a cause—the altruistic thought, the awakening mind of bodhichitta, and the perfection of skillful means” (Gyatso, 2003). Likewise, the prominent Buddhist scholar Chandrakirti emphasized that compassion is essential to all stages of enlightenment (Gyatso, 2003).

Buddhists agree that loving-kindness and compassion are essential to cultivate and are beneficial both to the one practicing and to the world. The Four Divine Abidings, also known as the Four Immeasurables, are four virtues that all Buddhist sects strive to cultivate. According to the *Metta Sutta*, perfect practice of the Four Divine Abidings can cause an individual to be reborn into the Brahma realm, or the realm of the gods (Thanissaro, 2010). The Divine Abidings consist of 1) loving-kindness, 2) compassion, 3) empathetic joy, and 4) equanimity. Although many sources treat loving-kindness and compassion synonymously, it is obvious that the Buddha made a distinction between the two since they are separate abidings. The Dalai Lama explains that loving-kindness is

empathy for all sentient beings based on the realization of equanimity, or the view that all sentient beings are equal (Gyatso, 2003). He further explains that compassion, then, is the desire to relieve sentient beings from their suffering, which stems from the impartial empathy of loving-kindness. Empathetic joy is defined as the pleasure one takes in another's well-being, success, or good-fortune (Salzberg, 1995). Practitioners are taught to radiate these emotions to all living beings in the world. According to Patanjali's *Yoga Sutra*, a classical Hindu scripture, the abidings are also antidotes to negative mental states (e.g., anger, greed, jealousy), which impede progress along the path (Hartranft, 2003).

While all Buddhists strive for loving-kindness and perfect compassion, as is illustrated by the Four Divine Abidings, the motivation behind this cultivation varies across traditions. One of these distinctions is the role of compassion in the attainment of enlightenment. Although both Theravadins and Mahayanists view compassion as integral for enlightenment, they differ in how they emphasize compassion. The embodiment of this distinction is that of the arhat and the bodhisattva, the ideal individuals in the Theravada and Mahayana traditions, respectively. These figures are discussed below, as well as the idea of bodhichitta, the motivation behind the actions of a bodhisattva.

Many consider the arhat-bodhisattva distinction, and the implications of that distinction, to be the key difference between Theravada Buddhism¹ and Mahayana Buddhism. As the Chinese monk Yijing conveys:

Both adopt one and the same Vinaya, and they have in common the prohibitions of the five offenses, and also the

¹ Representative of the lower philosophical schools, sometimes referred to as Hinayana, which is considered a derogatory term by many

practice of the Four Noble Truths. Those who venerate the bodhisattvas and read the Mahayana sutras are called the Mahayanists, while those who do not perform these are called the Hinayanists” (Williams, 1989).

Although it is common for Mahayana Buddhists to utilize early mainstream Buddhist texts and commentaries from the Pali Canon of Theravada Buddhism, it is less common for Theravadins who follow these to study Mahayana sources.

As mentioned above, most agree that Theravada Buddhists strive for arhatship, while Mahayana Buddhists aim for the bodhisattva ideal, which emphasizes the importance of great compassion. An arhat, or ‘worthy one,’ is someone who has broken the ten bonds, or fetters, that keep individuals locked in the cycle of *samsara*. The ten fetters can be described as symptoms of attachment, such as self-identity, ill will, and conceit (Thanissaro, 2000). This person has, after many lifetimes of practice, finally achieved nirvana and will not be reborn into *samsara* again (Skilton, 1994). However, arhats are not Buddhas, who are beings with a realization an embodiment of perfect compassion. A bodhisattva is someone who aims for Buddhahood to be able to help all sentient beings achieve liberation from *samsara*. Bodhisattvas are sometimes described as ‘great beings’ due to their noble goal of saving others. As such they commit to continued rebirth among the suffering beings of *samsara* until every last sentient has achieved liberation from suffering. Similar to arhats, bodhisattvas must work over many lifetimes to obtain the end goal (Skilton, 1994).

The bodhisattva path is not unique to Mahayanists. In the Pali canon, before attaining Buddhahood, Siddhartha Gautama, the unenlightened Buddha, is referred to as Gautama the bodhisattva. It is written that he sacrificed his own enlightenment to save

others eons before becoming the figure known as Shakyamuni Buddha (Ratnayaka, 1985). In addition to outlining the general bodhisattva path, the Pali canon also outlines the ten bodhisattva perfections, indicating that the bodhisattva ideal is not only a Mahayana concept. However, many consider full Buddhahood an unrealistic goal, and thus strive for arhatship and nirvana. Although there are numerous subtle differences between the concepts, two main distinctions can be made between the arhat and the bodhisattva: the quality of enlightenment and the incentive to attain enlightenment.

Compassion from the Perspective of the Arhat

It is clear that in early Buddhism, arhats were not considered different from Buddhas in their attainment of insight, since arhats are considered pure of the defilements that taint one's perception of reality. Even though many did not differentially view the attainment of arhats and Buddhas, Mahayanists began to make a distinction between the two to demote the status of the arhat and exalt the status of Buddhahood. The early Buddhist monk Mahadeva, shortly after the second Buddhist council, presented five reasons why arhats are fallible, which are overall characterized by an arhat's imperfect understanding of reality and an ability to regress along the eightfold path (Nattier & Prebish, 1977).

Because of this, and because arhats do not have the complete omniscience of a Buddha with all its ensuing qualities that make Buddhas perfect teachers, Mahayanists do not consider arhats and Buddhas to have a comparable quality of enlightenment. Mahayanists posit, as evidenced by Chandrakirti's *Madhyamakavatara*, that arhats have not eliminated all obscurations of full Buddhahood; they have not developed perfect

compassion, motivated by bodhichitta (Rinpoche, 2003). In turn, the status of the bodhisattva has been promoted as a goal among the Mahayanists (Skilton, 1994). The current consensus among some Theravadins is that while there may be a qualitative difference between arhatship and Buddhahood, Buddhahood is too lofty of a goal. However, Walpula Rahula, a venerated Theravadin scholar, posits that both Theravadins and Mahayanists hold bodhisattvas in the highest regard, and that many Buddhists in Theravadin countries vow to become Buddhas to save others (Rahula, 1996).

Although the bodhisattva ideal is revered, the bodhisattva path is sometimes misunderstood by Theravadins. Some maintain that bodhisattvas refuse nirvana to remain in *samsara*, a point that Mahayanists disagree with. Rahula demonstrates this misconception when he explains:

A Bodhisattva is a person (monk or layman) who is in a position to attain Nirvana...but out of great compassion (*maha karuna*) for the world, he renounces it and goes on suffering in *samsara* for the sake of others... [he] finally realizes Nirvana and becomes a Samyaksambuddha, a fully Enlightened Buddha. He discovers The Truth and declares it to the world. His capacity for service to others is unlimited. (Rahula, 1996)

Instead of renouncing nirvana to save others, Mahayanists claim that bodhisattvas become Buddhas to be able to be able to save others (Skilton, 1994), the perspective adopted in this discussion.

The disagreement concerning the status of enlightenment of the bodhisattva has led to contention between the traditions, as has their emphasis on different goals. With arhatship, because the main goal is one's own liberation, compassion and loving-kindness are necessary for that transformation, but are not end goals in and of themselves. For the

Bodhisattva, compassion is an integral part of the goal, demonstrated by the intention to reach Buddhahood to be able to save others. As Skilton summarizes, “Without doubt the Bodhisattva ideal represents a resurgent emphasis upon compassion, and implicitly accuses representatives of the non-Mahayana tradition...and their goal of arhatship, as lacking in this quality” (Skilton, 1994). Both traditions can agree, though, that the primary motivation behind seeking arhatship is personal transformation, meaning that the enlightenment of others is a secondary consideration, and the key motivation behind becoming a bodhisattva is the attainment of Buddhahood, not arhatship, for the sake of all living beings (Skilton, 1994).

Compassion from the Perspective of the Bodhisattva

Concerning the bodhisattva ideal, personal transformation is seen as a means to an end. The ultimate goal is to help as many beings as possible, and full Buddhahood is sought because only a Buddha would know the best way to do so (Skilton, 1994). That is, the highest form of enlightenment is sought because it is considered necessary to skillfully and maximally help others. How is someone to teach what is required to alleviate the ignorance, and thus suffering, of others if that person is still ignorant herself? She has not overcome all of the obstacles in her way, and thus does not have sufficient knowledge to teach others how to overcome them. Additionally, a Buddha, with perfect insight, will be most efficient in helping as many people as possible.

In *A Guide to the Bodhisattva Way of Life*, perhaps one of the most informative texts concerning the bodhisattva ideal, Shantideva outlined the primary motivation of the bodhisattva, “As long as space remains, as long as sentient beings remain, until then may

I too remain, and dispel the miseries of the world” (Kunpal, 2003). This popular verse characterizes the compassionate intention to help others and alleviate their suffering, specifically by striving for enlightenment and compassion for all sentient beings. Bodhichitta is defined as aspiring to supreme enlightenment (Skilton, 1994), which is characterized by this perfect compassion to help others achieve liberation. For a true bodhisattva, all actions are motivated by bodhichitta.

Compassion in Meditation

Buddhaghosa described the successive stages for developing compassion in his classic Theravadin treatise titled *The Path of Purification*, emphasizing meditation as the medium of cultivation (Nanamoli, 2010). He explains that loving-kindness and compassion must be developed in stages, beginning with oneself. After one has successfully cultivated self-compassion, one then cultivates compassion towards a close friend, then towards a person one neither likes nor dislikes, and finally towards a person one dislikes, successively. After cultivating loving-kindness for each of the above four targets, one must generate equivalent amounts of loving-kindness for all four, then move on to the entire universe. Although Buddhaghosa was a Theravada scholar, the Dalai Lama makes it clear that Mahayanists share this progression to develop loving-kindness through meditation, though he does not comment on self-compassion:

When, through prolonged meditation, we are able to equalize our feelings toward those three individuals—the friend, foe, and stranger—gradually extend the scope of the meditation to our neighbors, our fellow citizens, and our compatriots. Eventually, we extend the meditation to include all the beings in the world. (Gyatso, 2003)

The inclusion of foes and strangers emphasizes the importance of loving-kindness based on equanimity. Without uniform, consistent loving-kindness, one cannot cultivate true compassion for all sentient beings. As Buddharakkhita explains, when one can consider a dear friend and an enemy with the same amount of goodwill, the impartiality of loving-kindness has been established, which elevates the mind (Buddharakkhita, 1989).

Various forms of LKM include self-compassion meditation and *Tonglen* meditation, although there are many ways to radiate loving-kindness and compassion to the world (Buddharakkhita, 1989). An example of self-compassion meditation might entail focusing on positive self-qualities and the idea that we are all flawed human beings. By doing this, an individual can develop compassion towards him or herself by focusing on strengths instead of weaknesses, and acknowledging that every person makes mistakes. In a *Tonglen* meditation, for example, an individual might envision physically taking the suffering of another and replacing it with happiness through specific mental imagery of breathing in the negative karma and suffering of others (visualized as a dark smokey substance) and exhaling ones own accumulated virtue and merit for the indiscriminate benefit of others.

Pema Chodron, considered an expert in *Tonglen* meditation, explains that this visualization practice of taking suffering and sending relief or happiness cultivates love and compassion, ultimately opening our hearts and minds. In her book *Tonglen: The Path to Transformation*, Chodron describes how *Tonglen* cultivates these positive qualities. By focusing on the suffering of others, instead of yourself, you begin to move passed your own ego, which is considered one of the major sources of ignorance in Buddhism. In

other words, by focusing on yourself all of the time, you are facilitating an inaccurate view of reality, thus breeding your own ignorance. Chodron explains that by focusing on others, you are able to break through the many barriers of ego clinging, and can begin to see the world and reality more clearly. Your ego serves to reinforce ignorance by creating self-serving habits as well as self-serving perceptual and behavioral patterns. By focusing on others, we can step away from ourselves, which not only allows us insight into reality, but also insight into ourselves. As Chodron emphasizes, “Those patterns and habits have completely convinced us that they are real, and they motivate everything we do. The trick is to look at them again and again... Then, when you can begin to see through them, they no longer have a hold on you” (Chodron, 2001).

In line with Chodron’s discussion of *Tonglen*, the *Metta Sutta* within the Pali Canon describes several benefits of *metta* meditation, or LKM:

One sleeps easily, wakes easily, dreams no evil dreams.
One is dear to human beings, dear to non-human beings.
The devas protect one. Neither fire, poison, nor weapons
can touch one. One’s mind gains concentration quickly.
One’s complexion is bright. One dies unconfused and – if
penetrating no higher – is headed for the Brahma worlds.
(Thanissaro, 1997)

As this excerpt illustrates, variations of LKM serve to help abolish ignorance, and if one practices successfully, he or she “dies unconfused” and “is headed for the Brahma worlds,” implying enlightenment.

The Pali Canon also documents LKM as the primary antidote to ill will, which must be abolished to progress down the eightfold path. As the Buddha described in the *Anguttara Nikaya*, “No other thing do I know, O monks...For one who attends properly to the liberation of the heart by loving-kindness, unarisen ill will does not arise and arisen

ill will is abandoned” (Nanamoli & Bodhi, 1970). Loving-kindness therefore bolsters the development of characteristics of enlightenment by combatting symptoms of suffering, such as ill will. Because mental defilements, perpetuated by ignorance, are the sole cause of a lack of compassion, compassion was an inherent quality of the Buddha’s enlightenment (Analayo, 2010). Nirvana cannot be obtained without compassion because a lack of compassion is ultimately caused by ignorance.

The cultivation of true bodhichitta, or perfect compassion, is considered to be one of the most difficult aspects of the path to enlightenment, but Mahayanists consider it to be the best possible motivation to have for any action. There are many recognized ways to cultivate bodhichitta, including Buddha worship, confession of one’s faults, rejoicing in the good actions of others, and *Tonglen* meditation. Skilton explains that Shantideva developed this method “known as ‘exchange of self and others’... [Where] the practitioner takes upon himself or herself the sufferings of all other beings, and in return dedicates body, speech, mind, and all merits to their benefit” (Skilton, 1994). One may wonder how this visualization process specifically leads to compassionate sentiments, and ultimately prosocial behavior. Although it makes perfect sense that compassionate thoughts and compassionate behavior are linked, *why* does former particularly lead to the latter, according to Buddhism?

Intention and Karma

Buddhists believe that this cognition-behavior link is characterized by intention, as conveyed by the theory of karma. The theory of karma, while incredibly complex, can be summarized as the idea that our future experiences are shaped by the nature of our

own intentional actions (Skilton, 1994). More specifically, our future experiences will be congruent with the ethical nature, and thus intention, of our present actions. The Buddha stated in the *Nibbedhika Sutta* that, “Intention, I tell you, is [karma]. Intending, one does [karma] by way of body, speech, and intellect” (Thanissaro, 1997). This mechanism of karma between intention and concordant outcomes is often described with the metaphor of planting seeds in the mind, which come to fruition in the future (Skilton, 1994).

Karma can also be considered a function of memory: our actions (and thus the intentions that precede them) create behavioral patterns, patterns of perception, and patterns of emotion that elicit similar actions in the future, cause us to perceive similar actions from others, and cause us to react emotionally in a congruent way (Succitto, 2009). Indeed, the Buddha claimed that one of the benefits of compassion is that people will love you (Salzberg, 1995). Whether it is that compassionate actions prompt similar actions from others, or compassionate actions create perceptual patterns that cause us to see similar qualities in the actions of others, the end result is the same. Concerning karmic theory, the main point of interest is that intention precedes behavior, and is a cognitive event that produces like events in the future in various ways.

Therefore, according to karmic theory, when meditating on ways to help others (LKM), the formation of the compassionate intention will lead to compassionate outcomes. Thus, when one practices LKM, one is more likely to act in a compassionate manner, perceive the actions of others as compassionate, and respond with empathy to the plights of others. As American Buddhist meditation teacher Sharon Salzberg explains using the common metaphor, “doing metta, we plant the seeds of love, knowing that

nature will take its course and in time those seeds will bear fruit” (Salzberg, 1995). In other words, when we practice loving-kindness meditation, we do so with compassionate intentions, fortifying compassionate behavioral and perceptual patterns. Because of this, one would expect loving-kindness meditators to experience concordant compassionate outcomes, such as positive relations with others, empathic concern, and perspective taking, compared to people practicing other types of meditation that do not entail compassionate intentions, such as mindfulness meditation.

CHAPTER 3: SOCIAL COGNITION AND MEDITATION

The karmic mechanism of the cognition-behavior link, put forth by Buddhist theory, is very similar to the Western psychological theory of construct activation. Ultimately, both theories maintain that your current actions and cognitions produce concordant outcomes in the future. Although each theory describes the relevant processes using different language, both specify that the information used to interpret people and situations can be dictated by past thoughts and behavior. While Buddhists use the seed metaphor to describe how this works, psychologists have researched this process over the last 50 years in the context of memory structures and perception.

Perception is a constructive process that includes recalling information stored in memory in different domains, used to categorize environmental stimuli. This process implies that specific information must be selected and synthesized (Marcel, 1983). Moreover, perception is an ongoing interaction between environmental stimuli and memory representations (Bargh, Lombardi, & Higgins, 1988). Judgments and decisions, such as choosing how to behave, are likewise influenced by knowledge stored in memory (Wyer, 2007). From an evolutionary perspective, it makes sense that an ability to rapidly categorize and interpret objects and events would aid in survival and reduce uncertainty concerning one's environment (Kagan, 1972). The stored knowledge used for perception is usually a small subset of one's knowledge that comes to mind quickly and easily to enable immediate action if necessary. While psychologists may disagree about the structure of stored information, and thus how knowledge is recalled (e.g., discrete representations or patterns of associations), applicability to the objects of perception in

part determines what knowledge is activated (Smith & Decoster, 1998; Wyer, 2007). Indeed, it is intuitive that irrelevant information would not aid in environmental interpretation.

Terminology

As noted, psychologists have not yet come to a consensus concerning the nature of our mental representations. Generally speaking, though, a mental representation is encoded information stored in memory (Smith, 1998). Carlston (2010) extends this definition to general cognitive functioning, explaining that, “[mental] representations are cognitive structures that reflect acquired knowledge and experience, and that provide the material in which cognitive processes operate.” Psychologists often refer to these mental representations as “constructs” or “schemas” (depending on the theoretical context), and they can contain a range of content such as attitudes and opinions, memories, stereotypes, goals, and procedural scripts. A procedural script, for example, could represent the general process of making coffee or retrieving money from an ATM (Sedikides & Skowronski, 1991). For the purposes of the current study, I will refer to cognitive structures as constructs, which will represent a collection of ideas, attitudes, memories, stereotypes, goals, and scripts that are closely related in content. For example, a ‘cat’ construct may encompass cat breeds, past personal experiences with cats, attitudes about cats, ideas of how one should act when around cats, and goals concerning interactions with cats (e.g., to want the cat to sleep on your lap).

While Buddhists and psychologists define mindfulness in a consistent fashion, they vary in how they consider the concept of wisdom. In Buddhism, wisdom is defined

in terms of Buddhist goals, such that wisdom represents the attainment of these goals. For example, wisdom can be cultivated with realizations of emptiness, selflessness, and suffering. In this sense, Buddhist wisdom is highly specific to Buddhist concepts and ideals. Wisdom represents progression towards enlightenment, and is not subjectively defined. In psychology, wisdom is much more abstract and variable. For example, wisdom can encompass self-knowledge, sincerity, and behavior consistent with one's ethical beliefs (Harter, 2004). Some measures of wisdom also incorporate aspects of empathy and positive relations with others. In general, though, wisdom represents an ability to understand your environment at a deeper level and interact within it in a way that is conducive to yourself and others.

Theories of Memory Retrieval

According to Wyer (2007), there are three broad types of memory retrieval theories: associative models, retrieval cue models, and reconstructive memory models. Hybrid models generally combine features of these in some way. Associative models of memory assume that memory representations are stored in the form of associative networks. Memory representations can either take the form of single concepts or collections of associated concepts, and are generally referred to as "nodes." Discrete nodes can be connected by pathways between them if the concepts are related, with more pathways indicative of stronger associations. One implication of associative network models is the concept of spreading activation; that the cognitive access of one node can lead to the activation of a closely related node, even if related node is not applicable to the immediate situation (Smith, 1998). For example, when the construct of 'dog' is

activated, the concept of 'cat' may also inadvertently be activated due to their close association in many people's minds.

Retrieval cue models generally make fewer assumptions about how knowledge is organized in memory, and take more of a utility approach to information recall (Wyer, 2007). They maintain that when information is needed, a set of relevant features is compiled to suit the specific objective, which serve as cues to access constructs that contain these features. The specifics of the retrieval process, though, can vary by model. For example, resonance models stipulate that information retrieval (construct activation) is determined by cue-content similarity, and the construct containing the most similar information is the one activated. In contrast, exemplar models hold that all constructs that contain content similar to the cues are simultaneously activated, and the ones containing the features most similar to the cues are weighed and employed more heavily.

Reconstructive memory models emphasize the subjective nature of information recall. They state that when information is encoded into memory, features of the content or experience are omitted. Thus, when one attempts to recall the content or experience, the information is incomplete, and the knowledge gaps are inferred or reconstructed. These knowledge gaps can be filled with information from other similar previous experiences, and these inferences can even be factored into one's pre-existing memories. For example, a person may not remember paying for his gas, but infers that he must have based on previous experiences at the gas station.

Determinates of Construct Accessibility

Construct accessibility refers to the potential, or “pre-exposure strength,” of a construct being activated by some kind of input (Bargh et al., 1988). Constructs that have a high potential are more likely to be activated than other constructs that are similarly applicable to the situation at hand (Higgins, 1996). Note that knowledge must be applicable for it to facilitate perception or decision-making. For example, Higgins, Rholes, and Jones (1977) observed that an activated trait construct was used to perceive a person performing an ambiguous behavior only if that trait was reasonably applicable to that behavior. To provide another example, if you cannot tell if your friend is wearing a dress or a skirt, your peanut butter construct likely will not be used, even if it is highly active. Applicability of information is not the only determinate of construct activation, though. Recent activation of the construct, frequency of construct activation, and goals relevant to the construct also determine how accessible it is.

Conceptual priming, or exposure to relevant construct content, will temporarily increase a construct’s accessibility. This is why exposure to a stimulus (a “prime”) facilitates the subsequent perception of a target that is conceptually related; the construct has been recently activated. Indeed, research has shown that participants primed with a word will respond faster to a word of related content than to an unrelated word (Koriat, 1981). For example, a person primed with “horse” will respond more quickly to “saddle” than to “table.” Priming procedures can be subliminal, where exposure to relevant construct content is so rapid that the participant cannot consciously recognize the stimulus (Bar & Biederman, 1998). Priming procedures can also be overt, where the

participant can consciously recognize the prime, but may be unaware of the prime's purpose. For example, to prime uncertainty-related constructs, a researcher may choose to overtly prime a participant by having him or her work with uncertainty related words in a sentence-unscrambling task.

How often a construct is activated also determines its accessibility. To demonstrate this, Srull and Wyer (1979) primed participants with words related to a specific trait. Those who encountered trait-relevant words more frequently (80% of words versus 20%) were more likely to perceive an ambiguous target person in accordance with that trait than participants who were exposed to fewer trait-relevant words. Additionally, constructs that are more frequently activated will stay activated longer than more dormant constructs (Higgins, King, & Mavin, 1982). Frequent activation and recent activation often go hand-in-hand, since a construct that is frequently activated is likely to have been recently activated.

As discussed above, goals and motivations can be part of complex cognitive constructs, but can also be considered constructs themselves. Goals and motivations can be conscious or outside of conscious awareness, and can take many forms. People use information stored in memory to disambiguate their environment; this is accompanied by the goal or motivation to reduce uncertainty. However, this happens so quickly that it likely occurs outside of conscious awareness. Furthermore, skill acquisition research has demonstrated that frequently used acquired skills (e.g., driving or typing), characterized by the intention or goal to complete a task, consistently have a high activation potential to promote efficient execution of the task (Bargh & Chartrand, 2000).

More relevant to the present study, research has shown that constructs related to goals will remain activated as long as the goal is salient (Goschke & Kuhl, 1993; Bargh & Barndollar, 1996). For example, if a woman walking home at night has the goal to avoid “shady” people, her stereotype of shady people will remain active likely until she gets home, as will other stereotypes and attributes such as suspicious behavior, dark clothing, and solitary individuals. These findings demonstrate that goal constructs are subject to the same governing processes as other constructs, such as spreading activation. When a goal is activated, closely associated constructs, like those relevant to salient goals, will also remain active. The strength of the goal or motivation also determines its accessibility (Förster & Liberman, 2007).

Chronic Construct Accessibility

Constructs that consistently have a high activation potential are said to be chronically accessible (Bargh & Chartrand, 2000). Chronically accessible constructs have stronger influence on environmental interpretation and behavior than other applicable constructs (Bargh, Bond, Lombardi, & Tota, 1986). Because chronic accessibility is determined in part by personal experiences and goals, it is considered and studied as an individual difference (Higgins et al., 1982). Generally speaking, highly accessible constructs will be used for interpretation instead of less accessible constructs, even if the constructs of lower accessibility are more applicable (Burner, 1957). Additionally, highly accessible constructs are easily activated, requiring less information (cue-match) to influence perception and judgment than more dormant constructs. These findings convey the powerful influence of chronic accessibility. Even if other constructs are more

applicable to the situation, chronically accessible constructs will likely be used to interpret ambiguous stimuli.

Chronic construct accessibility can be measured in various ways, and is operationally defined by the methods used to assess it. It has been previously defined in terms of primacy, such that constructs that are chronically accessible will be utilized first for a task, perception, or decision, and thus will also be the most frequently activated (Higgins et al., 1982). For example, if asked to list types of flowers, the first flower(s) listed would be considered chronically accessible, compared to the others. Chronic accessibility has also been operationally defined in terms of processing speed, such that chronically accessible constructs will facilitate performance on a task, often measured with reaction times (Förster, 1976). However, both primacy and processing speed are not unique to chronic accessibility, as they can also demonstrate temporary construct accessibility (e.g., after a prime).

Two performance tasks in particular are often used to assess chronic construct accessibility, which the present experiment will employ. These are the lexical decision and modified Stroop tasks, called reaction-time paradigms because they operationally define chronic accessibility as reaction times to construct-relevant stimuli. In the lexical decision task, participants are presented with individual stimuli, either in the form of a word or a non word (e.g., friend or bleuf), and are asked to indicate whether the stimulus is a word in the English language or not (Meyer & Schvaneveldt, 1971). To test if a given construct is chronically accessible, participants are presented with both words related to that construct and unrelated words to enable comparison. Faster reaction times indicate

chronic accessibility because such constructs are already active and ready to be used in perceptual processes, and therefore facilitate responses to related stimuli.

In what is commonly referred to as the modified Stroop task, participants are similarly presented with words that are both related and unrelated to the construct under investigation (Bargh & Pratto, 1986). Instead of categorizing stimuli as words or nonwords, though, participants are asked to identify what color font a given word is presented in. Generally, words are either presented in blue, red, green, or yellow, and when a word is related to a chronically accessible construct that is already active, it takes participants longer to identify the font color. This is because the accessible construct diverts attention from the color naming process, leading to longer response latencies.

Effects of Construct Accessibility

Various studies have documented the effects of construct accessibility. Concerning attention, stimuli related to active constructs are more likely to attract attention than stimuli unrelated to active constructs (Higgins, 1996). Activated constructs can also influence memory and recall. Research has shown that people remember information related to accessible constructs better than information related to less active constructs (Higgins et al., 1982). For example, Bargh and Thien (1985) observed that participants under cognitive load (i.e., few cognitive resources at their disposal) who demonstrated chronic accessibility of honesty had better recall for a target person engaging in honest and dishonest behaviors than participants for whom honesty was not chronically accessible. Perhaps most pertinent to the current study, construct accessibility

influences perception and judgments of people and situations, and thus behavior (Jefferis & Fazio, 2008).

Active constructs are used for judgment and person perception, if the content is applicable. Social behavior is frequently ambiguous, meaning more than one interpretation could apply (Bruner, 1958). Because of this, social perception is a product of social input and the relative accessibility of applicable constructs (Higgins & King, 1981; Wyer & Srull, 1986). Studies have illustrated that people are more likely to form impressions of others in congruence with recently activated trait constructs than less active trait constructs (Higgins, 1996). This finding also applies to chronically accessible trait constructs. In one study, participants who were asked to read a paragraph describing a target person perceived the target in accordance with their chronically accessible trait constructs, ignoring inaccessible trait-related information (Higgins et al., 1982). These results especially emphasize the subjective nature of social perception. Even when other interpretations or information are available, perception depends on which constructs are most accessible, determined by personal experience and related factors. Perceiving people in a way congruent with one's active trait constructs is a powerful phenomenon, evidenced by decades of research (Kay, Wheeler, & Smeesters, 2008).

The influence of active constructs on behavior has also been well documented. As with impression formation, activated constructs are more likely to influence behavior than inactive constructs. Bargh, Chen, and Burrows (1996) demonstrated this relationship with three separate studies. In the first experiment, they found that participants primed with politeness waited significantly longer to interrupt a conversation than participants

primed with rudeness. In their second study, the researchers observed that participants primed with an elderly stereotype walked significantly slower down a hall (behaving in a way consistent with the stereotype) than participants who were not primed. In the last experiment, results showed that participants primed with the African American stereotype (which generally includes hostility) responded with more hostility to an unreasonable request than did participants who had not received the prime. These results were even replicated when an unreasonable request was not made (Chen & Bargh, 1997).

Like the Buddhist theory of karma, empirical findings regarding construct activation and accessibility suggest a strong link between cognition, perception, and behavior. Constructs that are recently and frequently activated are likely influence perception and behavior when the construct is applicable. Buddhists describe this process using the seed metaphor, stating that thoughts, perceptions, and behaviors plant seeds in one's mind, bringing to fruition future thoughts, perceptions, and behaviors that are similar in nature. Western psychology supports this abstract theory with concrete evidence, suggesting that the accessibility of cognitive constructs accounts for this relationship.

Prosociality

The current study aims to integrate these two theories by applying experimental social psychology methodology to Buddhist meditation practice. The construct of interest in this case is prosociality. Prosocial behavior has been defined as “a broad range of actions intended to benefit one or more people other than oneself” (Batson, 2003). Therefore, we define prosociality in this context as cognitions and behaviors intended to

benefit others. Loving-kindness and compassion are intuitively related to this construct since prosociality is characterized by the intention to benefit or aid someone else. Furthermore, research has demonstrated that trait compassion often motivates prosocial behavior, especially in people who do not consider themselves highly religious (Saslow et al., 2013).

Empathy predicts prosocial behavior, though the strength of this relationship depends on how empathy is measured (Eisenberg & Miller, 1987). While considered separate constructs by some, perspective taking, or the ability to adopt the perspective of another, and empathy are closely related (Galinski, Maddux, Gilin, & White, 2008). Also, because prosociality entails helping others, we expect that positive interpersonal relationships are related, and perhaps a consequence of an active prosociality construct.

Research on Meditation

Due to the immense amount of research on the technique, a wide variety of benefits of mindfulness meditation have been documented. As conveyed in the Buddhist philosophy review, the purpose of mindfulness meditation is to cultivate the characteristic of mindfulness, which can be described as bare, nonjudgmental attention to aspects of the present moment. Increases in trait levels of mindfulness are perhaps the most apparent benefit of Mindfulness meditation (Birnie, Speca, & Carlson, 2010). Mindfulness has been described as an adaptive characteristic, and has been strongly associated with other adaptive characteristics such as self-reflection and self-compassion (Carmody, Baer, Lykins, & Olendzki, 2009).

Studies show that mindfulness meditation increases general well-being, (Krasner, Epstein, Beckman, & Suchman, 2009) and decreases stress, anxiety, and negative rumination (Richards, Campenni, & Muse-Burke, 2010; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008, respectively). Consistent, extensive practice of mindfulness meditation has also shown to be more effective in reducing anxiety in people with social anxiety disorder than cognitive based group therapy, which is known for its efficacy (Koszycki, Bengler, Shlik, & Bradwejn, 2007). Mindfulness meditation is also known to reduce symptoms of professional burnout (Gold et al., 2010; Shapiro, Astin, Bishop, & Cordova, 2005).

Of more interest to the current study, mindfulness meditation leads to increases in empathy levels and spirituality (Shapiro, Schwartz, & Bonner, 1998). It has also been shown to influence attention by reducing distractive thoughts (Jain et al., 2007). Additionally, people who practice mindfulness meditation demonstrate decreases in physical illness symptoms (Carmody, Reed, Kristeller, & Merriam, 2008; Carmody & Baer, 2008), likely due to its positive effects on the immune system (Davidson et al., 2003; Carlson, Speca, Patel, & Goodey, 2003). Research also indicates that as people practice mindfulness meditation, they become more emotionally stable (Robins, Keng, Ekblad, & Brantley, 2012), possibly due to increases in emotion regulation abilities.

Because loving-kindness meditation (LKM) is a more obscure technique, not nearly as much research has been conducted on its effects. The main goal of LKM is the cultivation of loving-kindness and compassion, or the indiscriminate desire to help others who are suffering. Research on LKM illustrates that similar to mindfulness meditation, it

may be a beneficial intervention for negative mental and physical symptoms. Results indicate that it aids in the recovery from negative schizophrenic symptoms and can be used as a successful treatment for chronic pain (Johnson et al., 2009; Carson et al., 2005, respectively).

LKM has also been found to significantly increase social connectedness (Hutcherson, Seppala, & Gross, 2008). Furthermore, Fredrickson et al. (2008) found that LKM increased participants' experiences of positive emotions including love, joy, and gratitude, which over the course of nine weeks were associated with significant increases in a variety of personal resources. The researchers also documented some benefits that overlap with known benefits of mindfulness meditation, such as increases in mindfulness, self-acceptance, and satisfaction with life, and decreases in illness symptoms. This suggests that although differential benefits exist between the techniques, perhaps there are some that are inherent to meditation practice in general. However, research has not yet been conducted with both mindfulness meditation and LKM as experimental conditions in the same context and with the same measures.

CHAPTER 4: VARIABLE OPERATIONALIZATION

To investigate the effects of mindfulness meditation and LKM, the present research utilized a repeated-measures between-groups experimental design, with pre and post-test measurement administrations. We hoped to identify both common and differential effects of the two meditation techniques, particularly differential effects regarding prosociality. Specific hypotheses are addressed at the end of the subsequent chapter.

The variables included in the current study were chosen in accordance with psychological and philosophical theory, guided by previous research. This chapter outlines the choice of meditation techniques, and the justification for the included dependent measures. The dependent variables were selected via theoretical prediction; they were included with the intent to directly test specific hypotheses, or to identify commonalities and differences between the two meditation techniques.

Selection of the Independent Variable

Selection of the meditation techniques, and thus experimental groups, was a direct response to previous research. In their field study, Fredrickson and colleagues (2008) observed that LKM elicited increases in positive emotions, compared to a wait-list control group, and led to consequential increases in a variety of personal resources (e.g., social support). However, the researchers did not identify a cognitive mechanism through which these effects may work. The current experiment attempted to identify a possible mechanism of LKM, specifically concerning prosocial effects.

Furthermore, studies investigating meditation rarely compare across meditation techniques, and tend to generalize the effects of a specific practice to others (Awasthi, 2013). Assuming that meditation techniques will have the same effects is erroneous, as cognitive tasks vary by technique, and they are designed to have different outcomes (explained in the Buddhist literature review). The inclusion of mindfulness meditation as a comparator to LKM allowed us to investigate the common effects of both techniques and identify ways in which they differ.

Although many studies use wait-list or relaxation control groups, neither of these serves as an adequate comparator to an experimental meditation group; they do not control for influences such as expectancy effects, social interaction, instructor attention, and time spent practicing (AHRQ, 2007), not to mention the general cognitive activity of meditation practice. The current study addressed this critique of meditation research by incorporating mindfulness meditation as a comparator to LKM, which theoretically should not prompt prosocial construct activation as we expected LKM to.

Selection of the Dependent Variables

Standard measures of construct activation were incorporated in the present study. Reaction times in response to word stimuli on the modified Stroop and lexical decision tasks served as the operational definition of construct activation. Faster reaction times on the lexical decision task indicate a stronger association between concepts, which is illustrated by slower reaction times on the modified Stroop task. The procedures of these tasks were also outlined in the literature review. The primary goal of the present experiment concerned reaction times to prosocial word stimuli, although neutral and

antisocial stimuli were included to be able to contrast any observed effects. Word stimuli were first selected by identifying words with prosocial, antisocial, and neutral meaning, and were matched on commonality in the English language (Kucera & Francis, 1967). The word stimuli were then matched on concreteness (Clark & Paivio, 2004), and within-category valence (Bradley & Lang, 1999; Toggia & Battig, 1978) to account for confounding variables that the words themselves could produce. See Appendix A for a list of the word stimuli incorporated into the reaction time paradigms.

Various self-report measures were additionally included to assess the construct of prosociality. The researchers identified positive relations with others, empathic concern, and perspective taking as possible facets of compassion and altruism. All incorporated self-report measures were selected due to their demonstrated validity and reliability. We measured positive relations with others by using a subscale of Ryff's (1989) well-known psychological well-being scale (PWB; see Appendix B), which consists of six subscales. Because one would expect a compassionate person to be benevolent, positive relationships with others is a logical consequence of the characteristic. Participants were asked to rate on a 6-point scale (1 = *strongly disagree*, 6 = *strongly agree*) the extent to which they agreed with items such as, "I enjoy personal and mutual conversations with family members or friends." Items were summed for a singular score, with higher numbers indicating more positive relationships with others.

The Interpersonal Reactivity Index was used to measure two aspects of empathy (IRI; Davis, 1980). See Appendix C for scale items. As described, *Tonglen* meditation entails contemplating the causes of a person's suffering and how to relieve it; this is an

empathetic action at its core, so increased empathy was an expected outcome of the practice. Empathic concern, defined as “feelings of warmth, compassion, and concern for others,” was measured with the empathic concern subscale of the IRI. The students were asked to react to items such as, “I often have tender, concerned feelings for people less fortunate than me,” indicating on a 5-point rating scale whether the item was characteristic of them or not (1 = *Does not describe me well*, 5 = *Describes me very well*).

Perspective taking, the second aspect of empathy measured in the current study, is defined as the “spontaneous attempts to adopt the perspectives of other people and see things from their point of view” (Davis, 1980). Participants responded on the same scale to items like “Before criticizing somebody, I try to imagine how I would feel if I were in their place.” To score the IRI, the appropriate items for each subscale were reverse scored then summed, with higher numbers illustrating a greater tendency towards empathic concern or perspective taking.

In addition to assessing prosocial construct activation and related constructs, we wanted to assess some known effects of mindfulness meditation and explore if they generalize to LKM. Mindfulness is likely the most obvious benefit of mindfulness meditation, since that indeed is what the technique is meant to cultivate. There are currently two widely used self-report measures that assess aspects of trait mindfulness: the Mindful Attention and Awareness scale (MAAS; Brown & Ryan, 2003) and the Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buittenmuller, Kleinknecht, & Schmidt, 2006). Although the MAAS is more commonly used than the FMI, we included both to evaluate the extent of convergent validity between the two measures. For the

MAAS, participants were asked to rate (1 = *Almost always*, 6 = *Almost never*) how frequently they experienced qualities of mindlessness (e.g., “I could be experiencing some emotion and not be conscious of it until some time later). Refer to Appendix D for scale items. Items were then averaged for a singular score, higher numbers indicating higher levels of dispositional mindfulness.

The FMI, also designed to assess dispositional mindfulness, required our students to rate on a 4-point scale (1 = *Rarely*, 4 = *Almost always*) how often they partook in mindful and mindless behaviors. For example, participants were asked to respond to items such as, “I see my mistakes and difficulties without judging them.” Note that items on the MAAS only focus on the attention component of the mindfulness construct, where the FMI includes a more comprehensive array of items also focusing on the nonjudgmental and emotion regulation aspects of the construct, as outlined in the Buddhist literature review. See Appendix E for these items. After reverse coding, items were summed for a score; higher scores indicate more trait mindfulness.

Mindfulness meditation is known to have positive effects on the immune system (Davidson et al., 2003), and has been demonstrated to decrease the experience of physical illness symptoms (Carmody & Baer, 2007). We used the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983) to measure the extent to which our participants experienced a wide variety of illness symptoms including back pain, blurred vision, and cough or cold. Participants rated how much each illness symptom bothered them during the preceding two-week period (0 = *Have not been bothered by the*

problem, 4 = *The problem has been an extreme bother*), with higher scores indicating more troubling symptoms. See Appendix F for scale items.

Previous research has indicated that both mindfulness and concentrative meditation increase performance on a sustained attention task (Valentine & Sweet, 1999). Since these beneficial effects on attention seem to be independent of mindfulness, they could logically generalize to LKM. To measure the ability to regulate attention, we employed the Attentional Control Scale (ACS; Derryberry & Reed, 2002), which is comprised of attentional focus and attentional shifting subscales. Attentional focus is considered the ability to inhibit distractors of attention and notice details about the object of attention, while attentional shifting is the ability to disengage attention from one object and direct it to another. Participants rated the extent to which items like “When I am reading or studying, I am easily distracted if there are people talking in the same room” described them (1 = *Almost never*, 4 = *Always*). Scale items are located in Appendix G. The items were reverse scored and summed for each subscale. We analyzed the subscales separately to see what was driving any significant effects on attention.

Researchers have demonstrated that mindfulness meditation reduces depressive symptoms in clinical patients following a depressive episode, and prevents relapse in patients with repeated depressive episodes (Shahar, Britton, Sbarra, Figueredo, & Bootzin, 2010; Ma & Teasdale, 2004, respectively). This study sought to examine if these effects extend to nonclinical populations and other meditation types, a logical possibility since LKM has been shown to increase the experience of positive emotions (Fredrickson et al., 2008). The Center for Epidemiologic Studies Depression scale (CES-D; Radloff,

1977) was administered to the students, who were asked to indicate how often they experienced depressive symptoms in the previous week (e.g., “I did not feel like eating; my appetite was poor”) on a 4-point scale (1 = *Less than 1 day*, 4 = *5-7 days*). See Appendix H for scale items. Items were reverse scored and summed, with higher scores illustrating more depressive symptomology.

As indicated in the Buddhist literature review, mindfulness meditation entails emotional neutrality that allows one to accept experiences as they are without approach or avoidance. Although mindfulness meditation proposes that one accepts all experiences without trying to change them, even emotional ones, mindfulness has been shown to improve emotion regulation. Some researchers have proposed that increases in attentional control and metacognitive awareness account for changes in emotion regulation abilities (Kring & Sloan, 2009). While the mechanisms of this effect are beyond the scope of the current project, we were interested in its generalizability. We used the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003; See Appendix I) to assess the construct, which measures two emotion regulation strategies: expressive suppression and cognitive reappraisal. Expressive suppression entails concealing one’s emotions, while cognitive reappraisal consists of reevaluating one’s situation to alter the current emotional experience. Cognitive reappraisal is considered the more adaptive emotion regulation strategy. On the ERQ, participants rated the extent to which they agreed or disagreed with statements such as, “I control my emotions by not expressing them” by using a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*). Subscale items were summed for individual scores.

The Situational Test of Emotion Management and Situational Test of Emotional Understanding (STEM & STEU; MacCann & Roberts, 2008) assessed meditative influences on aspects of emotional intelligence. Emotional intelligence can be thought of as a group of intelligence-relevant factors that are used to process emotional stimuli. The STEM and the STEU measure two of these factors, management and understanding, with forced-choice items. For the STEM (see Appendix J), participants were presented with emotional situations and were asked to identify the most effective strategy for resolving them (e.g., “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?*”) from four possible actions. For the STEU (see Appendix K), participants were again presented with emotional situations, but were instead asked to identify the most likely emotional result of that situation (e.g., “An irritating neighbor of Eve's moves to another state. *Eve is most likely to feel?*”). Participants were asked to choose between five options what the emotional result was likely to be. For both scales, correct responses were summed for a singular score.

Increases in satisfaction with life may be a general effect of meditation practice, as studies have shown that satisfaction with life improves with both mindfulness meditation and LKM (Shapiro, 2005; Fredrickson et al., 2008, respectively). The current study intended to replicate these findings using the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), a 5-item measure composed of statements like “I am satisfied with my life.” Scale items are located in Appendix L. The students were asked to rate how much they agreed with each statement on a 7-point scale (1 =

Strongly disagree, 7 = *Strongly agree*), and individual scores were obtained by summing across the items.

In an exploratory vein, the current study investigated meditative effects on self-reported wisdom. According to Buddhist philosophy, meditation on the present moment facilitates the development of both mindfulness and insight (considered synonymous to wisdom in this context), though meditation on the present is not sufficient to develop perfect insight. As also noted in the Buddhist literature review, transcendental wisdom is rooted in compassion and altruistic thought, making wisdom a reasonable consequence of LKM. To measure wisdom, we incorporated two wisdom scales, again to evaluate the convergent validity between them. The 3-Dimensional Wisdom Scale (3D-WS; Ardel, 2003; see Appendix M) assesses the cognitive, reflective, and affective components of wisdom with statements such as, “People are either good or bad.” Students responded to these items on a 5-point scale (1 = *Strongly agree*, 5 = *Strongly disagree*), with all items averaged to obtain a singular score. Higher scores on this scale demonstrate higher levels of wisdom.

The other included self-report measure of wisdom was the Self-Assessed Wisdom Scale (SAWS; Webster, 2003), which consists of items like, “I can chuckle at personal embarrassments.” Participants responded to these items on a 5-point scale, indicating how much each statement described them (1 = *Strongly disagree*, 6 = *Strongly agree*). See Appendix N for scale items. Items were summed for a total, with higher scores reflecting higher levels of self-perceived wisdom.

The researchers administered additional self-report to participants for reasons pertinent to the unique experimental design of the study. Although the measures themselves are not discussed, the rationale for including them is outlined in the following chapter.

CHAPTER 5: EXPERIMENTAL DESIGN

Method

For reasons discussed below, the present study took place in a classroom setting and was advertised as a “Research Methods Workshop.” Students received upper-division psychology credits for enrollment in the class, which was independent of enrollment in the study (i.e., students could take the class, but refuse to consent to the use of their data). The class allowed students to become more informed about research procedures, as they were required to participate in all aspects of the study, even if they refused to consent. In between research-relevant activities (meditation, measures, research-relevant tasks), the students received introductory lectures on research methods and psychometrics. The self-report measures that were administered, but not used for data collection in this study, provided lecture topics and served as examples for the research methods overview. All students were graded on a pass/fail basis, and were only subject to fail if their absences exceeded a predetermined limit or if they did not complete required activities. The researchers did not consider consent when assigning grades.

Participants

A total of 69 Oregon State University undergraduates participated in the study across four academic terms (32 male). A majority of participants were psychology majors

of typical undergraduate age (18-24 years). Because the study took place in a classroom setting, participation spanned a full academic term (10 weeks). To be able to register for the class, and thus participate in the study, all potential participants met with the principle investigator to review attendance requirements. The ones admitted into the class gave verbal agreement of minimal absences from the class throughout the term. The researchers made it clear to participants that excessive absences put them at risk of failing the class. Although formally withdrawing from the class was an option for the first seven weeks of the study, there were no participants who chose to do so. However, the data of several participants were excluded due to excessive absences, and thus inadequate exposure to their assigned meditation practice ($n = 5$), yielding a final sample of 64 (30 male).

Design and Procedure

The researchers employed a classroom setting to study the relative effects of mindfulness and loving-kindness meditation. Students received course credit through the psychology department by enrolling in the class and study for an academic term. A unique experimental design was necessary for the current research for two reasons: the attempt to address a common critique of meditation research, and the longitudinal nature of meditation research. Because such research often focuses on clinical populations or recruits participants specifically interested in meditation, it has been criticized for susceptibility to expectancy effects and inadequate control groups (AHRQ, 2007). During recruitment for the current research, participants remained uninformed regarding the topic of investigation, and thus did not approach the researchers because of a specific

interest in meditation or its clinical benefits. Instead, students approached the researchers to earn upper-division psychology course credits, and did not learn about the purpose of the study until the first day of class.

Expanding on the benefits of our novel experimental design, the classroom setting allowed a repeated measures design ensuring consistent practice with low risk of attrition. Meditation research is longitudinal by nature if researchers do not want to use experienced practitioners as participants. Experienced practitioners have obvious interest in meditation, and may be qualitatively different in some way from those who do not meditate. In inexperienced meditators, an assortment of meditation studies have documented a wide variety of effects after seven to eight weeks of practice, including decreased anxiety, reduced psychological distress and depression, and increased experience of positive emotions (Davidson et al., 2003; Shapiro et al., 1998; and Fredrickson et al., 2008, respectively). Studies such as these generally utilize a between-subjects, repeated measures mixed design, which the current study also employed. By conducting the study within a classroom environment, the researchers were able to involve participants in a randomly assigned meditation practice for eight weeks, and were able to ensure the consistency of practice since class was held four times each week. Participants were additionally asked to meditate at least once a week outside of class, and coherence to this was tracked by the online daily survey. However, it should be noted that the online survey was easily falsifiable, so the researchers can only guarantee that the frequency of participant practice was at least four times per week.

Overall, the duration of the study was 10 weeks. The first and last weeks of the terms were reserved for pre and post-test measures, with the middle eight weeks dedicated to meditation practice and an overview of research methods. During the first week of class, the researchers presented participants with informed consent documents, explaining that consent was necessary for the publication of results based on their data, and was unrelated to class activities. Had any participants refused to consent to the use of their data, they would still have been required to complete all experimental activities to earn a passing grade. For the baseline measures, all scales and questionnaires were completed by hand, and the modified Stroop and lexical decision tasks were administered via computer using DirectRT v2008 (“Media Lab and DirectRT Psychology Software,” 2011). Participants were randomly assigned to either mindfulness meditation or LKM using a random number generator.

After the first week of class each term, participants fell into a predictable routine. At the beginning of every class period, the researchers took attendance then separated the class into the two meditation groups. Each day, one group remained in the regular classroom to meditate, and the other group was led to a separate room. Room assignments were counterbalanced daily to control for differences between the rooms. To teach the students their respective meditation technique, conduct meditation sessions, and maintain consistency across terms, the researchers used audio recordings of guided meditations. For the mindfulness meditation group, students listened to recordings of Dr. John Kabat-Zinn, a prominent meditation expert, researcher, and the creator of Mindfulness-Based Stress Reduction therapy. The LKM group listened to recordings

produced by Evan Osherow and Dr. Winston McCullough, both Buddhist teachers actively practicing in Oregon.

The meditation sessions ranged from 10 to 20 minutes, increasing in length and required skill as the students became more practiced. Two researchers oversaw the class on a daily basis and supervised the meditation sessions. The researcher in attendance for a given meditation session was also counterbalanced on a daily basis to account for differential influence on the groups. To isolate the effects of meditation, the researchers deliberately withheld from students the Buddhist philosophy behind each meditation technique; exceptions to this include teaching posture and why it is necessary to sit in a certain way, and clarifying minor ambiguities within meditation sessions. However, fundamentals of Buddhist thought, such as the Four Noble Truths, reasons for doing specific meditation practices, and benefits of meditation practice, were deliberately withheld.

During a given meditation session, the participants were provided with cushions specifically designed for contemplative practice, and asked to sit on the floor in a circle. The researchers made it clear that if any student had current or old bodily injuries that would make it difficult to remain in that position, he or she was welcome to use a chair or sit in a more comfortable position. At the beginning of each meditation, regardless of group, participants were asked to focus on their breath and clear their minds. For the mindfulness group, meditations then consisted of concentrating on some aspect of the present moment. It is important to stress the nonjudgmental nature of this cognitive activity. For instance, if one is feeling discomfort due to a limb falling asleep, one should

accept it as is without deeming the sensation as negative, and fully experience it. Examples of objects of concentration include the breath, bodily sensations, and noises in the environment. When the students noticed their minds wandering to other objects such as plans, homework assignments, or interpersonal problems, they were instructed to take notice and return attention back to the present moment.

For the loving-kindness group, they were asked to perform specific mental imagery during their meditations. These visualizations, though variable, generally entail imagining a person in one's life and any kind of suffering he or she is experiencing. Most meditations used were of the *Tonglen* technique, where the practitioner imagines suffering as a black substance throughout the person's body or veins that needs to be removed. By using regulated breathing, the practitioner draws out the suffering and takes it into his or her own body to be annihilated. Then, the practitioner replaces the person's suffering with a gift that he or she needs, such as happiness, strength, or insight. This style of meditation is referred to as "giving and taking" because participants are asked to take a person's suffering away and give something good in return.

Since there are limited variations of *Tonglen* meditation, the LKM participants were exposed to a new version each week, and practiced it for the duration of that week. Although participants practiced a couple other styles of LKM, all meditations for this group consisted of imagining a person's problems and responding compassionately to them, almost always in the form of giving aid in some way. As with the mindfulness group, when LKM participants noticed their attention wandering from the visualization task, they were instructed to take notice and return their attention to the task at hand. The

LKM participants were additionally instructed by the researchers to vary the subject of their meditations to prevent redundancy and boredom.

For the pre and post-test dependent measures, the students completed the scales and questionnaires within the classroom setting. The lexical decision and Stroop tasks were administered in a lab setting in individual cubicles. To protect confidentiality and minimize demand characteristics on these measures, all students were assigned an identification number to use instead of their names. We additionally asked participants to reflect on their meditation experiences by completing the online survey at least five times a week (four for the in-class meditations, and one for the at-home meditation). By the end of each term, the in-class self-report data were aggregated and scored, then presented to the class. This presentation served two purposes: to wrap up the research methods content throughout the term by providing the end result (analyses), and to debrief the students as to the nature of the study. At this point, we disclosed our hypotheses, and even explored with the class whether their data supported our expectations or not.

This study was a 2 (Group: mindfulness or loving-kindness meditation) X 2 (Pre-test and post-test) mixed design. The two meditation conditions were included to investigate the relative effects of each technique, the general effects of meditation practice (regardless of meditation content), as well as to contrast the LKM group with a legitimate control group. The baseline and post-test measures allowed us to track the nature and progress of meditation effects across the academic term.

Hypotheses

The main goal with this project was to determine if mindfulness and loving-kindness mediation differentially influence prosocial construct accessibility. By repeatedly visualizing relieving someone's suffering, and providing him or her with aid, the LKM group should be activating prosocial and compassionate constructs more frequently than the mindfulness group. Frequency of construct activation predicts its level of accessibility (Srull & Wyer, 1979). Furthermore, the lexical decision and modified Stroop tasks are valid measures of construct accessibility (Meyer & Schvaneveldt, 1971; Bargh & Pratto, 1986, respectively). We hypothesized that, after standardizing the data, the LKM group would respond more quickly to prosocial word stimuli than the mindfulness group.

The primary hypothesis of the current research stipulates differences between groups in prosocial construct accessibility, and we can also expect group differences concerning related self-report measures. Because of their probable association with accessible prosocial cognitive constructs, it was hypothesized that group differences would also be observed regarding positive relations with others, empathic concern, and perspective taking, such that the LKM group would demonstrate higher levels of these constructs over the course of the study, while the mindfulness group would remain the same.

The secondary goal of our project was to investigate the common effects of meditation practice, regardless of the content of the meditation. Since both LKM and mindfulness meditation require focus, concentration, and awareness of distraction, we

anticipated time, but not group effects, for constructs such as attentional control and mindfulness. Additionally, previous research has illustrated increases in satisfaction with life and physical health with both types of meditation, so we anticipated time effects for these variables as well. Based on previous research, the mindfulness group was hypothesized to illustrate decreases in depressive symptoms and increases in emotion regulation abilities (and thus perhaps emotional understanding and emotion management). However, we had no predictions of whether these effects would generalize to LKM or not.

Lastly, we wanted to explore if meditation influences self-reported wisdom and aspects of emotional intelligence. According to Buddhist literature, both mindfulness and compassion lead to experiences of insight, which we treated as wisdom in this context. Buddhist theory postulates that both the mindfulness and LKM groups should demonstrate increased levels of wisdom over time, but we made no explicit predictions based on psychological theory. The inclusion of wisdom measures, then, was strictly for exploratory purposes. This was also the case with measures of emotional intelligence. Because emotion regulation effects have been observed with mindfulness meditation, emotion management and emotional understanding could be relevant, but we made no specific predictions.

Results

A series of repeated measures MANOVAs (multivariate analysis of variance) explored between-group differences and time effects on our wide range of dependent variables. Meditation group and time (pre-test, post-test) were included as independent

variables. Before performing any analyses, we imputed missing items in the self-report data to permit scale scoring. The amount of missing data was negligible, at 0.3% of observations. All missing observations were completely at random, with no systematic differences between missing and observed values. Please refer to Table 1 at the end of the chapter for pre and post-test group means. Refer to Table 2 for overall administration means.

Prosocial Construct Accessibility

Because the current study incorporated two reaction time paradigms to measure construct accessibility, it was necessary to standardize the data within task type to enable comparison across experimental paradigm. However, we experienced unforeseen problems with this transformation process, preventing us from analyzing the data across task type. Students were randomly assigned to one of the task type at pre-test, and the other task at post-test to account for potential practice effects. Since it was not possible to analyze the data across task type, this meant that the data could not be analyzed across time either. One-way ANOVAs were conducted between-task at post-test to examine between-group differences after meditation practice. Due to software malfunctions during one term, the data from three participants had to be excluded, yielding an overall sample size of 61 for the RT data.

For the lexical decision task data at post-test, results indicated no significant differences between meditation technique ($F_{(1, 25)} = 2.95, p = .098$), although the means were trending in the anticipated direction. Findings were consistent for the modified Stroop task as well ($F_{(1, 32)} = .051, ns$), although group means were much more similar

than in the lexical decision task. Overall, neither prosocial nor antisocial constructs became more accessible with meditation practice.

Prosocial Self-Report Measures

As described, measures assessing positive relations with others (PWB), empathic concern, and perspective taking (IRI) were included due to their likely association with prosocial construct activation. For these three measures, we expected interaction effects with the LKM group increasing over time.

For positive relations with others, no significant effects were observed for experimental group ($F_{(1, 61)} = .855, ns$), time ($F_{(1, 61)} = 1.41, ns$), or their interaction ($F_{(1, 63)} = .034, ns$). Evidently, neither meditation technique influenced our participants' personal relationships. For empathic concern, analysis of variance revealed no significant effects (for group, $F_{(1, 61)} = .20, ns$; for time, $F_{(1, 61)} = 1.15, ns$; for interaction, $F_{(1, 63)} = 1.62, ns$). These analyses indicated that empathic concern did not change over the course of the study.

For perspective taking, results indicate no main effects for group or time ($F_{(1, 61)} = 2.51, ns$; $F_{(1, 61)} = 1.83, ns$, respectively). However, the interaction term was significant, demonstrating that the mindfulness group increased in perspective taking over time, while the LKM group even showed a slight decrease over time ($F_{(1, 63)} = 9.76, p = .003$, $\eta^2_{\text{partial}} = .14$). Post hoc contrasts confirm that the mindfulness group is significantly higher than the LKM group in perspective taking at post-test ($t = 2.69, p = .009$).

Additional Self-Report Measures

Concerning mindfulness, we included two different measures to explore their convergent validity. According the Buddhist theory, and results of previous research, we anticipated increases in mindfulness for both groups. For the MAAS, a repeated-measures ANOVA yielded a marginal significant interaction ($F_{(1, 63)} = 3.33, p = .073, \eta^2_{\text{partial}} = .05$), illustrating an increase for the mindfulness group and a decrease for the LKM group over time. Post hoc analyses did not confirm any differences. No significant main effects were observed (for group, $F_{(1, 61)} = .36, ns$; for time, $F_{(1, 61)} = .017, ns$).

Analysis of variance of the FMI, which we consider a more comprehensive measure of trait mindfulness, did not replicate the results of the MAAS. Instead, a main effect for time was observed, signifying that both meditation groups experienced increases in mindfulness with meditation practice ($F_{(1, 61)} = 12.23, p = .001, \eta^2_{\text{partial}} = .17$), as expected. This effect for time was not accompanied by a main effect for group ($F_{(1, 61)} = 1.80, ns$) or a group X time interaction ($F_{(1, 63)} = 1.19, ns$). As previously mentioned, the items of the MAAS and FMI seem to be measuring different aspects of the mindfulness construct, and this notion is supported by their varying results with the same sample.

Decreased illness symptoms have been a consistent finding with mindfulness meditation, and we wanted to investigate if this is the case with LKM as well. Analyses confirm that participants in both the mindfulness and LKM groups experienced increased physical health over the course of meditation practice, as demonstrated by decreases in physical illness symptoms ($F_{(1, 61)} = 10.33, p = .002, \eta^2_{\text{partial}} = .15$). Since this effect was unaccompanied by a group main effect or an interaction effect ($F_{(1, 61)} = .35, ns; F_{(1, 63)} =$

.81, *ns*, respectively), decreases in physical illness symptoms are indeed a benefit common to both mindfulness meditation and LKM.

Increases in attentional control have been demonstrated with both mindfulness and concentration meditation practice, and we expected to observe these effects with LKM as well. Two aspects of attentional control were measured with the ACS, attentional focus and attentional shifting. For attentional focus, no main effects were observed (for group, $F_{(1, 61)} = .01$, *ns*; for time, $F_{(1, 61)} = 1.02$, *ns*), and the interaction was nonsignificant ($F_{(1, 63)} = 1.43$, *ns*). For attentional shifting, the same pattern of results was observed (for group, $F_{(1, 61)} = .031$, *ns*; for time, $F_{(1, 61)} = 1.68$, *ns*; for interaction, $F_{(1, 63)} = .98$, *ns*). Neither the ability to remain focused nor the ability to shift attention increased with either type of meditation practice.

Reductions in depressive symptoms are a well-replicated effect of mindfulness meditation. We expected observe this in the present experiment as well, but were unsure if it would generalize to LKM. Contrary to our expectations, depressive symptoms remained constant across the duration of the study, with no main effect of group ($F_{(1, 61)} = .058$, *ns*), time ($F_{(1, 61)} = 2.20$, *ns*), and no interaction effect ($F_{(1, 63)} = .67$, *ns*).

An increased ability to regulate one's emotions is also an effect of mindfulness meditation that has been repeatedly replicated. We expected the current study to also replicate these findings, using the ERQ, but we were again unsure if the effect would generalize to LKM. The ERQ consists of two subscales representing different emotion regulation strategies, emotional reappraisal and emotional suppression, with appraisal considered the more adaptive strategy. Concerning emotional reappraisal, both groups

increased in their use of the strategy with meditation practice over time ($F_{(1, 61)} = 6.39, p = .014, \eta^2_{\text{partial}} = .09$). Neither the group main effect nor the interaction term was significant, indicating that this may be a general effect of meditation practice (for group, $F_{(1, 61)} = 2.73, ns$; for interaction, $F_{(1, 63)} = 2.52, ns$).

Increases in emotional reappraisal were unaccompanied by changes in emotional suppression. Analysis of variance indicated no main effects for group or time, and no interaction ($F_{(1, 61)} = .005, ns$; $F_{(1, 61)} = 1.41, ns$; $F_{(1, 63)} = .85, ns$, respectively). While our participants got better at reappraising their emotions, they neither decreased nor increased their use of emotional suppression.

Additionally, the STEM and the STEU assessed potential effects of meditation on aspects of emotional intelligence. For the STEM, analysis of variance showed a main effect for time, as participants' emotion management scores increased on average over the course of the study ($F_{(1, 61)} = 10.36, p = .002, \eta^2_{\text{partial}} = .15$). No group or interaction effects were observed ($F_{(1, 61)} = 2.07, ns$; $F_{(1, 63)} = 1.57, ns$, respectively). With meditation practice, participants got better at managing their emotions. For the STEU, no significant effects were observed for time ($F_{(1, 61)} = .32, ns$), group ($F_{(1, 61)} = 1.01, ns$), or their interaction ($F_{(1, 63)} = .41, ns$). Emotional understanding scores remained consistent throughout the study.

As illustrated, studies have shown that both mindfulness and LKM lead to increases in satisfaction with life over time. Because of this, we expected both of our meditation groups to become more satisfied with their lives over the course of the study, as indicated by a main effect for time, but not an interaction effect. The SWLS was used

to measure life satisfaction, and analyses of variance illustrated a main effect for time ($F_{(1, 61)} = 7.14, p = .01, \eta^2_{\text{partial}} = .10$), but not for group or the time X group interaction ($F_{(1, 61)} = .27, ns$; $F_{(1, 63)} = 1.02, ns$, respectively). As expected, both students in both meditation groups experiences increases in life satisfaction over time.

To measure wisdom, two self-report scales, the 3D-WS and the SAWS were incorporated into the current study, again to assess their convergent validity. No predictions were made regarding these scales, and their inclusion was purely exploratory. For the 3D-WS, the main effect for group was nonsignificant ($F_{(1, 61)} = .22, ns$), as was the main effect for time ($F_{(1, 61)} = .64, ns$). The interaction term, though, was significant, with the mindfulness group increasing slightly over time, and the LKM group decreasing slightly over time ($F_{(1, 63)} = 14.29, p < .001, \eta^2_{\text{partial}} = .19$). Simple slope comparisons confirmed that the mindfulness group increased significantly over time ($p = .036$), and the LKM group decreased significantly over time ($p = .002$).

For the SAWS, both groups demonstrated increases over time. While analysis of variance indicated no main effect for group ($F_{(1, 61)} = .39, ns$), significant time and interaction effects depict increases in wisdom over time, with the mindfulness group showing a greater increase than the LKM group (for time, $F_{(1, 61)} = 9.79, p = .003, \eta^2_{\text{partial}} = .14$; for interaction, $F_{(1, 63)} = 3.73, p = .058, \eta^2_{\text{partial}} = .06$). Simple slope contrasts indicated that the mindfulness group increased over time ($p = .001$), but did not confirm any change in the LKM group.

Table 1

Dependent Measure Means and Standard Deviations by Group

Measure	Pre-Test				Post-Test			
	Mindfulness		LKM		Mindfulness		LKM	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Lexical Decision Task	828.8	260.6	878.2	324.7	864	188.4	733.2	203
Modified Stroop Task	944	163.4	963.5	170.7	829.7	177.1	841.9	125.1
Positive Relations	66.63	11.06	69.04	11.60	67.24	12.11	69.93	11.95
Empathic Concern	28.09	4.04	28.35	4.82	28.06	4.19	27.13	5.38
Perspective Taking	25.66	4.63	25.39	4.68	27.97	4.26	24.77	5.12
Mindful Attention	3.77	1.00	4.03	0.78	3.92	0.99	3.86	0.83
Mindfulness	40.22	6.67	42.00	6.84	42.64	7.11	43.90	6.43
Illness Symptoms	62.42	18.13	61.85	19.06	57.26	21.52	54.52	19.07
Attentional Focus	21.00	4.57	19.80	4.10	21.05	4.68	20.97	5.28
Attentional Shifting	27.74	2.52	28.17	2.53	28.52	2.65	28.20	1.80
Depressive Symptoms	14.97	10.82	14.67	9.87	12.55	10.18	13.68	9.40
Emotional Reappraisal	26.94	6.60	30.68	5.76	30.18	5.35	31.42	6.08
Emotional Suppression	13.61	5.66	13.23	5.38	13.64	2.01	14.48	2.14
Emotion Management	29.12	3.33	28.50	4.18	31.01	2.70	29.19	4.41
Emotional Understanding	28.27	4.73	26.91	3.70	28.24	5.87	27.42	4.06
Satisfaction with Life	25.55	6.86	25.23	6.55	27.33	6.61	26.03	6.11
Wisdom (3D-WS)	3.70	0.40	3.76	0.37	3.78	0.42	3.63	0.45
Wisdom (SAWS)	179.4	22.20	186.3	24.34	188.6	21.83	188.5	23.47

Note: For reaction-time tasks, $n = 61$. In the lexical decision task, shorter latencies indicate greater construct accessibility. In the modified Stroop task, longer latencies indicate greater construct accessibility. For the self-report measures, $n = 64$.

Table 2

Dependent Measure Means and Standard Deviations by Administration

Measure	Pre-Test		Post-Test	
	Mean	SD	Mean	SD
Lexical Decision Task	851.36	288.22	791.35	203.96
Modified Stroop Task	954.46	164.32	835.07	154.22
Positive Relations	67.80	11.31	68.54	12.01
Empathic Concern	28.22	4.40	27.60	4.79
Perspective Taking	25.52	4.62	26.40	4.94
Mindful Attention	3.90	0.90	3.89	0.91
Mindfulness	41.08	6.76	43.25	6.76
Illness Symptoms	62.15	18.43	55.93	20.26
Attentional Focus	20.43	4.36	21.01	4.94
Attentional Shifting	27.94	2.52	28.36	2.26
Depressive Symptoms	14.83	10.29	13.09	9.75
Emotional Reappraisal	28.75	6.44	30.78	5.70
Emotional Suppression	13.42	5.49	14.05	2.10
Emotion Management	28.82	3.74	30.17	3.72
Emotional Understanding	27.61	4.28	27.84	5.05
Satisfaction with Life	25.39	6.66	26.70	6.36
Wisdom (3D-WS)	3.73	0.39	3.71	0.44
Wisdom (SAWS)	182.72	23.34	188.56	22.46

Note: For reaction-time tasks, $n = 61$. In the lexical decision task, shorter latencies indicate greater construct accessibility. In the modified Stroop task, longer latencies indicate greater construct accessibility. For the self-report measures, $n = 64$.

CHAPTER 6: GENERAL DISCUSSION

The present study utilized experimental methods from social psychology to examine effects of Buddhist meditation practice. The main goal of this project was to investigate if mindfulness meditation and LKM differentially influence prosocial construct accessibility. According to Buddhist theory, the visualization processes of LKM, characterized by the compassionate intention to alleviate the suffering of another, should plant compassionate seeds in one's memory. These seeds will then come to fruition to prompt concordant outcomes by influencing perception, judgment, and behavior in an ethically congruent manner. Because mindfulness meditation does not incorporate these compassionate intentions, mindfulness meditators should not exhibit these effects.

Psychological theory also posits that LKM meditators should demonstrate increases in prosociality over time, while mindfulness meditators should remain the same. In LKM, by repeatedly visualizing helping others and engaging in compassionate thought, prosocial cognitive constructs should become more accessible, potentially influencing perception, judgment, and behavior. Mindfulness meditation does not entail these processes, and theoretically would not elicit prosocial construct activation. Thus, mindfulness meditators should not show increases in prosocial construct activation over time.

Our secondary goal was to explore if the documented effects of mindfulness meditation generalize to LKM. Although research has more thoroughly replicated these effects with mindfulness meditation, both mindfulness and loving-kindness meditation

are associated with increases in mindfulness, physical health, and satisfaction with life. The current experiment sought to reproduce these results. Mindfulness meditation has also been shown to lead to increases in attentional control, mental health (reduced depression symptomology), and emotion regulation, and we aimed to investigate if these effects generalize to LKM.

Lastly, the present study incorporated measures of wisdom and emotional intelligence (emotion management and emotional understanding) for exploratory purposes. Buddhist theory postulates that both meditation types lead to wisdom and insight, but we made no predictions based on psychological theory. Furthermore, since mindfulness meditation is known to increase one's ability to regulate emotions, aspects of emotional intelligence could also be relevant.

Results illustrate a lack of support for the primary hypothesis. The current study also failed to replicate some of the documented effects of mindfulness meditation. However, for the effects we specifically expected to be common to both mindfulness meditation and LKM, analyses confirmed our hypotheses. Overall, various factors limited the ability of the present experiment to observe significant findings. In this chapter, I explore the results of performed analyses, discuss issues and limitations of our experiment, and then make suggestions for future meditation research.

Summary of Findings

Prosocial Construct Accessibility

Significant changes in prosocial construct accessibility did not occur over the duration of the study for either meditation group. There are several potential reasons for

why the LKM group did not increase in prosocial construct accessibility. Throughout the four academic terms of the study, the researchers consistently noted that LKM participants seemed to grow bored with repeated loving-kindness meditations over time. The students may have found the redundancy monotonous; indeed, one student commented at the end of the study that she grew tired of doing the same visualization process four times within a week. If students became bored, they were likely prone to more distraction while meditating, and may have stopped putting in as much effort.

It is possible that *Tonglen* may not be the best operational definition of compassion meditation. While the visualization practice clearly entails taking another's suffering and replacing it with some kind of assistance, this imagery is very abstract and unrealistic. If students felt like this imagery was pointless or ridiculous, they plausibly could have disengaged and invested minimal effort in the meditations. Perhaps by having students visualize concrete, realistic ways to help close others in need (e.g., take care of a sick friend), we would have observed different results.

Another possibility for our lack of results is that the LKM participants grew tired of envisioning how to help people four days a week for eight weeks. Generally speaking in Buddhist practice, a meditator interchanges the type of meditation frequently to cultivate different characteristics of enlightenment, or to address specific ills (e. g., LKM for ill will; mindfulness for absentmindedness). Although the students were asked to vary the target of their compassionate intentions, after a few weeks students may have struggled to find additional close others to meditate on, or new causes of suffering, leading to a lack of investment and effort. Assessing the depth of practice is a problem in

meditation research (Shapiro, Schwartz, & Santerre, 2001), and if students were not putting effort into their practice, it is essentially as if they were not practicing at all.

The prosocial word stimuli could have further hampered the ability to detect changes in prosocial construct accessibility. Some words had numerous meanings depending on context, and there was no way for us to know if participants were interpreting them in a prosocial manner. For example, “warmth” could imply interpersonal warmth, but also temperature. “Save” could refer to saving someone, or saving a video game. The word “nurse” could refer to a person nursing another back to health, or simply to someone who works in the medical field. Furthermore, while our word stimuli were certainly relevant to prosociality in general, they were not all specific to compassion and aiding others, which were the themes of the loving-kindness meditations. It may be that the LKM participants increased in their accessibility to more compassion or help specific constructs, and our word stimuli were too general to detect this.

The use of two reaction-time paradigms to assess construct accessibility likely also influenced the current study’s ability to observed significant results in this area. Both the Stroop and lexical decision tasks were used for two reasons: to see if results generalize across reaction time paradigm, and to prevent any practice effects from occurring. Because of this, participants were randomly assigned to one of the two tasks at pre-test, and the completed the other at post-test. While working with the reaction time data, it became apparent that while lexical decision reaction times were trending in the anticipated direction, the Stroop latencies were not. We attempted to separate out the data

and analyze them separately, but this halved our sample size, and greatly reduced the power of those analyses, yielding nonsignificant results. Ultimately, the processes involved in the modified Stroop task are complex, and may be inhibiting an ability to detect effects of this nature.

Finally, meta-analysis of meditation research indicates that meditation effect sizes are small for behavioral measures, such as reaction-time paradigms (Sedlmeier et al., 2012). Even though these effects are demonstrable, they are difficult to detect, generally requiring a larger sample than we were able to obtain. Furthermore, with potential issues concerning participant effort and the reaction-time paradigms, our ability to detect such effects was probably greatly reduced.

Prosocial Self-Report Measures

Consistent with the reaction-time results, the prosocial self-report measures did not detect increases in the LKM group over time. No significant changes were observed for positive relations with others and empathic concern. Changes in these variables were not expected for the mindfulness group, but potential issues with the loving-kindness meditations might explain why they were not observed for the LKM group either. If the LKM participants were not invested in their meditation practice, for whatever reason, it could explain why they did not demonstrate changes in prosociality.

For perspective taking, results indicated a significant interaction effect in the opposite direction than expected, illustrating that the mindfulness group increased in perspective taking over time, with the LKM group even showing a slight decrease. Buddhist philosophy posits that mindfulness leads to insight. Because indiscriminate

loving-kindness and compassion are aspects of insight, this finding does not contradict Buddhist thought. Corroborating this, research in psychology has identified empathy and loving-kindness as qualities of mindfulness (Shapiro & Schwartz, 2000). However, since both meditation groups increased in mindfulness over time, this cannot account for our unexpected findings.

Additional Self-Report Measures

Both groups in the study demonstrated increases in mindfulness, physical health, and satisfaction with life over time, as hypothesized. Although only the FMI illustrated this mindfulness effect (for the MAAS, the mindfulness group increased slightly and the LKM group decreased slightly), we consider the FMI to be the more comprehensive measure of the mindfulness construct. The MAAS specifically measures mindful attention, and does not attempt to assess the nonjudgmental aspect of the mindfulness trait. Based on the results of the FMI, both mindfulness meditation and LKM lead to increases in mindfulness over time.

The CHIPS was used to inventory physical illness symptoms; those with fewer symptoms were considered to be more physically healthy. Congruent with past studies, both the mindfulness group and the LKM group experienced decreases in illness symptoms over time. This finding is especially noteworthy because as an academic term progresses, student stress levels generally increase, and one might expect illness symptoms to increase as well. This was not the case though, as both groups decreased in physical symptoms over time.

Both groups also experienced significant increases in satisfaction with life over time. These results are congruent with previous research. For the same reason that the illness symptoms finding is noteworthy, it is somewhat surprising that students' life increased over the course of each term. The post-test self-report measures were administered before finals week, so the students were in the concluding stages of their other classes, and may have began preparation for finals. Apparently, any stress due to this, or apprehension of finals, did not interfere with meditative influences on life satisfaction.

Other documented effects of mindfulness meditation include increases in emotion regulation abilities, attentional control, and decreases in depressive symptoms with practice. The present experiment explored if these results generalize to LKM. Regarding emotion regulation, both meditation groups increased in their use of the emotion reappraisal strategy over time, signifying that increased use of emotional reappraisal is a general effect of meditation. Emotional reappraisal consists of changing your emotional experience by altering how you think about the situation, and is considered an adaptive regulation strategy, as compared to emotional suppression. Emotional suppression consists of withholding or covering-up one's emotions, not expressing them but also not changing any undesired experiences. Neither meditation group changed in their use of emotional suppression as an emotion regulation strategy, so while they reappraised their emotions more with meditation practice, they did not decrease their use of emotional suppression.

Because emotion regulation and aspects of emotional intelligence are conceptually related, we included the STEM and STEU to assess emotion management and emotional understanding. While there were no changes in participants' emotional understanding, they did demonstrate increases in emotion management, in a way confirming the emotion regulation results. All participants, regardless of meditation group, increased in their ability to manage their emotions effectively. Since participants increased in their use of the emotional reappraisal strategy, this likely provided them with an effective way to manage their emotions.

No significant changes were observed with attentional control and depressive symptomology, even for the mindfulness group. Bearing in mind our methods and sample, though, these results are not surprising. Concerning attentional control, self-report is not considered an ideal method for assessing aspects of attention. Cognitive psychologists generally utilize behavioral measures such as reaction-time paradigms to manipulate and study aspects of attention. Because attentional control was not of major importance in the current study, we decided to use an available self-report measure instead of creating a reaction-time task for our purposes.

Regarding, depression, it is clear from examining group means that our sample did not exhibit much depressive symptomology. CES-D scores range from zero to 60, higher scores indicating more symptomology. At baseline, participants on average scored a 14.82, which decreased to a 13.12 at post-test. Because our students were already a non-depressed sample, they did not have the ability to decrease significantly with meditation practice.

In an exploratory vein, the current study incorporated measures of wisdom to assess effects of meditation. According to Buddhist philosophy, both mindfulness meditation cultivates insight, and compassion is an aspect of wisdom. Wisdom and insight are treated synonymously in this context (which may or may not be appropriate), so we did not predict differential effects for the meditation groups. Two wisdom measures were used to assess the construct: the TDWS and the SAWS. For the TDWS, an interaction effect was observed. The mindfulness group increased slightly in wisdom over time, while the LKM group decreased slightly over time. Results differed for the SAWS. A significant time effect and interaction indicate that while both groups increased over time, the mindfulness group increased more. This is likely due to their differences at baseline, though. Overall, the results for the wisdom scales are inconclusive. Since wisdom was not of primary interest to us, we did not take time to define the construct and measure it appropriately. However, the two scales appear to be assessing different aspects of wisdom, as evidenced by their varying results.

Limitations

The most prominent limitations of the present research concern the primary hypothesis predicting prosocial construct accessibility. As outlined above, issues with how LKM was operationalized, participant boredom, the prosocial word stimuli, and the use of two reaction-time paradigms likely impacted our ability to observe significant results. There are many kinds of loving-kindness meditations, and using a wider variety of them may address issues of redundancy, participant boredom, and abstractness of visualizations. Although included for reasonable considerations, the use of two reaction-

time paradigms also hindered our ability to observe differences in prosocial construct accessibility. The modified Stroop task does not seem to be an appropriate measure of meditation's effects on construct accessibility, suggesting that future research should utilize the lexical decision task.

Although running this study in the context of a class was beneficial in several ways, it also posed some problems for the implementation of meditation practice. By recruiting students, we were able to study participants not especially interested in meditation, meaning they did not have goals concerning meditation outcomes. This can be considered a strength of the design, but the researchers noticed that this also led to apathy in some cases. Students were primarily interested in earning a "pass" in the class, and were aware that attendance and participation determined their grade. Some students essentially went through the motions to obtain their desired outcome, without actually investing effort into their meditation practice. While this certainly does not describe most participants in the sample, in general, a lack of specific goals concerning meditation practice may have influenced effort in meditation practice.

Based on the above considerations, future meditation research should make a point to include a valid measure of participant effort. Without concentrated effort during meditation, one is especially prone to distraction, less likely to notice distraction, and less likely to return attention to the task at hand. Since meditation is a cognitive practice, there is no way to determine if a participant is actually meditating, or is merely closing his or her eyes. A measure of effort is one way to assess dedication to the practice.

Future meditation research should also attempt to include behavioral outcomes measures to assess to construct of prosociality. Experimental game paradigms can be used to measure tendencies toward cooperative and competitive behavior, such as the prisoner's dilemma game, which would be relevant to the prosociality construct. Observational measures of helping behavior could also be used to evaluate prosocial behavior. While chronic prosocial construct accessibility may lead to changes in perception and judgment, this is not socially meaningful without a measure of behavior.

Future Directions

The limitations and explanations for the results serve as considerations and directions for future research on meditation. Of primary concern are the loving-kindness meditations employed, the stimuli and paradigms used to assess construct accessibility, and the measurement of participant effort in meditation practice. Researchers should also include an appropriate behavioral outcome measure.

The pattern of findings of the present study also provides guidance concerning topics of interest. The relationship between mindfulness and empathy is unclear; mindfulness may account for the mindfulness group's increase in perspective taking, but this effect was not replicated with the LKM group, who also increased in mindfulness. Future research is necessary to determine what is driving these effects, and why. Likewise, the influence of meditation practice on wisdom is ambiguous. The effects of meditation vary by scale, so it would benefit meditation research to define wisdom in a way congruent with Buddhist philosophy, and develop a corresponding measurement tool. Also, parsing out differences between insight and wisdom and measuring them

accordingly would allow researchers to make more specific predictions concerning specific meditation techniques.

Conclusion

Buddhist philosophy and psychological theory and research support the idea that one's cognitions and actions in the present influence future perceptions, cognitions, and actions in a congruent way. The study reported here investigated this idea by comparing the influence of the mindfulness and loving-kindness meditation techniques on prosocial construct accessibility and related measures. This study also examined if some documented effects of mindfulness meditation generalize to loving-kindness meditation, or if the meditations techniques differed in these respects. Results do not support the primary hypothesis that loving-kindness meditation increases prosocial construct accessibility, as compared to mindfulness meditation. The pattern of results is the same for related prosocial self-report measures, and even indicates an effect for perspective taking in the opposite direction than expected. Analyses indicate that both mindfulness and loving-kindness meditation lead to increases in mindfulness, emotional reappraisal, emotion management, and life satisfaction. Previous research findings that mindfulness elicits increases in attentional control and decreases in depressive symptoms were not replicated, although they do suggest influences on perceived wisdom. Given the limitations of this research, further investigation into loving-kindness meditation and prosocial construct accessibility is worthwhile, as is future exploration into the common and differential effects of the two techniques.

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APPENDICES

Appendix A. Word Stimuli Used in the Reaction-Time Paradigms

Antisocial words:

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

Prosocial words:

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

Neutral words:

Bored, chaos, dance, debt, grief, pretty, prize, slime, wise, zeal.

Nonwords (lexical decision):

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

Appendix B. The Psychological Well-Being Scale (Ryff, 1989)

Instructions to Participants:

The following set of questions deals with how you feel about yourself and your life. Please remember that there are no right or wrong answers. Circle the number that best describes your present agreement or disagreement with each statement.

Response Scale:

Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewhat	Strongly Agree
1	2	3	4	5	6

Scale Items:

1. Most people see me as loving and affectionate.
2. Sometimes I change the way I act or think to be more like those around me.
3. In general, I feel I am in charge of the situation in which I live.
4. I am not interested in activities that will expand my horizons.
5. I feel good when I think of what I've done in the past and what I hope to do in the future.
6. When I look at the story of my life, I am pleased with how things have turned out.
7. Maintaining close relationships has been difficult and frustrating for me.
8. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.
9. The demands of everyday life often get me down.
10. In general, I feel that I continue to learn more about myself as time goes by.
11. I live life one day at a time and don't really think about the future.
12. In general, I feel confident and positive about myself.
13. I often feel lonely because I have few close friends with whom to share my concerns.
14. My decisions are not usually influenced by what everyone else is doing.
15. I do not fit very well with the people and the community around me.
16. I am the kind of person who likes to give new things a try.
17. I tend to focus on the present, because the future nearly always brings me problems.
18. I feel like many of the people I know have gotten more out of life than I have.
19. I enjoy personal and mutual conversations with family members or friends.
20. I tend to worry about what other people think of me.
21. I am quite good at managing the many responsibilities of my daily life.
22. I don't want to try new ways of doing things - my life is fine the way it is.
23. I have a sense of direction and purpose in life.

24. Given the opportunity, there are many things about myself that I would change.
25. It is important to me to be a good listener when close friends talk to me about their problems.
26. Being happy with myself is more important to me than having others approve of me.
27. I often feel overwhelmed by my responsibilities.
28. I think it is important to have new experiences that challenge how you think about yourself and the world.
29. My daily activities often seem trivial and unimportant to me.
30. I like most aspects of my personality.
31. I don't have many people who want to listen when I need to talk.
32. I tend to be influenced by people with strong opinions.
33. If I were unhappy with my living situation, I would take effective steps to change it.
34. When I think about it, I haven't really improved much as a person over the years.
35. I don't have a good sense of what it is I'm trying to accomplish in life.
36. I made some mistakes in the past, but I feel that all in all everything has worked out for the best.
37. I feel like I get a lot out of my friendships.
38. People rarely talk to me into doing things I don't want to do.
39. I generally do a good job of taking care of my personal finances and affairs.
40. In my view, people of every age are able to continue growing and developing.
41. I used to set goals for myself, but that now seems like a waste of time.
42. In many ways, I feel disappointed about my achievements in life.
43. It seems to me that most other people have more friends than I do.
44. It is more important to me to "fit in" with others than to stand alone on my principles.
45. I find it stressful that I can't keep up with all of the things I have to do each day.
46. With time, I have gained a lot of insight about life that has made me a stronger, more capable person.
47. I enjoy making plans for the future and working to make them a reality.
48. For the most part, I am proud of who I am and the life I lead.
49. People would describe me as a giving person, willing to share my time with others.
50. I have confidence in my opinions, even if they are contrary to the general consensus.
51. I am good at juggling my time so that I can fit everything in that needs to be done.
52. I have a sense that I have developed a lot as a person over time.
53. I am an active person in carrying out the plans I set for myself.
54. I envy many people for the lives they lead.
55. I have not experienced many warm and trusting relationships with others.
56. It's difficult for me to voice my own opinions on controversial matters.

57. My daily life is busy, but I derive a sense of satisfaction from keeping up with everything.
58. I do not enjoy being in new situations that require me to change my old familiar ways of doing things.
59. Some people wander aimlessly through life, but I am not one of them.
60. My attitude about myself is probably not as positive as most people feel about themselves.
61. I often feel as if I'm on the outside looking in when it comes to friendships.
62. I often change my mind about decisions if my friends or family disagree.
63. I get frustrated when trying to plan my daily activities because I never accomplish the thing I set out to do.
64. For me, life has been a continuous process of learning, changing, and growth.
65. I sometimes feel as if I've done all there is to do in life.
66. Many days I wake up feeling discouraged about how I have lived my life.
67. I know that I can trust my friends, and they know they can trust me.
68. I am not the kind of person who gives in to social pressures to think or act in certain ways.
69. My efforts to find the kinds of activities and relationships that I need have been quite successful.
70. I enjoy seeing how my views have changed and matured over the years.
71. My aims in life have been more a source of satisfaction than frustration to me.
72. The past had its ups and downs, but in general, I wouldn't want to change it.
73. I find it difficult to really open up when I talk with others.
74. I am concerned about how other people evaluate the choices I have made in my life.
75. I have difficulty arranging my life in a way that is satisfying to me.
76. I gave up trying to make big improvements or changes in my life a long time ago.
77. I find it satisfying to think about what I have accomplished in life.
78. When I compare myself to friends and acquaintances, it makes me feel good about who I am.
79. My friends and I sympathize with each other's problems.
80. I judge myself by what I think is important, not by the values of what others think is important.
81. I have been able to build a home and a lifestyle for myself that is much to my liking.
82. There is truth to the saying that you can't teach an old dog new tricks.
83. In the final analysis, I'm not so sure that my life adds up to much.
84. Everyone has their weaknesses, but I seem to have more than my share.

Appendix C. 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'm 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 D. The Mindful Attention and Awareness Scale (Brown & Ryan, 2003)

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 E. The Freiburg Mindfulness Inventory (Walach et al., 2006)

Instructions to Participants:

The purpose of this inventory is to characterize your experience of mindfulness. Please use the last 14 days as the time-frame to consider each item. Provide an answer for every statement as best you can. Please answer as honestly and spontaneously as possible. There are neither 'right' nor 'wrong' answers, nor 'good' or 'bad' responses. What is important to us is your own personal experience.

Response Scale:

Rarely	Occasionally	Fairly Often	Almost Always
1	2	3	4

Scale Items:

1. I am open to the experience of the present moment.
2. I sense my body, whether eating, cooking, cleaning or talking.
3. When I notice an absence of mind, I gently return to the experience of the here and now.
4. I am able to appreciate myself.
5. I pay attention to what's behind my actions.
6. I see my mistakes and difficulties without judging them.
7. I feel connected to my experience in the here-and-now.
8. I accept unpleasant experiences.
9. I am friendly to myself when things go wrong.
10. I watch my feelings without getting lost in them.
11. In difficult situations, I can pause without immediately reacting.
12. I experience moments of inner peace and ease, even when things get hectic and stressful.
13. I am impatient with myself and with others.
14. I am able to smile when I notice how I sometimes make life difficult.

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 middle of night or early in morning)
2. Weight change (gain or loss of 5 lbs. 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 Attentional Control Scale (Derryberry & Reed, 2002)

Instructions to Participants:

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

Response Scale:

Almost Never			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 events 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 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 hard 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. It is 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 lectures.
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 need to.
20. I have a hard time coming up with new ideas quickly.

Appendix H. 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 I. 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'm 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 am 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 J. The Situational Test of Emotion Management (MacCann & Roberts, 2008)

Instructions to Participants:

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 and 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 K. 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 is 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 is most likely to feel?*

- (a) Hope
- (b) Pride
- (c) Relief
- (d) Joy
- (e) Surprise

Appendix L. 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 my 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 M. The 3-Dimensional Wisdom Scale (Ardelt, 2003)

Section 1 Instructions to Participants:

This section asks you about your opinion and feelings. How strongly do you agree or disagree with the following statements?

Section 1 Response Scale:

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

Section 1 Scale Items:

1. In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.
2. I am annoyed by unhappy people who just feel sorry for themselves.
3. Life is basically the same most of the time.
4. People make too much of the feelings and sensitivity of animals.
5. You can classify almost all people as either honest or crooked.
6. I would feel much better if my present circumstances changed.
7. There is only one right way to do anything.
8. There are some people I know I would never like.
9. It is better not to know too much about things that cannot be changed.
10. Things often go wrong for me by no fault of my own.
11. Ignorance is bliss.
12. I can be comfortable with all kinds of people.
13. A person either knows the answer to a question or he/she doesn't.
14. It's not really my problem if others are in trouble and need help.
15. People are either good or bad.

Section 2 Instructions to Participants:

How much are the following statements true of yourself?

Section 2 Response Scale:

Definitely True of Myself	Mostly True of Myself	About Half-Way True	Rarely True of Myself	Not True of Myself
1	2	3	4	5

Section 2 Scale Items:

1. I try to look at everybody's side of a disagreement before I make a decision.
2. If I see people in need, I try to help them one way or another.
3. When I'm upset at someone, I usually try to "put myself in his or her shoes" for a while.
4. There are certain people whom I dislike so much that I am inwardly pleased when they are caught and punished for something they have done.
5. I always try to look at all sides of a problem.
6. Sometimes I feel a real compassion for everyone.
7. I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.
8. When I look back on what has happened to me, I can't help feeling resentful.
9. I often have not comforted another when he or she needed it.
10. A problem has little attraction for me if I don't think it has a solution.
11. I either get very angry or depressed if things go wrong.
12. Sometimes I don't feel very sorry for other people when they are having problems.
13. I often do not understand people's behavior.
14. Sometimes I get so charged up emotionally that I am unable to consider many ways of dealing with my problems.
15. Sometimes when people are talking to me, I find myself wishing that they would leave.
16. I prefer just to let things happen rather than try to understand why they turned out that way.
17. When I am confused by a problem, one of the first things I do is survey the situation and consider all the relevant pieces of information.
18. I don't like to get involved in listening to another person's troubles.
19. I am hesitant about making important decisions after thinking about them.
20. Before criticizing somebody, I try to imagine how I would feel if I were in their place.
21. I'm easily irritated by people who argue with me.
22. When I look back on what's happened to me, I feel cheated.
23. Simply knowing the answer rather than understanding the reasons for the answer to a problem is fine with me.
24. I sometimes find it difficult to see things from another person's point of view.

Appendix N. The Self-Assessed Wisdom Scale (Webster, 2003)

Instructions to Participants:

This brief questionnaire is designed to investigate how people of different ages perceive themselves with respect to life experiences and whether or not these perceptions change as we grow older. You are asked to rate all of the following statements using the scale below. Remember, there are no “right” or “wrong” answers and your responses will remain anonymous. Do not rush, but work steadily as we are interested in your first impressions. Please record your responses by circling only one number on the rating scale to the left of each statement.

Response Scale:

Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6

Scale Items:

1. I have overcome many painful events in my life.
2. It is easy for me to adjust my emotions to the situation at hand.
3. I often think about connections between my past and present.
4. I can chuckle at personal embarrassments.
5. I like to read books which challenge me to think differently about issues.
6. I have had to make many important life decisions.
7. Emotions do not overwhelm me when I make personal decisions.
8. I often think about my personal past.
9. There can be amusing elements even in very difficult life situations.
10. I enjoy listening to a variety of musical styles besides my favourite kind.
11. I have dealt with a great many different kinds of people during my lifetime.
12. I am “tuned” in to my own emotions.
13. I reminisce quite frequently.
14. I try and find a humorous side when coping with a major life transition.
15. I enjoy sampling a wide variety of different ethnic foods.
16. I have experienced many moral dilemmas.
17. I am very good at reading my emotional states.
18. Reviewing my past helps me gain perspective on current concerns.
19. I am easily aroused to laughter.
20. I often look for new things to try.
21. I have seen much of the negative side of life (e.g., dishonesty, hypocrisy).

22. I can freely express my emotions without feeling like I might lose control.
23. I often recall earlier times in my life to see how I've changed since then.
24. At this point in my life, I find it easy to laugh at my mistakes.
25. Controversial works of art play an important and valuable role in society.
26. I have lived through many difficult life transitions.
27. I am good at identifying subtle emotions within myself.
28. Recalling my earlier days helps me gain insight into important life matters.
29. I often use humour to put others at ease.
30. I like being around persons whose views are strongly different from mine.
31. I've personally discovered that "you can't always tell a book from its cover".
32. I can regulate my emotions when the situation calls for it.
33. I often find memories of my past can be important coping resources.
34. Now I find that I can really appreciate life's little ironies.
35. I'm very curious about other religious and/or philosophical belief systems.
36. I've learned valuable life lessons from others.
37. It seems I have a talent for reading other people's emotions.
38. Reliving past accomplishments in memory increases my confidence for today.
39. I can make fun of myself to comfort others.
40. I've often wondered about life and what lies beyond.