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More than the Sum of its Parts: The Differential Roles of Non-judgment and Present-Moment Awareness as Components of Mindfulness

Jesse Martin-Allan

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**More than the Sum of its Parts: The Differential Roles of Non-judgment and
Present-Moment Awareness as Components of Mindfulness**

A thesis submitted in partial fulfilment of the requirements for the award of the degree

DOCTOR OF PHILOSOPHY (CLINICAL PSYCHOLOGY)

From the University of Wollongong

Jesse Martin-Allan

Supervisors: Dr. Peter Leeson, Dr. William Lovegrove

This research has been conducted with the support of a scholarship awarded by the
Australian Government Research Training Project

University of Wollongong

School of Psychology

March 2022

Certification

I, Jesse Martin-Allan, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy (Clinical Psychology), in the School of Psychology, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Jesse Martin-Allan

28/03/22

Abstract

Mindfulness is defined as purposefully paying attention towards the present moment in a non-judgemental way. In the last five years there has been increasing interest in how the components within mindfulness interact with each other to affect both interpersonal and intrapersonal outcomes. This thesis aims to continue this exploration by firstly examining how mindfulness meditation interacts with compassion meditation, and then using a variety of methods to determine how different subcomponents of mindfulness may interact with each other.

Both mindfulness and compassion meditation have been found to increase empathy and emotional regulation. Study 1 aimed to determine which meditation condition is optimal for priming empathy prior to watching an emotionally engaging video, and which meditation condition is optimal for increasing emotional regulation after the video finished. It was found that repeating the same meditation type (e.g., mindfulness meditation before and after watching the video) aided with both empathy and emotional regulation, where changing meditation types (e.g., compassion before and mindfulness after) did not increase emotion regulation compared to the control.

Whilst there are clear theoretical links between compassion and empathy, the links between mindfulness and empathy are less clear and both non-judgement and present-moment awareness may play a role in its association with empathy. Study 2 was a randomized, controlled component analysis which aimed to determine the differences between different meditation conditions which focused on attention-monitoring (i.e., present-moment awareness), acceptance (i.e., non-judgement) or a combination (i.e., mindfulness). The study found that the mindfulness condition primed empathy most effectively, whilst the acceptance and attention-monitoring

conditions primed unique aspects of empathy, and were still overall superior in terms of empathy to the control group.

Study 3 was a latent profile analysis which aimed to determine the differences between profiles of mindfulness in terms of burnout trajectory and profile stability. Three latent classes emerged: a high mindfulness class, a non-judgmentally aware class, and a judgmentally observing class. The high mindfulness class and non-judgmentally aware class were associated with lower levels of burnout than the judgmentally observing class. The mindfulness profile of the high mindfulness class remained relatively stable over time, whilst the non-judgmentally aware class and judgmentally observing class experienced significant changes in multiple mindfulness traits.

The finding that non-judgment and acting with awareness were sufficient to produce outcomes similar to high overall mindfulness warrants further investigation into how these two facets interact. Thus, study 4 used a double-moderation to determine how non-judgment and awareness of action interact to affect the relationship between stress, anxiety and academic achievement. The findings indicated that for individuals with high non-judgment, awareness of action reduced the degree to which stress and anxiety negatively impacted upon academic achievement. For individuals with low non-judgment, however, increased awareness of action increased the negative impact of stress and anxiety upon academic achievement.

Taken together this body of work highlights the importance of a dual-faceted definition of mindfulness, and suggests that the positive effects of present-moment awareness are dependent upon concurrent development of non-judgment.

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Thank you to my primary supervisor, Peter Leeson, for his invaluable help in bringing this whole thesis together. Your quick-thinking, statistical know-how and ability to think outside the box has helped me to develop considerably as a researcher over the course of this thesis, and has really opened my mind as a PhD student. I would also like to thank my secondary supervisor, William Lovegrove, for his excellent conceptual input throughout the early stages of this thesis.

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I would like to thank my mother, Sue, for her unwavering moral support throughout this whole thesis. Your ability to listen to me and validate my experience throughout the thesis prevented me from becoming a case study in burnout myself. I would like to thank my father, Chris, for his kindness and generosity. Being able to drop by my family home every week to a beautiful home-cooked meal kept me feeling connected and supported, especially as the finish line approached. I would like to thank my brother, Jon, for modeling to me a balanced, pragmatic work ethic and his support throughout the thesis. Finally I would like to thank my girlfriend, Lucy, for being such a caring, considerate and supportive partner during the final stages of the thesis. I'm flattered that you met me in the months before my thesis was due, and decided I was worth sticking it out for. I promise we can do more on the weekends now.

Formatting Statement

This thesis has been prepared as a compilation of journal articles, with each manuscript written for a specific journal. The manuscripts have been re-formatted for the purpose of this thesis using APA 7th style.

Chapter 1 presents an overview of mindfulness research, background into some of the theoretical underpinnings of this thesis, and highlights gaps in the research which lead to the specific aims of this thesis.

Chapter 2 presents a comparison of the effects of mindfulness meditation and compassion meditation on state empathy and emotion. It has been peer-reviewed and published in *Mindfulness*.

Chapter 3 presents a randomized, controlled components analysis comparing the effects of acceptance, attention-monitoring and mindfulness on empathy. It has been submitted for publication in *Mindfulness*.

Chapter 4 presents a latent profile analysis of university students, and aims to determine the longitudinal outcomes associated with profiles identified in terms of mindfulness and burnout. It has been submitted for publication in *Mindfulness*.

Chapter 5 presents a double moderation exploring how the interaction between non-judgment and awareness affect the relationship between stress, anxiety and academic achievement. It has been submitted for publication in *The Journal of Contemplative Inquiry*.

Chapter 6 aims to bring together the conclusions made in each study and identify common themes, as well as highlight limitations of this thesis and directions for future research.

Statement of Contribution of Others

This statement of authorship identifies the nature and extent of contribution of the PhD candidate and all co-authors for chapters based on journal articles. The contributions follow the CRediT taxonomy of roles of the authors: Jesse Martin-Allan (PhD candidate; JMA), Peter Leeson (primary supervisor; PL) and William Lovegrove (secondary supervisor; WL).

	Chapter 2	Chapter 3	Chapter 4	Chapter 5
Conceptualisation	JMA, PL, WL	JMA, PL	JMA, PL, WL	JMA, PL, WL
Data curation	JMA	JMA	JMA	JMA
Formal Analysis	JMA, PL	JMA, PL	JMA, PL	JMA, PL
Investigation	JMA	JMA	JMA	JMA
Methodology	JMA, PL	JMA, PL	JMA, PL	JMA, PL
Supervision	PL, WL	PL	PL, WL	PL, WL
Writing - Original draft	JMA	JMA	JMA	JMA
Writing - Reviewing and editing	JMA, PL	JMA, PL	JMA, PL	JMA, PL

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Chapter 1: Introduction and Aims

1.1. Preamble

In the field of psychology, mindfulness is commonly defined as, “A kind of non-elaborative, nonjudgmental, present-centered awareness in which each thought, feeling, or sensation that arises in the attentional field is acknowledged and accepted as it is” (Bishop et al., 2004, p. 232). However, mindfulness as a term predates modern psychology, and whilst similar concepts are present in a multitude of religions and philosophies, modern psychology’s conception of mindfulness is most deeply rooted in Buddhism (Gethin, 2015). In a review of Buddhist conceptualisations of mindfulness, Gethin (2015), suggests that modern psychology conceptualises mindfulness in a relatively narrow way. Mindfulness within Buddhism is a translation of the Pali word “sati”, which translates to “remembering” or “keeping in mind”. What is “kept in mind” or “remembered” varies between different schools of Buddhism as well as different translations and interpretations of the texts. Modern psychological conceptualisations of mindfulness are primarily derived from the Satipatthana Sutta (Thera, 1941) which focuses on “keeping in mind” certain types of attention (which is where the modern psychological focus of non-judgemental, present-moment attention is primarily derived from; Kabat-Zinn, 1982). Mindfulness within Buddhism encompasses a far broader range of different types of paying attention (e.g., contemplating one’s death and mortality), as well as “keeping in mind” ethical principles in one’s day-to-day activities (Dunne, 2011). It is also deeply embedded within other elements of Buddhist philosophy, and can be an overarching concept or theoretically linked to other constructs such as compassion/love. Certain schools of Buddhism hold mindfulness and compassion as “two wings of the same bird” and suggest that developing one without another may be akin to a bird trying to fly with one wing clipped (Siegal & Germer, 2012). This conception is one that has begun to be integrated within some psychological conceptualisations

of mindfulness over the last decade with psychology articles discussing the “two wings” concept and using it to inform clinical interventions such as mindfulness-based compassion/self-compassion interventions, with some researchers even defining mindfulness as the combination of “awareness and compassion” (Siegal & Germer, 2012; Fulton, 2012).

The range of conceptions of mindfulness within Buddhism highlights how the modern definition originally given by Kabat-Zinn (1982) is essentially a fragment of a single Buddhist school’s conceptualisation (i.e., the Theravadan Mahasi tradition) of mindfulness. This conceptualisation, whilst limited in scope, is well operationalised, secular and easily understood within the framework of Western psychology. The notion that Buddhist wellbeing practices such as mindfulness meditation could be secularised and subject to legitimate academic research is what inspired Kabat-Zinn (1982) to develop Mindfulness Based Stress Reduction (MBSR). A primary focus of this thesis will be evaluating the relationship between two components outlined by Kabat-Zinn (1982), that is, mindfulness is the combination of (1) present-moment awareness and (2) non-judgement (i.e., an individual’s ability to be accepting of their experience as it is, without classifying it as desirable or undesirable; Baer et al., 2006). A secondary aim of this thesis will be to evaluate the relationship between mindfulness and compassion, as modern psychological literature is beginning to explore the degree to which these two concepts are linked.

Since the development of MBSR, mindfulness practices have become widely integrated within wellbeing programs and evidence-based treatments for mental illness (Barnhofer et al., 2009; Hayes et al., 2009). This growth in practice has been parallel with exponential growth in mindfulness research since the early 2000s (Baminiwatta & Solangaarachchi, 2021).

Mindfulness training has been found to result in a very broad range of beneficial outcomes, including reducing stress (Baer, Carmody, et al., 2012; Beddoe & Murphy, 2004), anxiety (Bartels-Velthuis et al., 2015; Evans et al., 2008), depression (Barnhofer et al., 2009; Kuyken et al., 2008), improving concentration (Jha et al., 2007; Rahl et al., 2017), improved academic achievement (Goretzki & Zysk, 2017), improved interpersonal relationships (Lindsay et al., 2019), greater empathy (Barbosa et al., 2013; Beddoe & Murphy, 2004), and greater wellbeing (Al-Ghalib & Salim, 2018; Lomas et al., 2017). As mindfulness has started to become a part of the common Western vernacular, misconceptions have arisen around what mindfulness constitutes. Pop-psychology articles often focus on the present-moment awareness component (James, 2022; Tinsley, 2022), conceptualising mindfulness as “being in the here and now”, sometimes with little or no mention of non-judging. Furthermore, loosely related techniques such as grounding, breathing retraining and progressive muscle relaxation are sometimes referred to as mindfulness techniques, despite not actively incorporating non-judgement (Ghelani, 2022; Tout, 2022).

Despite only focusing on awareness training, some of these techniques exhibit similar effectiveness to mindfulness (Feldman et al., 2010; Jain et al., 2007), which brings into question whether non-judgment is a necessary component within the construct of mindfulness. Determining the role of non-judgment and how it interacts with present-moment awareness is a fundamental task for mindfulness researchers, as the combination of these two constructs working in unison is what makes mindfulness unique. Whilst the majority of research into mindfulness outcomes treat mindfulness as a unitary construct, a number of researchers have attempted to break mindfulness down in various ways to explore which components are most responsible for its positive outcomes. This thesis will aim to extend upon the work of these

researchers, and explore how non-judgement and awareness interact to enact the positive outcomes already established within the mindfulness literature. Prior to this, however, this literature review will aim to establish:

- The primary tool used to measure mindfulness in the thesis (i.e., the five factor mindfulness questionnaire; FFMQ; 1.2.).
- The primary theory this thesis will be relating the concepts of non-judgement and awareness to (i.e., monitor and acceptance theory; MAT; 1.3., this is relevant to studies two through four).
- How MAT relates to mindfulness meditation techniques (which is relevant to studies one and two, both of which employ brief mindfulness meditation inductions; 1.4.).
- How MAT relates to latent profile analysis using the FFMQ (a statistical technique used in study three; 1.5.).
- How mindfulness operates within the population this research will be conducted on (i.e., university students; 1.6.).
- The relationship between mindfulness and compassion (which informs the basis for study one; 1.7.).
- The relationship between mindfulness, compassion and empathy (which informs the basis for studies one and two; 1.8.).
- A summary of the different meditation typologies discussed in this thesis (1.9.).
- A summary of the gaps in the literature which this thesis will aim to address (1.10.).

1.2. The Five Factor Mindfulness Questionnaire

The Five Factor Mindfulness Questionnaire (FFMQ) is one of the most commonly used mindfulness questionnaires at present, and measures mindfulness as a combination of

subcomponents (Baer et al., 2008). Baer et al. (2006) used an exploratory factor analysis to identify latent factors within five commonly used mindfulness questionnaires: The Mindful Attention Awareness Scale (K. W. Brown & Ryan, 2003), The Freiburg Mindfulness inventory (Buchheld et al., 2001), The Kentucky Inventory of Mindfulness Skills (Baer et al., 2004), The Cognitive and Affective Mindfulness Scale (Feldman et al., 2004) and The Mindfulness Questionnaire (Chadwick et al., 2005). After identifying five latent factors, they developed the FFMQ. The FFMQ is advantageous over uni-dimensional measures of mindfulness as it allows researchers to explore how individual components relate to each other and differentially predict outcomes. Furthermore, the very definition of mindfulness is multi-dimensional, therefore measures which reflect this multidimensionality are better able to examine the underlying theoretical assumptions of each component. The FFMQ consists of the following facets:

- “Observing” measures how well one is able to attend to their senses, body sensations, thoughts and feelings, for example, “I pay attention to how my emotions affect my thoughts and behaviour”.
- “Describing” measures how well one is able to describe their experiences verbally, for example, “even when I’m terribly upset I can find a way to put it into words.”
- “Acting with awareness” measures how well one is able to pay attention to their activities in the moment. This facet consists of reverse-scored items which measure one’s tendency to act automatically/without awareness, “I don’t pay attention to what I’m doing because I’m daydreaming, worrying or otherwise distracted.”
- “Non-judging of inner experience” measures how accepting and tolerant one is of their thoughts and feelings. This facet consists of reverse-scored items which measure one’s

tendency to negatively evaluate their inner experience, “I criticise myself for having inappropriate or irrational emotions.”

- “Non-reactivity to inner experience” measures one’s ability to be able to allow thoughts and feelings to arise and pass, without the need to react to them either internally (i.e., by getting caught up in them or avoiding them) or behaviourally. For example, “when I have distressing thoughts or images I am able to notice them and let them go.”

Since its development, the FFMQ has quickly become one of the most widely used measures of mindfulness. Whilst it is sometimes used as a unitary construct, research has found that the individual facets do not appear to have a homogenous relationship with all outcomes. Carpenter et al. (2019) conducted a meta-analysis of 148 studies, comprising 44,075 participants, to explore the relationship between mindfulness facets and affective outcomes (e.g., depression, anxiety and stress). They found that act with awareness and non-judging had large negative correlations with affective outcomes, describing and non-reactivity had medium negative correlations with affective outcomes, and there was no meaningful correlation between observing and affective outcomes.

The first four facets (awareness, non-judging, describing and non-reactivity) have been found to be consistently correlated with positive outcomes such as greater well-being, reduced anxiety and depression, and improved stress tolerance. The observing facet is far less consistent, however, with some studies showing no correlation with positive outcomes (Carpenter et al., 2019; Curtiss & Klemanski, 2014b; Lu et al., 2019), and other studies finding it to be positively correlated with anxiety and stress (D. B. Brown et al., 2015; Curtiss & Klemanski, 2014a). The inconsistent effects of observing compared to other mindfulness facets has caused some researchers to suggest it should be replaced with more specific subtypes of observation (e.g.,

body-awareness, external perception) whilst other researchers have chosen to exclude it entirely when adapting the FFMQ (Abujaradeh, 2019; Rudkin et al., 2018, Siegling & Petrides, 2016).

Because these factors were derived from exploratory factor analysis, they reflect a spectrum of different conceptualisations of mindfulness. For example, conceptualisations of mindfulness influenced the Mahasi tradition of Buddhism (e.g., MBSR) may more strongly emphasise the importance of mental noting or “describing” one’s experience (Kabat-Zinn, 1982), as mentally noting distractions is a central part of Mahasi-style mindfulness meditation. Conceptualisations of mindfulness influenced by Zen Buddhism (e.g., Dialectical Behaviour Therapy and Acceptance and Commitment Therapy) may emphasise being aware of one’s actions (i.e., act with awareness), as, Zen Buddhism emphasises the importance “meditative action” (Hayes, 2012 & Linehan, 2014). In this way, the FFMQ does not reflect a single theory of mindfulness but rather five distinct conceptualisations of mindfulness subcomponents that are present to varying degrees across a range of different theories. MAT is one such theory which attempts to theoretically link together a number of the FFMQ facets.

1.3. Monitor and Acceptance Theory (MAT)

MAT takes Kabat-Zinn’s (1982) original definition of mindfulness, i.e., purposeful, non-judgemental attention on the present moment, and breaks it down into two primary components (1) acceptance of experience (which corresponds to the non-judging component of the definition) and (2) attention-monitoring (which corresponds to the purposeful present-moment awareness component of the definition). Within MAT, acceptance is an umbrella term covering a range of closely related constructs such as non-reactivity, equanimity, non-judgement, non-evaluation and non-attachment (Lindsay & Creswell, 2017). Acceptance stands in opposition to the construct of experiential avoidance, which is defined as efforts

(including internal efforts) to avoid or change unwanted thoughts and feelings. It also stands in contrast to becoming engrossed or “fused” within distressing thoughts and feelings, as may occur when one is ruminating or worrying. Acceptance is proposed to stand outside of these two extremes, allowing one to be with experiences as they are, without needing to grasp at them or push them away.

Attention monitoring is defined as sustained awareness of sensory or perceptual experiences (i.e., thoughts, feelings and sensations) as they occur in the present moment (Lindsay & Creswell, 2017). The attention monitoring component of MAT is suggested to be responsible for the positive cognitive outcomes of mindfulness training such as increased executive functioning, improved grades and improved concentration (Chiesa et al., 2011; Jha et al., 2007; Lutz et al., 2008). It is proposed that the ability to pay attention to present-moment thoughts, feelings and sensations may also translate to attentional capacity more generally. Within the FFMQ, Lindsay et al. (2017) suggests that attention monitoring is best encompassed by the observing facet. Lindsay et al. (2017) also suggests that if one’s level of acceptance is low, greater attention-monitoring may in fact lead to poor outcomes (e.g., increased anxiety, stress and depression). If one has difficulty accepting their internal experience, heightened awareness of it may in fact increase distress. This may give some explanation as to why the observing facet is more likely to predict negative outcomes in meditation naive populations (Neale-Lorello & Haaga, 2015), who may not have had concurrent training in acceptance.

When applied to meditation, MAT suggests that the attention monitoring component of meditation involves sustaining attention on the primary object of meditation (which is often the breath or body) and redirecting attention back to the object of meditation if the mind wanders. The acceptance component encourages the meditator to allow both positive and negative

experiences to arise and pass without clinging to them or pushing them away. In this way, attention monitoring dictates where the meditator places their attention, and acceptance dictates the type of attention the meditator has. Lindsay et al. (2017) suggests that these components work synergistically - if the meditator is able to accept and let go of distractions, they are much more likely to be able to efficiently redirect their attention to the object of meditation. Likewise, if they are able to sustain their attention on the objective qualities of bodily experiences, there is less room for judgements to arise.

Before continuing, it is important to note that there are multiple overlapping terms inherent when discussing concepts within mindfulness as there is disparity between different theories, measures and definitions of mindfulness. Relevant to this thesis is the construct of awareness which is an umbrella for a number of related constructs/measures which will be discussed such as “observing”, “acting with awareness” and “attention monitoring”. To make these distinctions clear when the concept of “awareness” is discussed in this thesis it refers to awareness as an overarching construct (i.e., being in the present moment). When “attention monitoring” is discussed, it refers specifically to the conceptualisation of awareness outlined within MAT (Lindsay et al., 2017). When “acting with awareness” and “observe/observing” are discussed, they refer specifically to the corresponding dimensions within the FFMQ.

1.4. The Spectrum of Mindfulness Meditation Techniques

Mindfulness meditation is an umbrella term which refers to a range of meditation practices that emphasise attention-monitoring and acceptance to varying degrees. In this way, mindfulness meditation techniques can be thought of as existing on a spectrum between techniques which heavily favour attention-monitoring or acceptance on either end. Practices which heavily favour attention monitoring are often referred to as concentrative meditation

(Prakash et al., 2012). These involve placing attention on a single object, such as the breath (Anālayo, 2019), body scanning (Zeng et al., 2014) and counting (Jung & Lee, 2014). When distractions are referenced, it is often to instruct the meditator to divert their attention away from them and back to the primary meditation object. Other types of mindfulness meditation do not instruct the meditator to focus on a primary object of meditation, but rather encourage an open-awareness towards all arising experiences (Dahl, Lutz, & Davidson, 2015). Whilst there is no single object of concentration, these types of meditation encourage the meditator to adopt a non-judgemental/accepting stance towards their experiences (and thus primarily focus on the acceptance element of mindfulness).

Traditional mindfulness meditation exists between these two extremes. Generally there is a primary object of attention (e.g., the breath), however, if one's attention is drawn away towards another experience (i.e., a secondary object), the meditator is encouraged to label the experience, acknowledge and accept it before returning to the breath (Kabat-Zinn, 1982). The act of labelling experiences objectively (e.g., labelling the thought "I really hope my boss doesn't ask me to come in early tomorrow" as "worrying") is intended to bring the meditator from being embedded *within* the thought, to observing the thought from outside. This is hoped to increase acceptance towards the thought, as well as give insight into its nature as a present-moment experience, as opposed to something which is happening in the future or past. Furthermore, the meditator is encouraged to focus on objective qualities of the primary object (e.g., movement at the abdomen when breathing), as opposed to whether they like or dislike it. Similarly, this is aimed to both focus attention, and reduce judgements about the breath. In this way, traditional mindfulness meditation aims to increase both acceptance and one's ability to monitor their attention.

Component analyses aim to test how acceptance and attention-monitoring differentially affect outcomes by comparing the effects of meditation which primes one versus both components of mindfulness (Lindsay et al., 2019; Rahl et al., 2017). Lindsay et al. (2017) suggests that it may not be possible to prime acceptance without including some aspect of attention-monitoring, as one requires an object of meditation with which to monitor their attention in an accepting way. Thus, component analyses of MAT typically compare an attention-monitoring only group with an attention-monitoring plus acceptance group. As noted previously, there are existing meditation approaches which heavily favour acceptance, or even attempt to remove the attention-monitoring component altogether (Siff, 2014, Ainsworth et al., 2013). Examples of acceptance-focused meditation techniques are open-monitoring meditation and recollective awareness meditation. In these types of meditation there is no singular focus, and the meditator is encouraged to allow their attention to move where it naturally wishes to go. In these types of meditation, there is still an emphasis on accepting and allowing what arises without preference. Thus, they provide a good basis for developing an experimental induction of acceptance-focused meditation, as instructions regarding attention monitoring are relatively limited or absent.

1.5. Profiles of Mindfulness

Just as meditation techniques may emphasise different components of mindfulness, different individuals are naturally higher in different mindfulness traits, even if they are meditation-naive (Pearson et al., 2015). Research into the outcomes associated with different mindfulness profiles is another method of understanding how the different components of mindfulness may relate to each other. Variable-centered analysis focuses on how individual mindfulness traits independently predict outcomes (Carpenter et al., 2019), however, as MAT

suggests, present-moment awareness can either be detrimental or helpful, depending on one's level of acceptance.

Person-centered analysis focuses on identifying latent profiles of mindfulness that exist within the population. This gives a more naturalistic picture of what individual profiles of mindfulness may look like in a person (as opposed to looking at each trait in isolation), and how differing combinations of traits may interact to produce differing outcomes. Pearson et al. (2015) performed a latent profile analysis (LPA) on 663 students and identified four profiles of mindfulness in a university student population. High Mindfulness (HM) and Low Mindfulness (LM) profiles emerged, in which overall mindfulness facets were either elevated or lowered. Furthermore a Judgmentally Observing group (JO; high in observing, low in non-judgement and act with awareness) and a Non-Judgmentally Aware group (NJA; high in non-judgement and act with awareness, low in non-reactivity and observe) emerged. Predictably, HM was associated with lower depression, anxiety, emotional lability and distress intolerance when compared to the low mindfulness group. Interestingly, however, NJA was associated with similar outcomes to HM, despite having the lowest scores out of any group in multiple facets (non-reactivity and observing). JO had the poorest outcomes of any profile, however, it is important to note that their non-judging scores and act with awareness scores were more than a standard deviation below the low mindfulness group. Nevertheless, this supports the hypothesis proposed by MAT: that high awareness of internal states, coupled with low levels of acceptance may in fact increase distress (Lindsay & Creswell, 2017). Further research into these profiles has found that the HM group is associated with greater or similar positive outcomes (e.g., improved health-behaviours, substance-use and more adaptive attachment styles) when compared with NJA, which is associated with better outcomes than JO and LM (Bravo et al., 2016, 2018a; Kimmes et al.,

2017; K. F. Lam et al., 2018). The JO group has typically been associated with poorer or similar positive outcomes when compared with the LM groups in these studies. These latent classes are robust among meditators and non-meditators, indicating that the groups are not simply reflections of who meditates and who does not (Bravo et al., 2016). Furthermore, even in meditators, the combination of low non-judgement and high observing is associated with poorer outcomes than low mindfulness.

Strangely, facets of mindfulness which are conceptually linked showed inverse relationships in these two groups. For example, non-judging and non-reactivity are both purported to be measures of acceptance in MAT (Lindsay & Creswell, 2017), however, the NJA group often has the lowest levels of non-reactivity and the highest levels of non-judging out of any group. A similar inverse relationship is often observed with the JO group. Similarly, acting with awareness and observing are both intended to measure one's level of present-moment awareness. The NJA group, however, often has the lowest levels of observing and the highest levels of acting with awareness. This suggests that, despite there being a conceptual link between constructs such as non-reactivity and non-judgement, they are sometimes more closely related to styles of awareness in individuals.

Non-judgement and acting with awareness appear to disproportionately affect outcomes, as NJA often exhibits the same or similar outcomes to HM. Furthermore the group with the lowest non-judgement and acting with awareness (JO) exhibited the poorest outcomes across studies. This is consistent with research which suggests these two variables have the largest effect on affective outcomes out of the five facets (Carpenter et al., 2019). Pearson et al. (2015) notes that this supports Kabat-Zinn's (1982) original definition of mindfulness as non-judgmental, present moment awareness. MAT however, suggests that acting with awareness

is not an attention-monitoring skill, as it implicitly measures non-judgment. Whilst the facet explicitly measures one's ability to act without automaticity and focus on their actions (i.e., monitor their attention on present-moment activity), Lindsay et al. (2017) argues that acting with awareness implicitly suggests an “openness and willingness to engage with one’s experience”. It is unclear how the variable “observing” (which is classified as an attention-monitoring measure) is any different, as being aware of one’s thoughts, feelings and body sensations could also implicitly suggest an “openness and willingness to engage with one’s experience”. In both cases, however, profiles exist with high levels of acting with awareness and observing, with low levels of acceptance (i.e., either non-judging or non-reactivity), indicating that they do not always necessarily implicitly measure acceptance. The rationale for the omission of acting with awareness from the attention-monitoring component of MAT is explained as a footnote in Lindsay et al.’s original paper outlining the theory. Given the omission is based on an assumption about an implication, however, empirical validation would be required to determine whether their argument is sound. This is especially important given that acting with awareness (along with non-judgement) appears to account for a larger portion of mindfulness’ effect on outcomes than other facets, and would therefore be a significant omission from any theory aiming to explain these effects.

1.6. Mindfulness in University Students

Mindfulness initiatives are becoming increasingly adopted within Western universities as a way to combat stress, anxiety, burnout and associated reduction in academic performance. A recent survey of American College students reported that 60% of students felt overwhelmed by their workload in the two weeks prior to the survey (American College Health Association, 2021.). Anxiety was the most common mental health condition students reported (30% had

sought treatment or been diagnosed in the last 12 months), whilst stress was the primary mental health factor students believed to negatively affect their grades. Mindfulness has been found to be protective against stress, burnout and anxiety, as well as have a positive relationship with academic performance. Given there is considerable overlap between many of these constructs, it is important to explore further the mechanisms of mindfulness in relation to each of these constructs.

Anxiety, stress and burnout are all forms of either discrete or prolonged autonomic arousal. Anxiety is an emotion which occurs in response to threat, and is characterised by a number of physical changes in the body (i.e., increased heart-rate, shallow breathing and cognitive-processing changes) which are thought to have primarily evolved to aid with survival in the face of physical danger (Akiskal, 2019). Stress is often defined as the physiological and psychological reaction to a challenge or demand (Dewe et al., 2012), and can involve similar physical changes to the body depending on the stressor. Burnout is a state linked to stress, whereby cumulative emotional or physical demands result in a perceived exhaustion of psychological resources (Campos et al., 2013). Whilst stress and anxiety are generalised states that can be caused by a range of environmental and individual factors, burnout is more often specifically tied to a specific environmental stressor or stressors (e.g., work burnout, study burnout, social burnout).

MBSR was eponymously designed as a program to reduce stress experienced by those with chronic pain (Kabat-Zinn, 1982), and subsequent studies have corroborated the efficacy of mindfulness-based interventions in reducing levels of stress (Baer, Carmody, et al., 2012; Beddoe & Murphy, 2004; Würtzen et al., 2015). Mindfulness-based interventions have similarly been found to be efficacious in treating anxiety disorders (Evans et al., 2008; Koszycki et al., 2016;

Semple et al., 2005), as well as reducing burnout (Duarte & Pinto-Gouveia, 2016; Kinnunen et al., 2019). Furthermore, individuals with higher levels of trait mindfulness have been found to have lower levels of stress, anxiety and burnout (Barbosa et al., 2013; Carpenter et al., 2019; N. Z. Taylor & Millier, 2016), suggesting that even in the absence of mindfulness training, dispositional mindfulness is effective in helping individuals to regulate their emotions. There are a number of mechanisms believed to be at play which give theoretical insight as to how the specific components of mindfulness may interact with each other to aid with emotional regulation.

The first of these is experiential avoidance. Experiential avoidance is a state that occurs when an individual attempts to avoid an internal experience because they deem it to be unpleasant, difficult to tolerate or overwhelming (Mitmansgruber et al., 2009). Experiential avoidance is sometimes conceptualised as an inverse construct of mindfulness as an individual is often actively bringing their attention away from a present-moment experience (as opposed to towards), because it is something they are not accepting of. Experiential avoidance is linked to a range of negative outcomes including substance misuse, mental illness, physical illness and emotional reactivity (Blakey et al., 2021; Shorey et al., 2017; Sloan, 2004). A reduction in experiential avoidance is thought to be one mechanism in which mindfulness reduces the prevalence or intensity of such issues. Whilst successful experiential avoidance is sometimes associated with a brief reduction in distress, the avoidance of these states reinforces beliefs that they are intolerable (and therefore must be avoided), which may increase distress in response to these states over time. The experience of being overwhelmed by another emotion can be described as a secondary emotion (Mitmansgruber et al., 2009), as the feeling of overwhelm is an emotion that has arisen in response to another emotion. There are a number of studies which

have explored the relationship between mindfulness and experiential avoidance with the two constructs being inversely correlated (Hooper et al., 2010, Riley, 2013, McCluskey et al., 2020). Furthermore, there are multiple studies which indicate experiential avoidance mediates the relationship between mindfulness and secondary outcomes (e.g., gambling, anxiety; Riley, 2013, McCluskey et al., 2020).

The concept of secondary emotions, and their cognitive counterpart, meta-cognitions (i.e., thoughts about other thoughts), are also important in understanding how acceptance and attention-monitoring may interact to affect emotional outcomes. Secondary emotions refer to emotions which occur in response to another emotion (e.g., feeling sad because one is anxious; Becker & Wachsmuth, 2008). If an individual is non-accepting of emotions such as stress and anxiety, they are liable to have a negative perception towards these states. This, in turn, is likely to result in secondary emotions and meta-cognitions which are both distressing within themselves and reinforce feelings of non-acceptance towards internal states. In fact, for individuals with lower levels of acceptance, high present-moment awareness of internal states may lead to greater distress (Lindsay & Creswell, 2017). An extreme example of this is the negative feedback loop individuals often experience during a panic attack, whereby an individual begins to feel anxious and become highly aware of their present-moment body sensations. The perception of the anxiety as intolerable (i.e., non-acceptance), leads to further anxiety, which in turn creates a cascade of increasingly intense secondary emotions (American Psychiatric Association & Association, 2013). Interoceptive exposure, a technique which aims to improve an individual's ability to tolerate and accept symptoms of anxiety by inducing panic symptoms is a first-line treatment for panic disorder (Boettcher et al., 2016). Herlache (2017) describes mindfulness as a type of "internal exposure therapy", and suggests that becoming more accepting

of distressing emotions such as stress, anxiety and burnout decreases consequent secondary emotions and meta-cognitions which may create further distress.

Stress, anxiety and burnout are issues for university students, not only as they affect wellbeing, but also because they often have a negative effect on academic performance. Mindfulness, in contrast, has a positive relationship with academic performance (Vorontsova-Wenger et al., 2021), but a negative relationship with stress, anxiety and burnout (Barbosa et al., 2013; Beddoe & Murphy, 2004; N. Z. Taylor & Milllear, 2016). Mindfulness, however, is also correlated with improvements in attention, and present-moment awareness in itself is an attentional skill (Jha et al., 2007; Morrison & Jha, 2015). This raises the question as to whether mindfulness improves grades by increasing one's ability to focus, changing one's relationship towards emotions so that these interfere less with academic performance, or a combination of both.

1.7. Mindfulness, Compassion and Empathy

There is some conceptual overlap between mindfulness and compassion, especially within Buddhist philosophy (Dunne, 2011). In the last decade research on compassion and self-compassion has witnessed significant growth, much like mindfulness research in the decade previous (Raffone et al., 2019). Parallel with this growth in research, there have been efforts to reintegrate mindfulness practice with compassion practice, as is common when these techniques are practiced within Buddhism (Neff & Germer, 2012). Some researchers have even gone so far as to suggest that mindfulness can be conceptualised as compassionate awareness, as opposed to non-judgemental awareness (Siegal & Germer, 2012; Fulton, 2012).

The skills of non-judgement and attention monitoring have been proposed to be helpful for developing compassion, as the meditator often has to hold their attention on a compassionate

image or phrase. Furthermore, acceptance of inner experience is thought to aid with any negative emotions which may arise while contemplating the suffering of another (Gilbert, 2009a). For this reason, compassion-focused interventions almost always involve concurrent development in mindfulness skills (Brito-Pons, Gonzalo et al., 2018; Gilbert, 2009a). Whilst this conceptualisation is supported by theory, it requires empirical validation, as the few studies which have compared mindfulness meditation interventions to compassion-based interventions generally include some mindfulness training within their compassion-based interventions.

There are a number of studies which have found that practicing compassion meditation increases empathy (Klimecki, Leiberg, et al., 2013; Luberto et al., 2018). Strauss et. al. (2016) identified five factors which are necessary for compassion: (a) recognition of suffering, (b) understanding the common humanity of suffering, (c) connecting emotionally with suffering, (d) tolerating the distressing feelings that may arise and (e) having a desire for suffering to be alleviated. Empathy can be defined as the ability to understand another's experience, either emotionally or cognitively. Thus, as compassion requires recognition, understanding, and connection with another's suffering (all of which can be thought of as different aspects of empathy), empathy can be conceptualised as a prerequisite to compassion. The key distinction between the two is that compassion adds a desire for any suffering recognised to be alleviated. There is evidence to suggest that this addition may change an individual's relationship towards suffering.

One study found that giving subjects empathy-training alone resulted in an increase in self-reported distress when observing others' pain, whereas instructing the participants to additionally wish for others' pain to be alleviated resulted in lower negative affect and a neural profile consistent with positive affect (Klimecki, Leiberg, et al., 2013). In this way,

compassion-meditation draws parallels to mindfulness whereby paying attention to distress corresponds to attention-monitoring, and similarly has the capacity to increase distress when practiced alone (Lindsay & Creswell, 2017). The addition of a second component (acceptance in mindfulness, and the wish for suffering to be alleviated in compassion), however, appears to be important for emotional regulation in both practices when connecting with distressing thoughts or feelings in oneself or another.

Given mindfulness meditation is often developed as a prerequisite skill to compassion meditation, researchers have examined whether training in mindfulness itself is sufficient to increase empathy. A number of studies have found positive correlations between mindfulness and empathy, as well as direct improvements in empathy as a result of mindfulness training in a range of populations, including medical students, nurses, university students and other healthcare professionals (Barbosa et al., 2013; Beddoe & Murphy, 2004; Kemper & Khirallah, 2015; Raab, 2014; Shapiro et al., 1998). These studies, however, did not examine which components of mindfulness were responsible for improvements in empathy.

From a theoretical perspective, both attention-monitoring and acceptance may differentially affect empathy. Increased attentional ability is not only likely to increase one's ability to detect cues indicative of emotions in another, but is also likely to increase awareness of one's own emotional response. Mindfulness training has been found to increase attentional capacity broadly (Jensen et al., 2012; Jha et al., 2007; Morrison & Jha, 2015), and research also indicates that attentional capacity and emotional awareness are beneficial for empathy (Braaten & Rosén, 2000; Groen et al., 2018; Rampoldi et al., 2019). This indicates that attention-monitoring may be partially responsible for improvements in empathy as a result of mindfulness training.

Interpersonal acceptance is a cornerstone of therapies such as person-centered therapy and compassion-focused therapy as it is believed to allow an individual to more fully connect with another's experience without the interference of negative judgements (Gilbert, 2009a; Raskin & Rogers, 2005). Individuals are less likely to empathise with individuals who they judge to differ from themselves (e.g., in terms of class, race or gender). It is important to note, however, that acceptance within mindfulness is focused towards acceptance of one's own experience, and further research is required to determine if it may increase the ability to accept another person's experience. Nevertheless, the ability to accept one's own thoughts and feelings that arise in response to another person's distress may be sufficient to increase empathy.

Empathising with individuals who are experiencing distress, can lead to a condition known as compassion fatigue (Duarte & Pinto-Gouveia, 2016), whereby prolonged exposure to the distress of others can lead to reduced empathy, increased burnout and negative health outcomes (Cavanagh et al., 2020; Ortega-Campos et al., 2019; Zhang et al., 2018). This is common in helping professions such as medicine or psychotherapy, where professionals are required to emotionally connect with suffering as part of their everyday work. Both mindfulness and compassion meditation increase empathy as well as emotional regulation (Al-Ghalib & Salim, 2018; Baer, Lykins, et al., 2012; Barbosa et al., 2013; Klimecki, Leiberg, et al., 2013), and may offer a way for professionals to increase their empathy without increasing compassion fatigue. It is important to note that, given the distinction contemplative practices make between compassion and empathy, the "compassion fatigue" discussed in broader psychological literature could better be described as "empathy-fatigue", as it is generally refers to fatigue that occurs as the result of empathy (which is sometimes used interchangeably with compassion outside of the contemplative practice literature).

1.8.. Summary of Meditation Typologies

This thesis includes a range of different meditation typologies and below is a summary to aid the reader in understanding what is meant when specific types of meditation are referred to:

- Attention Monitoring Meditation (MO)/Concentrative practices: These types of meditation correspond to the attention monitoring component outlined within MAT (Lindsay et al., 2017). The defining feature of MO is that the meditator is encouraged to focus on a singular object of attention within the present moment, with limited instructions encouraging acceptance. That is, the primary “goal” of this type of meditation is to maintain attention on the object, and return to it when the mind goes elsewhere. The primary object can include the breath (and most commonly does in mindfulness traditions), counting or the body. This meditation corresponds to the “present-moment awareness” component of mindfulness (Kabat-Zinn, 1984).
- Acceptance-focused Meditation (AM)/Non-judgement focused meditation: These types of meditation correspond to the acceptance component outlined within MAT (Lindsay et al., 2017). The defining feature of AM is that the meditator is encouraged to accept their experience as it arises, without controlling (or at least, minimally controlling) where their attention goes. That is, the primary “goal” of this type of meditation is to accept one’s experience as it is. Examples of this type of meditation include open-monitoring meditation and recollective awareness meditation (Siff, 2014, Ainsworth et al., 2013). This corresponds to the “non-judgemental awareness” component of mindfulness (Kabat-Zinn, 1984). It is important to note that both AM and MO refer to meditation techniques that are towards their respective sides of a spectrum (i.e., awareness versus

acceptance), but that AM techniques may include some instruction around attentional focus and vice versa.

- Mindfulness meditation: These types of meditation exist between AM and MO. During mindfulness meditation a relatively equal amount of attention is given to monitoring one's attention (usually on a primary meditation object, e.g., the breath), as well as accepting one's experience (usually towards the primary meditation object, and distractions that may arise). Common instructions for mindfulness meditation may ask the meditator to focus on their breath, then, when their attention wanders they are encouraged to label where it has gone in a non-judgemental way, before returning to the breath (Kabat-Zinn, 1984). This type of meditation primes both components of mindfulness.
- Compassion meditation: Compassion meditation refers to meditation styles in which the meditator is encouraged to recognise the emotional suffering of themselves or others as well as wishing for the reduction of emotional suffering in themselves or others, or simply generating goodwill (Strauss et al., 2016). This is generally done as a type of mantra, where the meditator may mentally recite a phrase which primes one or both components (e.g., they may recite a phrase that acknowledges their own anxiety, and then follow this with a wish that their anxiety dissipates). It is important to note that compassion meditation is distinct from loving-kindness meditation (although the two are commonly confused), in that loving-kindness meditation simply focuses on generating goodwill for others (i.e., the second component of compassion-focused meditation), whereas compassion meditation additionally focuses on recognising the suffering of others.

A number of studies have directly compared these different types of meditation finding significant differences between key variables such as attention, sociability and stress-reactivity (Lindsay, Chin, et al., 2018; Lindsay et al., 2019; Lindsay, Young, et al., 2018; Rahl et al., 2017). Singer and Engert's (2019) ReSource project is one of the most relevant studies in relation to the above meditation typologies. As a part of a nine month program they assigned individuals to different meditation programs (i.e., presence module training, perspective module training and affect training). These roughly correspond to MO, AM and compassion meditation (although affect training also involved loving-kindness meditation). They found changes in secondary outcomes consistent with the theoretical underpinnings of each meditation practice. For example, affect training resulted in an increase in pro-sociality and greater positive thoughts, where perspective training resulted in an increased ability to observe thoughts, and presence training resulted in increased body awareness. These studies indicate that there are real, discernible differences between the effects between different types of meditation, and that further attempts to unpack what these differences look like are warranted.

1.10. Summary of Gaps

The reviewed literature outlines a number of gaps in our understanding of the relationship between mindfulness and compassion meditation, as well as how components of mindfulness relate to each other:

- Previous MAT studies have not explored adding an acceptance-only condition to components analyses, because of the difficulty dissociating attention monitoring from acceptance. This is somewhat problematic as comparing attention-monitoring only to a mindfulness group limits conclusions about the component of acceptance, as MAT specifically states that these components interact with each other. Furthermore, findings

which indicate mindfulness is superior to attention monitoring do not preclude the possibility that acceptance-training is solely responsible for changes. The development of experimental inductions for acceptance meditation is likely to benefit the literature.

- Whilst there is a host of research indicating that mindfulness interventions are able to increase empathy, a literature review revealed no research exploring how the individual components (i.e., attention monitoring and acceptance) may differentially prime empathy.
- The majority of LPA research is cross-sectional, and works under the implicit assumption that mindfulness classes are relatively stable over time and in response to stress. Longitudinal research is required to confirm the temporal consistency of latent profiles.
- Whilst MAT provides a good theoretical framework for understanding the relationship between three FFMQ facets (i.e., non-reactivity, non-judgement and observing), it does not provide a theoretical account for how acting with awareness may interact with non-judgement.
- Both mindfulness and compassion meditation increase empathy and emotional regulation, offering the potential for emotional connection while reducing the likelihood of associated emotional burnout. There is a lack of research which explores how these meditation techniques may be combined to most effectively increase empathy prior to emotional engagement with another person, and then to subsequently regulate emotions which may arise afterwards.
- More broadly, there is an assumption that mindfulness training has a complementary effect on compassion training that has influenced the design of compassion-based interventions (i.e., major compassion-based interventions always include mindfulness meditation training). The assumption that mindfulness which is integrated within

compassion training is more beneficial than a strict compassion intervention is one that has largely gone untested, as these studies have worked under this theoretical premise from the outset. A direct comparison between mindfulness meditation, compassion meditation and their combination would benefit the literature.

1.11. Aims and outline of thesis

The aim of this thesis is to disentangle the effects of contemplative practices. This is firstly between separate types of contemplative practice (i.e., mindfulness and compassion), and secondly between different components of a single contemplative practice (i.e., non-judgement and present-moment awareness in mindfulness). This thesis will explore the individual effects of these distinct constructs on both interpersonal (i.e., empathy) and intrapersonal outcomes (i.e., burnout, emotions and academic achievement).

Study one begins this exploration by comparing two contemplative practices that are commonly practiced together (i.e., mindfulness and compassion meditation) in terms of their effects on state empathy and emotion. The specific aim of this study was to determine the optimal ordering and combination of these two techniques to prime empathy prior to an emotionally engaging task, and to promote emotional regulation after the task.

Study two narrows this exploration down to specifically examining how the individual components of mindfulness (i.e., non-judgement and present-moment awareness) differentially affect empathy. Study three uses person-centered analysis to determine how different configurations of mindfulness facets predict the trajectory of university-related burnout in students. Finally, study four explores how the facets of non-judgement and present-moment awareness interact to affect the relationship between vulnerability to stress and academic

achievement. Together these studies aim to use a variety of quantitative methods to test a number of theoretical assumptions held about mindfulness, and how its components interact.

**Chapter Two: Study One - The Effect of Mindfulness and Compassion on State Empathy
and Emotion**

Martin-Allan, J., Leeson, P., and Lovegrove, W. "The Effect of Mindfulness and Compassion Meditation on State Empathy and Emotion." *Mindfulness* 12.7 (2021): 1768-1778.

2.1. Abstract

Objectives: Research suggests meditation may increase empathy and emotional engagement.

While this may be beneficial in professions where empathy results in greater effectiveness (e.g., psychotherapy), emotional engagement may also produce emotional burnout. This study aims to determine whether mindfulness and/or compassion meditation can prime empathy prior to connecting with another's emotions, and facilitate emotional stability afterwards.

Methods: University students (N = 156) listened to recordings of compassion meditation, mindfulness meditation, or a control, then watched videos depicting sadness, happiness or anxiety, then listened to compassion, mindfulness or control recordings again. This produced five groups: Compassion-compassion (i.e., compassion meditation before and after videos), mindfulness-mindfulness, mindfulness-compassion, compassion-mindfulness and a control. State emotions and empathy were assessed throughout.

Results: Compassion and mindfulness meditation resulted in greater empathy than the control ($p = .03$). Prior to watching videos, mindfulness meditation produced greater sadness and anxiety, and compassion meditation produced greater sadness and happiness ($p = .001$). After watching videos, happiness was greater in the mindfulness-mindfulness and compassion-compassion condition ($p = .03$).

Conclusions: Both types of meditation resulted in greater self-reported distressing emotions prior to videos (and happiness in compassion condition), and empathy during presentation compared to the control. Afterwards there was an increase in positive emotions in the compassion-compassion and mindfulness-mindfulness conditions. This indicates that meditation may allow for individuals to process emotional content in a way that is conducive to wellbeing.

Whilst compassion meditation is often combined with mindfulness, these results suggest using a consistent approach of either mindfulness or compassion is most beneficial to wellbeing.

2.2. Introduction

Over the last 20 years meditation has been an exponentially growing phenomenon, both within academia and the public psyche (Raffone et al., 2019). The term “meditation” encompasses hundreds of different approaches prescribing unique methods of altering attentional focus to influence thoughts, emotions or attention itself (Sedlmeier et al., 2012). Repeated experiences of meditative states are thought to translate to changes in traits, a conceptualisation supported by studies finding that greater intensity and frequency of certain states during meditation are associated with greater trait changes (Hölzel & Ott, 2006; Kiken et al., 2015).

Whilst there are countless studies exploring the effects of meditation, few compare the effects of different types of meditation against each other, and only a handful explore these comparisons at a state level (Eberth & Sedlmeier, 2012; Goyal et al., 2014; Sedlmeier et al., 2012). Given that change in meditation is thought to begin at the state level, and that meditation techniques are employed for different and sometimes contradictory purposes (e.g., to increase *or* decrease connection with one’s own emotions), it is important to explore the differences in state outcomes produced by different meditation techniques so they can be tailored to the goals of the meditator. Furthermore, exploration at the state level allows for an understanding of how different types of meditation can be applied in different contexts. For example, one needs to be connected to the emotions of another person in the process of empathetic listening (Laska et al., 2014). Being emotionally occupied with another’s distress long after they cease contact with that person, however, can be a sign of over-involvement and emotional fatigue (Gleichgerrcht & Decety, 2013).

A meta-analysis of 26 randomly controlled studies found that meditation had a medium positive effect on self-reported empathy and related observable outcomes (Luberto et al., 2018),

whilst another meta-analysis of 163 studies indicated that meditation had a medium to large effect on reducing negative emotionality (Sedlmeier et al., 2012). As meditation techniques have been found to increase emotional attunement *and* decrease emotionality in different contexts, it may be possible to order meditation such that a state of attunement is primed before connecting with another's distress, while using meditation to prime emotional stability immediately after connection with another's distress.

Compassion and mindfulness meditation are popular meditation techniques which are both potential candidates for this role. They have both been found to increase empathy (Beddoe & Murphy, 2004; Leppma & Young, 2016), wellbeing (McIntyre-Mills, 2010), and have both been found to decrease symptoms of anxiety and depression (Barnhofer et al., 2009; Evans et al., 2008; Goldin & Gross, 2010; Segal & Teasdale, 2018). Despite some similarity in outcomes, these techniques are conceptually distinct. Mindfulness meditation focuses on adopting a non-judgemental relationship towards internal thoughts and feelings, while compassion meditation focuses on cultivating an intention to assuage the suffering of others and/or oneself (Gilbert, 2009a).

Strauss et. al. (2016) identified five factors common across definitions which are necessary for compassion: (a) recognition of suffering, (b) understanding the common humanity of suffering, (c) connecting emotionally with suffering, (d) tolerating the distressing feelings that may arise and (e) being motivated to help. Empathy (i.e., the ability to understand and/or feel what another person is experiencing) serves as a precondition to compassion within this definition. In order to recognise, connect emotionally and see commonality of suffering one first needs to be empathic towards the other's suffering (Klimecki, Ricard, et al., 2013).

A number of findings support the theoretical link between compassion meditation and empathy. Compassion interventions have been found to result in increased empathy scores on standardised psychometrics (Leppma & Young, 2016), as well as increased empathic accuracy and neurological changes in brain regions associated with empathy (Mascaro et al., 2013).

The effects of compassion, however, may be distinct from empathy alone. Klimecki et al. (2013) found that training subjects to empathise with others' pain resulted in self-reported distress when exposed to another's suffering that quickly became intolerable (there was also higher activity in neurological regions associated with distress). In contrast, participants trained in compassion meditation exhibited a neural profile associated with positive affect, and reported lower negative affect. This indicates that empathy alone can be detrimental, however, adding elements of compassion (i.e., identifying common humanity, tolerating distress and intending help towards that person) may alter neurological pathways responsible for processing the distress of others resulting in an ability to tolerate it.

Mental health professionals may benefit from techniques such as compassion meditation, in order to increase empathy without increasing burnout. Baumont et al. (2017) explored the effects of compassionate mind training on 21 therapists-in-training, finding an increase in self-compassion and a decrease in self-criticism. There was no increase in compassion towards others as a result of CMT, which brings into question whether compassion training results in greater empathy.

A number of other findings indicate compassion can improve wellbeing. Research has consistently found that kind people are happier, and that kind acts positively affect wellbeing (Buchanan & Bardi, 2010; Layous et al., 2012). A meta-analysis of 14 Compassion Focused Therapy (CFT) interventions and a systematic review of 22 self-compassion based interventions

found a medium effect for reduction in depression, anxiety and improvement in compassion in studies which measured these variables (Leaviss & Uttley, 2015; Wilson et al., 2019).

Mindfulness, defined as non-judgemental, present-moment awareness, has also been found to produce a number of positive effects on mood and wellbeing (J. M. G. Williams & Kabat-Zinn, 2011). Attending to the present is proposed to increase positive engagement with present activities, and limit worry and/or rumination (Eberth & Sedlmeier, 2012).

Non-judgement is proposed to reduce the compounding impact of negative experiences (J. M. G. Williams & Kabat-Zinn, 2011). When individuals judge an experience as unpleasant, the judging becomes a secondary experience that is unpleasant itself. For example, if an individual notices they are anxious, they may fear that it will compound and cause a panic attack, causing further anxiety. In this case anxiety functions as both a cause and consequence, creating a feedback loop. If an individual is non-judgemental about their anxiety, they still feel anxious, but do not feel anxious about feeling anxious. Thus, both the length of time an individual experiences an emotion, and intensity are likely to be reduced. This would suggest that mindfulness should help individuals to manage distressing emotions after a distressing event. There are a large number of studies demonstrating the effect mindfulness-based interventions have on increasing wellbeing (Baer et al., 2012; Howells et al., 2016), as well as reducing distressing emotions such as depression (Barnhofer et al., 2009; Segal & Teasdale, 2018) and anxiety (Evans et al., 2008; Goldin & Gross, 2010).

There is also some evidence to suggest that mindfulness increases empathy. After medical students were engaged in an 8-week MBSR course Shapiro et al. (1998) found that those who completed the course were significantly more empathetic post-intervention than those who did not. Another study of nurses found a trend increase in empathy after an 8-week MBSR

course (Beddoe & Murphy, 2004). Furthermore, there are a number of other studies which have demonstrated correlations between trait mindfulness and empathy (Barbosa et al., 2013; Kemper & Khirallah, 2015; Raab, 2014). These studies indicate that mindfulness meditation may have the capacity to increase an individual's level of empathy.

Mechanisms underlying these changes are implicit within the definition of mindfulness, which is most commonly defined as non-judgementally paying attention to the present moment on purpose (J. M. G. Williams & Kabat-Zinn, 2011). The subject of mindfulness is often one's inner experience, but when this definition is focused towards others (i.e., "non-judgementally paying attention to another person's present moment feelings"), the definition comes close to one of empathy. That is not to say that mindful people necessarily do this, however, changes in empathy related to mindfulness may be a result of this open, non-judgemental awareness being transferred into one's relationship towards others. Both non-judgement and attentional focus are often considered to be important pre-requisites to empathy (Gilbert, 2009a).

For these reasons, Mindfulness-Based Compassionate Living (MBCL) was designed specifically to be used after an individual has completed an MBCT or MBSR course, to take advantage of the positive effect developing non-judgement and attentional focus could have on cultivating compassion (Bartels-Velthuis et al., 2016). Studies researching the efficacy of MBCL on individuals who had already received MBCT, found an improvement in mindfulness, self-compassion and a reduction in depressive symptoms compared to treatment as usual (Bartels-Velthuis et al., 2015; Bartels-Velthuis et al., 2016; Schuling et al., 2016). A more recent study replicated these findings and found them to be robust at six-month follow-up (Schuling et al., 2020).

The assumption that mindfulness training enhances compassion training is often applied on a smaller scale within compassion-focused courses: Compassion Cultivation Training (CCT), Cognitively Based Compassion Training (CBCT), Compassion-Focused Therapy (CFT), and Mindful Self-Compassion (MSC) all include at least one session focused on mindfulness within their course (Boellinghaus et al., 2013; Brito-Pons, Gonzalo et al., 2018; Leaviss & Uttley, 2015; Neff & Germer, 2013). Applying this same rule on an even smaller scale, these courses often include a period of mindfulness meditation *within compassion meditation sessions*. This demonstrates the degree to which the premise combining mindfulness and compassion is accepted practice within the contemplative practices literature.

Despite making good theoretical sense, this methodology relies on an assumption that remains untested - that combining mindfulness meditation with compassion meditation is more effective at producing compassion than combining compassion meditation with more compassion meditation (as in a time-limited intervention or even meditation session, adding one component is always done so at the sacrifice of another). This approach is problematic as studies which purport to be comparing compassion meditation with mindfulness meditation are generally comparing combined compassion and mindfulness meditation with pure mindfulness meditation. It is thus difficult to determine what mechanisms are at play, and how these constructs interact.

There are a handful of studies which compare the effects of mindfulness to compassion meditation in this way. Brito-Pons et al. (2018) compared the effects of a Compassion Cultivation Training (CCT) program to MBSR and found similar results across most measures, however, mindfulness resulted in a reduction in anxiety where compassion did not, and compassion resulted in an increase in altruistic disposition where mindfulness did not. The

authors suggest that mindfulness may offer more intrapersonal benefits (i.e., emotion regulation) where compassion provides more interpersonal benefits (e.g., empathy, altruism).

Desbordes et. al. (2012) found that individuals who had completed a CBCT meditation intervention had a trend increase in right amygdala activity (a region of the brain most associated with anxiety) post-intervention when exposed to emotion-inducing stimuli, where individuals who completed Mindful Attention Training (MAT) had significantly less right amygdala activity. Decreased amygdala response to distressing stimulus has also been observed in other mindfulness interventions (Goldin & Gross, 2010; V. A. Taylor et al., 2011). This suggests that mindfulness may decrease the intensity of an individual's emotional response to others, where compassion may increase it (or at least have no effect). Thus, compassion may be better at cultivating affective empathy (i.e., being emotionally congruent with another).

Whilst there has been a demonstrable link made between both compassion meditation and mindfulness meditation and trait changes in empathy and wellbeing, there are fewer studies which have explored the state changes of these techniques on individuals. The potential for meditation to produce state changes warrants further exploration, as there are specific contexts where state change may be helpful. For example, a recent meta-analysis found empathy and genuineness to be the second and fourth biggest predictors of client outcomes within psychotherapy (Laska et al., 2014). For a therapist to be genuinely empathetic, they need to, at some level, feel their client's emotions. Thus, a change in state *prior* to client presentation, to one that is more emotionally attuned may improve client connection and outcome. As therapists are often dealing with distressing emotions, the transfer of emotions from client to therapist has the potential to cause distress (perhaps even more so if the therapist is highly attuned to them). Thus, a change in state *after* client presentation, to one that is less emotionally distressed, is likely to be

beneficial in reducing burnout. This same concept has the potential to be applied in other professional populations (e.g., carers, doctors) or more broadly as the emotional distress created by empathy has been found to inhibit altruism and empathetic engagement in the general population (Contri, 2011).

This study aims to compare the effects of mindfulness meditation and compassion meditation on emotional congruence and empathy through exploring the following hypotheses. Firstly, compassion meditation will result in the highest level of empathy, followed by mindfulness and then the control group. Secondly, mindfulness meditation will result in lower distressing emotions (anxiety and depression) and higher positive emotions (relaxedness and happiness) after meditation, but before presentation of emotional stimuli, compared to the compassion meditation, which will in turn be greater than the control. Thirdly, mindfulness meditation will result in greater decentering and lower distressing emotions, and higher positive emotions post-presentation of emotional stimuli compared to compassion meditation, which will in turn be greater than the control. Finally, it is hypothesised that mindfulness before compassion meditation may help to strengthen the effects of compassion in the second meditation period, whereas compassion before mindfulness may be optimal for increasing empathy during the presentation of emotional videos, and decrease distress post-presentation. Thus, this study will also aim to evaluate which ordering of meditation is optimal on balance.

2.3. Methods

2.3.1. Participants

The initial sample was comprised of 247 undergraduate university students. In order to account for the possibility of students playing the meditation recording without listening to it (or meditating significantly longer than the allotted time), those who spent more than 20 minutes on

the audio page (the recordings were 15 minutes each) were screened out. Furthermore, those who were unable to correctly answer a basic multiple choice comprehension question (i.e., “what was the focus of this audio?”) were screened out. There was no difference between responders and non-responders in terms of trait mindfulness and compassion. Of these, 156 (123 females, 33 males, average age of 21.03, $SD = 6.04$) students contributed to the first measurement as they exited the meditation page within 20 minutes and responded correctly to the screening comprehension questions, indicating they had listened to the audio recording. 106 participants contributed to the second measurement, as those who failed the final screening question or went overtime were screened out ($F = 84$, $M = 22$, $age = 22.02$, $SD = 7.41$).

2.3.2. Procedure

Participants signed up for the study using the university’s online research participation scheme. Participants were given the link to a Qualtrics survey. After participants had read the information and consent form they were given the FFMQ and the SCBCS to complete. After this participants were randomised to one of three audio conditions: Mindfulness meditation, compassion meditation or control audio. Based on the audio listened to, participants were initially broken up into three groups: mindfulness ($N = 71$), compassion ($N = 56$) and control ($N = 28$; note that the mindfulness and compassion groups would later be further split into different conditions, which accounts for the significantly larger sample in these groups compared to the control group. They then answered the basic comprehension questions and were given the DEQ which measured their state depression, anxiety, happiness and relaxedness.

They were then asked to watch three videos, one which elicited happiness, one which elicited sadness and one which elicited anxiety, and answer the SES and DEQ after each video. The ordering of videos was evenly allocated between participants, that is there were six different

orderings of the videos (Happy-Sad-Anxious, Happy-Anxious-Sad, Sad-Happy-Anxious, Sad-Anxious-Happy, Anxious-Happy-Sad, Anxious-Sad-Happy). For each of these videos relaxedness was omitted from the DEQ as it was not a target emotion.

After the three videos the participants were given another audio. Participants who listened to the control condition first were given the control again. All other participants were either given a repeat of the same meditation, or given the other meditation type. Thus, at the final stage there were five groups: mindfulness-mindfulness (MM; $N = 15$), compassion-compassion (CC; $N = 19$), compassion-mindfulness (CM; $N = 19$), mindfulness-compassion (MC; $N = 25$) or the control condition (CTRL; $N = 28$). After listening to the final audio participants were given another DEQ which measured all four items and the TMS, to measure their level of decentering.

Mindfulness Meditation involved both a noting practice and breath meditation. The script was developed to focus on the three main components of mindfulness as outlined by Kabat-Zinn (1982), that is 1) non-judgementally 2) paying attention to the 3) present moment. The focus of the exercise was paying attention to breathing, which is for most people a neutral stimulus (thus easy to be non-judgemental towards) that is constantly available for attention, allowing individuals to pay attention to it throughout the exercise. Participants were also asked to note any distractions with one word labels (e.g., “thinking” or “planning” if their mind began to wander away from the breath). This instruction was intended to increase non-judgement towards distractibility, as mind wandering is typically associated with self-judgement when meditating. Furthermore, labelling allows for even future focused thoughts to be recognised as a present moment activity which can be attended to in a non-judgemental way. This practice allows for

both breathing and distraction from breathing to be part of the meditative practice throughout the 15 minutes.

Compassion Meditation involved the mental recitation of phrases intended to elicit compassion. Strauss et al. (2016) reviewed the current state of compassion literature and identified five primary factors which are necessary for compassion (a) recognition of suffering, (b) understanding the common humanity of the suffering, (c) connecting emotional with the suffering, (d) tolerating the distress of difficult feelings that may arise and (e) being motivated to help that person.

Firstly, recitation began with a sentence which highlighted the common humanity between the meditator and their object of compassion (b), and the recognition of suffering within them (a), for example, “just like me (b), this person has known fear (a)”. The combination of these two elements (i.e., recognition of the similarity between the emotional suffering of the self and other), was intended to also enhance the emotional connection between the meditator and their object of compassion (c). This second part to each recitation involved the meditator developing an intention of shared distress tolerance (d) in order to develop an intention of helping or goodwill (e) towards the object of compassion, “may we both stay strong in the face of fear to come.” Furthermore, this phrasing allows for continued elicitation of emotional connection between the meditator and their object. It is acknowledged that this phrase may prime fear (which was to be measured later in the study), however, acknowledgement of emotional suffering is a key component of compassion. Phrases that addressed each of the other primary emotions explored in the study (i.e., fear, sadness and happiness) were included, as well as other phrases that were unrelated to the constructs being measured, “e.g., just like me, this person is doing the best that they can”.

The Control Condition involved the participants listening to a recording of the history of the telephone. The length of audio was the same as the other two conditions, and the tone and pace was controlled to be similar. In addition, participants were given the same instructions at the beginning of the control to the other two conditions.

Videos: Prior to performing the main study, a pilot study of 24 participants was conducted. Each participant viewed nine videos (three for each emotion: anxiety, sadness and happiness). After each video participants completed the SES and DEQ. Once results were collected, videos were judged based on the means of target emotions and affective empathy. The videos with the highest mean target emotions and affective empathy, and the lowest means of non-target emotions were chosen. From the nine videos presented three were chosen for the main study. Happiness was elicited by a 4:38 video where individuals recall the happiest day of their life. Anxiousness was elicited by a 3:19 video taken from the film “Zodiac” where a man fears he is talking to a serial killer. Sadness was elicited by a 4:21 video where individuals read text messages from deceased loved ones.

2.3.3. Measures

The Five Facet Mindfulness Questionnaire (FFMQ) is a 39-item self-report instrument which assesses five facets of mindfulness: Observing, describing, acting with awareness, non-judgement and non-reactivity (Baer et al., 2006). Responders use a Likert scale ranging from one (never or very rarely true) to five (very often or always true). The FFMQ demonstrates good internal consistency and validity (Baer et al., 2008). Within the sample the FFMQ demonstrated acceptable reliability with Chronbach’s alphas ranging between .79 and .92 for each of the five facets.

The Santa Clara Brief Compassion Scale (SBCS) is a 5 item questionnaire designed to measure compassion (Hwang et al., 2008). Items on the SBCS are scored on a Likert scale from 1 being “not at all true of me” to 7 being “very true of me”. This scale was chosen as a brief measure to determine participants’ trait compassion prior to being assigned to a condition. A recent study which aimed to determine the psychometric properties of the SBCS found it to have high internal reliability (Chronabch’s Alpha = .89-.90), split-half reliability and test/retest reliability as well as good convergent and divergent validity (Hwang et al., 2008). Within this sample the SBCS demonstrated similarly high internal reliability (Chronbach’s Alpha = .925).

The Discrete Emotions Questionnaire (DEQ) is a 32 item questionnaire which measures state emotions (Harmon-Jones et al., 2016). It asks for respondents to rate to what extent they felt an emotion during a task from 1 (not at all) to 7 (an extreme amount). This measure was chosen as it allows for quick responding after each condition is presented. A number of emotions are listed, however, for the purpose of this study the subscales of happiness, anxiety and sadness were chosen to measure emotional congruence with each emotion-eliciting stimulus, and the relaxation subscale was chosen to measure relaxation post meditation or control audio. All other scales were excluded as they were not relevant to the study, and would prolong response time, which would impact the validity of the state measurement. Thus, of the original 32 items, 16 were chosen for this study. The DEQ has been found to have good inter-rater reliability and internal consistency as well as adequate construct and discriminant validity, within the current sample the Chronbach’s Alpha ranged from .81 to .90.

The State Empathy Scale (SES) is a 12-item questionnaire which aims to measure state empathy (Shen, 2010). There are three subscales: Affective empathy, associative empathy and cognitive empathy. Participants are asked to what degree they agree with a statement on a Likert

scale from 1 (not at all) to 5 (completely). This measure was chosen as it has a specific subscale for affective empathy (a focus of this paper) and it is designed to measure empathy during the presentation of an emotive stimulus (i.e., a message) which allows for easy adaptation for other emotive stimuli (i.e., videos). Shen (2010) found that the SES demonstrated good discriminant validity, construct validity and internal reliability ($\alpha = .92$). For the current study the word “message” was replaced with “video” for each item. Within the current sample the Cronbach’s alpha was .85.

The Toronto Mindfulness Scale (TMS) was used to assess decentering (Lau et al., 2006). The Toronto Mindfulness Scale is a state-level measure which is designed to be used after a person meditates. There are seven items within the TMS which measure decentering, these items are aimed to assess the degree to which the responder has an experience of being separate from their thoughts and feelings, as well as being non-judgemental towards them. Participants are asked to rate to what degree they agree with each statement on a Likert scale ranging from 0 (not at all) to 4 (very much). Initial validation showed the measure to have good internal consistency (Cronbach’s $\alpha = .84$; Lau et al., 2006). Past research has found that the state changes in TMS mindfulness are predictive of longer term changes in trait mindfulness over the course of an MBSR program, as well as change in distress after an 8 week program (Kiken et al., 2015; Lau et al., 2006). Furthermore, experienced meditators have been found to score higher on this scale than novices (Ortner et al., 2007). The current study used the TMS to measure decentering.

2.3.4. Data Analyses

Prior to testing the hypotheses, an ANOVA was conducted comparing each group based on their FFMQ scores and SCBCS scores in order to ensure that no group had unusual high or low trait levels of mindfulness and compassion. To determine the difference in empathy between

mindfulness, compassion and the control, a MANOVA was conducted comparing participants' scores in the SES and their endorsement of state emotions relevant to each video (i.e., how happy they feel when watching the happy video, how sad they feel when watching the sad video).

The score for endorsement of state emotions was calculated by subtracting participant's average non-target emotion score (e.g., how happy and sad they felt during an anxious video, or how anxious and sad they felt during a happy video) from the target emotion score. This was done to control for the fact that more emotional individuals are likely to feel higher levels of all emotions (target and non-target), whereas the construct this study is aiming to measure is how meditation affects the increase of empathically accurate emotions. Thus, the "target emotions" score was intended to reflect the degree to which the individual watching the video felt the same emotions as the character they were watching, over and above their baseline level of emotionality. This methodology was employed as a means of measuring affective empathy, which is defined as the ability to share feelings with another (Shen, 2010). Affective empathy was also measured as a subscale of the SES. Therefore, as "target emotions" and SES affective empathy were both aiming to measure the same latent variable (i.e., affective empathy), a MANOVA was employed to measure the effect of the different meditation conditions on multivariate affective empathy. In order to determine the nature of the difference detected in the MANOVA, a Descriptive Discriminant Analysis (DDA) was performed.

Two Non-Parametric Multivariate Analyses of Variance (npMANOVA) were used to examine the difference in state effects between mindfulness meditation, compassion meditation and the control on depression, anxiety, happiness and relaxation immediately after the two meditation periods. These tests were used over a standard MANOVA as the assumption of normality of dependent variables was violated. The multivariate model initially tested for both of

these models was global emotionality (i.e., a combination of anxiety, depression, happiness and relaxedness). Multiple comparisons using Bonferroni-corrected Mann-Whitney U tests were used to examine the univariate differences between each condition. In addition to these two npMANOVAs, a one-way ANOVA was conducted to explore the difference between groups in terms of decentering (this was performed separately, as the construct of decentering is separate from emotionality).

2.4. Results

There were no significant differences between groups in terms of FFMQ and SBCS scores. Assumptions of normality, linearity, non-multicollinearity, and homogeneity of variance-covariance matrices were met. Findings demonstrated a significant effect of meditation condition on both SES and target emotions, $F(2, 152) = 2.08, p = .03, \text{partial } \eta^2 = .05$. Examination of the canonical discriminant functions revealed a moderate canonical correlation ($\eta = 0.259$) on the first function, termed affective empathy (the second function was non-significant, and thus the first model was used). The full model test of the first function produced was statistically significant (Wilk's $\lambda = 0.93, \chi^2 = 11.81, p = 0.02$). The standardized canonical discriminant function coefficients were above .3 (.32 for SES and .75 for target emotions), indicating they both significantly contributed to the function (Stevens, 2012).

The direction of this relationship was indicated in the group centroid statistics which were .23 for compassion, .08 for mindfulness and -.53 for the control. This indicates that compassionate meditation produced greater levels of empathy compared to mindfulness, and much greater levels of empathy compared to the control.

After the first meditation period, findings indicated a significant difference between groups on the combined dependent variables, Wilk's $\lambda(8, 300) = 3.44, p = .001, \text{partial } \eta^2 = .08$.

In terms of global effects (i.e., the effect of combined variables), the meditation conditions scored higher in terms of multivariate emotionality (i.e., both pleasant and unpleasant emotions), compared to the control at an alpha level of .05. The relative effects of each variable on group membership are summarised in table one. A relative effect value gives the likelihood that an individual chosen from one group (e.g., mindfulness) would exhibit a higher value than another randomly chosen individual from all groups (e.g., mindfulness, compassion and control), thus higher values correspond to a greater effect of the treatment condition on the dependent variable (Ellis et al., 2017).

Table 2.1.

Relative effects of the first period of meditation on anxiety, sadness, happiness and relaxedness

	Anxiety	Sadness	Happiness	Relaxedness
Mindfulness	.55	.52	.52	.52
Compassion	.49	.54	.55	.53
Control	.38	.36	.37	.39

Multiple comparisons using Bonferroni-corrected Mann-Whitney U tests were used to examine the significance of the differences between each condition. A summary of these results is presented in table two, with comparisons between compassion and mindfulness omitted as these were all non-significant.

Table 2.2.

Multiple comparisons of each condition's effect on state emotion after the first meditation period.

Dependent variable	Comparison (Mean rank)	Sig
---------------------------	-------------------------------	------------

Happy	Mindfulness (54.74) vs control (39.61)	$p = .06$
	Compassion (47.55) vs control (32.39)	$p = .02$
Sad	Mindfulness (55.18) vs control (28.46)	$p = .02$
	Compassion (47.71) vs control (32.09)	$p = .01$
Anxious	Mindfulness (55.21) vs control (38.39)	$p = .02$
	Compassion (45.43) vs control (36.64)	$p = .27$
Relaxed	Mindfulness (54.21) vs control (40.96)	$p = .12$
	Compassion (46.23) vs control (25.04)	$p = .14$

After the second meditation period, findings indicated a significant difference between groups on the combined dependent variables, Wilk's $\lambda = 2.00 (16, 300)$, $p = .03$, partial $\eta^2 = .15$. The relative effects of each variable are summarised in table three. Combined anxiety and sadness did not contribute significantly to the multivariate model at an alpha level of .05, thus in order to test post-hoc differences between groups a new multivariate model of pleasant emotions (i.e., combined happiness and relaxedness) was tested. This model indicated that the MM group had significantly higher pleasant emotions than the control and CM.

Table 2.3.

Relative effects of the second period of meditation on anxiety, sadness, happiness and relaxedness.

Anxiety	Sadness	Happiness	Relaxedness	
MM	.53	.53	.69	.71
CC	.53	.51	.59	.56

MC	.55	.57	.54	.47
CM	.49	.44	.43	.48
Control	.46	.46	.34	.39

MM was found to produce greater happiness (*Mean rank* = 31.53) and relaxedness (*Mean Rank* = 30.70) than CTRL (*Mean rank for happiness* = 16.89, *mean rank for relaxedness* = 17.34) at a significance of $p = .001$, $p = .02$. CC (*Mean rank* = 30.84) was found to produce greater happiness than CTRL (*Mean rank* = 19.36), $p = .04$. All other comparisons were non-significant.

The results of the ANOVA measuring differences between groups in terms of decentering was significant $F(4, 101) = 3.04$, $p = .02$. Multiple comparisons using a Bonferroni corrected alpha revealed that the MM group had significantly higher ($M = 5.75$) decentering scores compared to the control group ($M = 4.59$; $p = .04$).

2.5. Discussion

This study examined the difference in effect between compassion meditation and mindfulness meditation on state empathy and mood. Directly after the first period of meditation, both meditation groups were found to increase multivariate global emotionality (i.e., both positive and negative affect). Furthermore, there was a significant difference between groups in terms of empathy, with compassion producing the strongest effect on empathy, followed by mindfulness and then the control. Both MM and CC produced a significant increase in happiness after the final meditation compared to the control group, whilst MM produced significantly higher multivariate positive emotions compared to CM and the control.

In support of the first hypothesis, both compassion and mindfulness meditation were found to result in significantly higher levels of empathy compared to the control, with compassion exhibiting the strongest effect. These results suggest that the empathy embedded within compassion (i.e., identification with others and recognition of their suffering and happiness), can be cultivated to some degree in a relatively short period of time (15 minutes) for effects which last beyond the initial meditation period. There was also a significant effect of mindfulness meditation on empathy - suggesting that the ability to be aware of one's own emotions may be transferable to the awareness of others' emotions.

Contrary to the second hypothesis, compassion and mindfulness meditation initially resulted in increased anxiety (in the mindfulness condition) and sadness compared to the control. In support of the second hypothesis, however, meditation resulted in a significant increase (in the compassion condition) or marginally significant increase (in the mindfulness condition) in happiness. This resulted in a multivariate model of global emotionality (i.e., positive and negative affect changing linearly depending on group membership) being produced, as opposed to an inverse multivariate model which would have been in line with the second hypothesis (i.e., positive and negative affect differing inversely way depending on group membership). Whilst this result (i.e., an increase in positive *and* negative emotion as a result of meditation), is unexpected and somewhat paradoxical, it can be explained in light of the theoretical mechanisms which underpin each method.

Firstly, the mindfulness instructions given were focused on paying attention to and noting internal thoughts and emotions. An individual who gives 15 minutes of devoted attention to their internal world is likely to have a heightened awareness of emotions both distressing and pleasant. Compassion meditation involves connecting with suffering within the self and others (which may

explain the significant increase in sadness), as well as wishing goodwill upon the self and others (which may explain the significant increase in happiness).

The second hypothesis was partially supported, as it was found that both CC and MM meditation schemes resulted in higher happiness after the second round of meditation compared to the control. Furthermore, the MM group was higher in relaxedness, multivariate positive emotions and decentering compared to control. This suggests that both compassion and mindfulness are able to produce positive changes in affect after the presentation of emotional stimuli, however, mindfulness produced changes in a higher number of desirable variables. These results also contrast with the initial effects of meditation which produced an increase in both distressing and pleasant emotions. The results suggest that meditation does not occur in a vacuum. That is, what happens prior to meditation can influence its effects. This is consistent with the findings of Klimecki et al. (2013), who noted that compassion meditation training produced greater positive affect in the face of others' distress compared to empathy training.

From a theoretical perspective, both meditation techniques place focus on the reappraisal of distress (mindfulness through non-judgement, and compassion through interpersonal connection and well-wishing). This is consistent with the findings of the current study, indicating that both mindfulness and compassion meditation interact with distress to produce outcomes distinct from when no distress is present, thus supporting their role as distress tolerance techniques.

These results indicate that meditating prior to coming in contact with distressing stimuli helps to increase contact with all emotions (i.e., both positive and negative), which may partially contribute to the meditators' increased ability to empathise and experience similar emotional states to the individuals in the videos they watched. Meditating afterwards appears to more

specifically cultivate positive emotions which are in themselves protective against the burnout that may arise from emotionally connecting to another's distress (Qu & Wang, 2015). These results suggest that both meditation combinations have their strengths. MM exhibited multiple positive emotional effects (as it exhibited an increase in happiness and multivariate positive emotions compared to the control), whilst still significantly increasing levels of empathy. Conversely, CC exhibited the strongest relationship with empathy, whilst still producing some positive effects on emotion (as it still exhibited an increase in happiness relative to the control, but not multivariate positive emotions).

Interestingly, the MC and CM groups had no effect on emotion post-final-meditation. The fourth hypothesis stipulated that the CM group would produce optimal outcomes, as beginning with compassion was expected to prime empathy best whilst viewing emotion-inducing videos, and ending with mindfulness was expected to prime the most beneficial emotional state. These results suggest that the value of alternating meditation types is in fact *less* than the sum of its parts. This may be due to practice effects (i.e., by the second run-through of the same meditation type the meditator is more comfortable with the technique). It may also be because changing meditation involves changing one's mindstate and approach to distress, as opposed to strengthening one that is already potentially present.

These findings are inconsistent with a dominant theoretical paradigm within the contemplative practice literature: Mindfulness should be developed prior to compassion as a calm state of mind supports developing compassion. Compassion-based interventions generally spend significant portions of their programs focused on mindfulness (Boellinghaus et al., 2013; Klimecki, Ricard, et al., 2013; Neff & Germer, 2013). Furthermore, compassion-based guided meditations often begin with a period of mindfulness meditation. The current study suggests that,

at a state level, an extra period of compassion meditation may be more supportive of compassion meditation than supplementation with mindfulness meditation (and vice versa with mindfulness).

2.5.1. Limitations and Future Research

The generalisability of the above conclusion is limited as the meditation conditions were broken up with the presentation of emotional stimuli, which is not how these conditions would normally be combined (i.e., a period of mindfulness meditation immediately followed by a period of compassion meditation). Furthermore, the findings do not necessarily dispute the effectiveness of mindfulness training as an adjunct to compassion-based interventions in the longer term, as only state effects were investigated. It is important that future research addresses whether combined meditation schemes are most effective in the longer term, as the assumption that mindfulness should be developed prior to compassion is one that remains untested in the context of these programs, and could potentially be impacting on their effectiveness.

A primary limitation of this study is that, because the study was conducted online, students may not have given their complete attention to the meditation tasks. Those who incorrectly answered the comprehension questions and those who stayed on the page for longer than 20 minutes (the meditation only takes 15 minutes) were removed from the data pool. Despite these measures, there is still the possibility that students listened to the tapes without meditating, or meditated only for some of the time. This limitation, however, would most likely serve to dilute the differences between those who meditated and the control, and thus the effect sizes observed may in fact be an underrepresentation of actual effects. Future research which tested these same hypotheses using an in-person intervention would give a better indication of the actual effect size.

A further limitation is that participants were not asked about their previous meditation experience. The participants were given questionnaires in order to determine whether there were differences in trait mindfulness and compassion (of which there were none), however, participants' interpretation of these questions may differ depending on the individual's familiarity with mindfulness terminology. Furthermore, these questionnaires suffer from self-report bias, and their perception of their own mindfulness may not necessarily be accurate (Grossman & Van Dam, 2011). Conversely, greater meditation experience does not necessarily mean an individual has greater trait mindfulness. Therefore, collecting both information about an individual's meditation experience as well as their levels of trait mindfulness or compassion would have been a better method for determining if there are differences between groups in terms of trait mindfulness or compassion.

A further limitation of this study is the use of self-report measures which may lead to common methods bias (Podsakoff, 2003). Measuring multiple constructs using common methods (e.g., Likert style questionnaires) may affect the accuracy of data due to the repetitive nature of the questionnaires, response styles and priming effects. The literature would benefit from verifying these results using alternative methods that may be less subject to these effects (e.g., skin conductance, electroencephalography).

Finally, a limitation of this study is the generalisability of the current study is that it was performed using undergraduate psychology students, a majority of whom were young, female adults. Future research would be beneficial in order to determine whether these findings are applicable to the general population, or specific populations of interest.

A logical population to investigate these interventions with would be practicing therapists in order determine whether they a) affected their ability to empathise with their patients b)

affected their emotionality when seeing clients c) affected the patient's perception of the therapist's empathy and d) affected relevant clinical outcomes within the patient (e.g., depression, anxiety). Therapist empathy is one of the most significant predictors of clinical outcomes (Laska et al., 2014), and thus determining ways in which it can be increased is an important clinical question that has the potential to be of considerable benefit to society.

These findings also suggest that future research into meditation interventions may benefit from considering the order and timing of meditation. Exploring whether the timing of meditation interventions can be manipulated to produce state changes which are additive to trait changes could potentially aid in increasing their efficacy. For example, if an intervention's primary goal is to increase trait empathy in psychologists, it may be helpful to also investigate whether meditating directly before working also increases state empathy during work-time.

Another related research question would be exploring whether shorter meditation periods are effective in producing these state effects. The majority of therapists in conventional private practice settings see clients for 45-50 minutes (Goodman et al., 2013), allowing for a 10-15 minute break in which the therapist could briefly meditate. Investigation into the efficacy of shorter meditation periods (i.e., 5-10 minutes) would be of practical benefit, as this type of intervention could easily be implemented within the time-constraints of a typical therapist's working day.

Chapter Three: Study Two - A Randomized, Controlled Components Analysis of the Effect of Mindfulness Meditation on State Empathy

Martin-Allan, J. and Leeson, P. "A Randomized, Controlled Components Analysis of the Effect of Mindfulness Meditation on State Empathy." Submitted to *Mindfulness* (2021).

3.1 Abstract

Objectives: Research suggests mindfulness meditation may help to improve empathy.

Mindfulness is typically defined as maintaining attention towards present-moment experience in an accepting way. These components are proposed to work synergistically to allow an individual to maintain attention on another person in an accepting way, as well as to be aware and non-judgemental towards emotional responses that may arise within themselves. This study aims to compare attention-monitoring meditation, acceptance-focused meditation and mindfulness meditation (i.e., a combination of both) in terms of their differential effects on empathy.

Methods: University students ($N = 101$) listened to recordings of attention-monitoring meditation, acceptance meditation, mindfulness meditation, or a control. They then watched videos depicting character(s) experiencing sadness, happiness or anxiety and reported their emotional state, as well as the degree to which they empathised with the characters in each video.

Results: A multivariate analysis of variance was used to determine differences between participants in terms of empathy ($p < .01$). Mindfulness meditation produced the highest levels of empathy in participants with a canonical correlation coefficient of .46, followed by acceptance and attention-monitoring meditation (.09, .07 respectively), followed by the control (-.74).

Univariate analysis suggested that acceptance meditation increased self-reported empathy ($p = .04$), as well as overall emotional response to emotion-inducing videos ($p < .03$).

Present-moment meditation did not increase self-reported empathy, but did marginally increase empathic accuracy (i.e., feeling anxious when watching someone feeling anxious over and above other emotions; $p = .05$). Mindfulness meditation increased empathy ($p = .02$), overall emotional response ($p < .01$) and empathic accuracy ($p = .02$).

Conclusions: These findings suggest that acceptance meditation increases one's feeling of

affective empathy towards another person, as well as overall emotional response (which is not specific to the primary emotion the other is eliciting). Present-moment meditation appears to aid with specificity in relation to emotional empathy (i.e., feeling the primary emotion the other is eliciting over and above background emotions). Mindfulness, however, produces the greatest overall empathetic response supporting the theory that these components work synergistically to produce a whole that is greater than the sum of its parts.

3.2 Introduction

Mindfulness refers to an individual's ability to purposefully pay attention to one's present-moment experience with an attitude of non-judgement (Kabat-Zinn, 1982). Research into the effects of mindfulness as a broad construct has grown exponentially in the past twenty years. As research into the effects of mindfulness as a broad construct has become more established, some researchers have begun to focus on the individual components of mindfulness in order to develop a more nuanced understanding of how they function together to create mindful states (Christopher & Gilbert, 2010; McCracken & Thompson, 2009; Stein & Witkiewitz, 2020).

One theory which has served as a driver for components analysis research is Monitor and Acceptance Theory (MAT; Lindsay & Cresswell, 2017). MAT suggests that mindfulness consists of two major components: monitoring attention towards the present moment and accepting one's experience as it is. It suggests that attention monitoring alone is likely to enhance cognitive performance and may intensify emotional experiences (both positive and negative), whilst acceptance improves an individual's ability to tolerate their experience without having the desire for them to be different. The majority of meditation styles exist on a spectrum between favouring attention monitoring (as in strict breath meditation) to favouring acceptance (as in open awareness meditation). Approaches which heavily focus on attention-monitoring generally instruct the meditator to focus on a primary meditation-object such as the body or breath, and to redirect their attention back to the primary object whenever it wanders away. It is a common experience of meditators, however, to become non-accepting of distracted states, as these instructions imply that one type of attention (i.e., attention on the primary object) is more acceptable than others (Siff, 2014). Therefore, meditation techniques which focus solely on acceptance often do not have a primary meditation object (as to do so may create non-acceptance

of other experiences), but rather instruct the meditator to accept whatever arises in their experience. This is done so at the sacrifice of attention-monitoring, as there is no primary object for the meditator to practice maintaining their attention on. Traditional forms of mindfulness meditation exist in the middle of these two extremes and aim to develop attention-monitoring by instructing the meditator to focus on a primary meditation object (e.g., the breath or body scanning), and to develop acceptance by encouraging non-judgmentally letting go of distractions which may arise (Kabat-Zinn, 1982). Lindsay et al. (2017) suggests that these two components work synergistically, as acceptance allows one to tolerate and “stay with” the unpleasant parts of their experience, and not become overly attached and fixated on the pleasant parts of experience, both of which may negatively affect one’s ability to pay attention.

Whilst there have been some component analyses testing the assumptions of MAT, these often compare attention-monitoring with a mindfulness group (i.e., attention-monitoring plus acceptance). These component analyses have found that mindfulness meditation results in a number of positive outcomes compared to the attention-monitoring group, including reduced mind-wandering, increased social contact, reduced loneliness, and lower stress-reactivity (Lindsay, Chin, et al., 2018; Lindsay et al., 2019; Lindsay, Young, et al., 2018; Rahl et al., 2017). Lindsay et al. (2017) use this methodology as they note that it would be difficult to prime acceptance without having an object of meditation to be accepting towards, however, they do not rule out the possibility or utility of acceptance-focused techniques being utilised in components analysis. Wang et al. (2019) used a multi-component acceptance exercise in their study and compared this to both an attention-monitoring task, and a combined attention-monitoring and acceptance task. The exercise involved multiple tasks adapted from Acceptance and Commitment Therapy (Hayes et al., 2009). The participant was asked to bring their attention to

certain questions or aspects of their experience in order to promote acceptance. Furthermore, they were then asked specifically to bring their attention back to the experience and write about it. Whilst this exercise improved acceptance, and in fact was the most effective in reducing pain, it is less applicable to acceptance primed in meditation as the participants had to physically move, write and were asked to contemplate questions.

Recollective awareness meditation is a possible model for producing an acceptance-focused meditation condition, as during the initial sitting-meditation period the meditator is not instructed to monitor their attention at all, but rather to let it wander freely. The meditator is even encouraged to allow themselves to go into states of inattention that would normally be redirected in traditional mindfulness meditation such as worry, daydreaming, planning and thoughts about the past or future (Siff, 2014). Siff (2014) suggests that the avoidance of these states in mindfulness meditation creates a non-accepting attitude towards them, and that by allowing these states to arise and pass one can become familiar and comfortable with them. Whilst recollective awareness meditation may naturally lead to states of being attentive, there is no attempt to guide or monitor one's attention towards present-moment sensory or perceptual experiences. Awareness of internal experience is encouraged after the meditation, when the meditator recollects their experience through journaling. The initial meditation period, however, is a good model for acceptance-focused meditation that does not have a traditional attention-monitoring component.

The majority of mindfulness research relates to intrapersonal outcomes, such as emotional regulation, as mindfulness training programs were initially developed with this goal in mind (Kabat-Zinn, 1982; Segal & Teasdale, 2018). Theoretical accounts which examine the components of mindfulness, such as MAT, are still in their infancy in terms of serious

experimental evaluation using appropriate methodology (e.g., components analysis). Therefore, theory and experimentation is focused around establishing whether MAT can be applied to intrapersonal constructs which already have well-established bodies of mindfulness research around them (e.g., emotion regulation and sustained attention; Lindsay, Chin, et al., 2018; Lindsay, Young, et al., 2018; Rahl et al., 2017). MAT does not give an account for how mindfulness may relate to empathy, and theoretical accounts for the relationship between mindfulness and empathy are limited. One component analysis found that mindfulness meditation was more effective in reducing loneliness and increasing social contact than attention-monitoring meditation, giving preliminary evidence that MAT may be applied to inform research on interpersonal constructs such as empathy (Lindsay et al., 2019).

There are a wide range of definitions of empathy, however, it is commonly broken down into two major components: cognitive empathy and affective empathy (Reniers et al., 2011). Cognitive empathy refers to an individual's ability to intellectually understand another individual's perspective. Affective empathy is traditionally defined as the ability to experience a similar emotional state to another. Affective empathy can be thought of as a multi-stage process between two individuals (Lovett & Sheffield, 2007). The first individual feels emotions which results in some form of emotional expression (e.g., body language, verbalisation or facial expression). The second individual observes and interprets said emotional expression, and if they have good affective empathy, feels similar emotions to the first. Lovett and Sheffield (2007), however, suggest that affective empathy is less about feeling the same emotions as the individual being empathised with, but rather feeling emotions that the observer would expect the individual to feel. For example, individual A may be a wealthy gambler and lose money on a bet. Upon observing this, individual B (for whom this would be considered a large amount of money) may

feel upset or anxious for individual A, despite individual A having little emotional reaction to it themselves. This conception of affective empathy suggests it is distinct from empathic accuracy (which would involve individual B feeling the same emotions as individual A). Both attention-monitoring and acceptance have different theoretical roles to play in exploring the relationship between mindfulness, affective empathy and empathic accuracy.

Attention monitoring in mindfulness is generally focused around one's awareness of present-moment internal experiences. Given affective empathy depends on an emotional state being produced in the observer, having greater awareness of one's internal experience may be helpful in detecting any empathetically congruent emotions which may arise in response to another's emotional expression. Furthermore, the ability to pay attention more generally is also likely to aid with empathy. To begin with, one must pay at least some attention to another's emotional expression in order to appraise their emotional state. The closer attention one pays to another's emotional expression, the more likely they are to notice cues indicative of emotion such as body-language, tone and facial expression.

There is evidence to support this notion that attention as a broad construct plays a role in empathy. Morelli and Lieberman (2013) found that two brain regions, the anterior insula and the septal area, were consistently engaged during both attentional tasks and empathy, indicating there may be elements common to both. Furthermore, deficits in attention (i.e., as in Attention Deficit/Hyperactivity Disorder; ADHD) are associated with lower perspective-taking and empathy (Braaten & Rosén, 2000; Groen et al., 2018). Whilst mindfulness training is generally focused on increasing internal awareness, there is a large body of evidence to suggest that it improves attentional capacity more broadly (Jensen et al., 2012; Jha et al., 2007; Morrison & Jha,

2015). This raises the possibility that these skills may also be generalisable to paying attention to another's emotional expression.

Acceptance/non-judgement as a broad construct is proposed to aid with connecting to the internal world of another individual in a range of different therapy approaches, most notably person-centered therapy and compassion-focused therapy (Gilbert, 2009b; Raskin & Rogers, 2005). Judgements about the appropriateness of another's emotions are theorised to affect whether an observer identifies with these emotions, and consequently feels them themselves. For example, if the observer interprets the other as being inappropriately anxious, they may feel pity, frustration or sadness (as opposed to mirroring their anxiety). In this case, acceptance of the individual's emotions are likely to aid empathy, as judgements about the other's emotions are likely to create secondary emotions which are not congruent with the emotion being observed. Similarly, acceptance of the individual as a whole has been found to aid with empathy, as judgements made about characteristics such as race, gender and culture have demonstrable effects on empathy (Albiero & Matricardi, 2013; Chung et al., 2010; Ciarrochi et al., 2017). It is important to note that this type of acceptance is a broader construct than the one which mindfulness aims to foster (i.e., acceptance of one's own experience), which raises the question as to whether intrapersonal acceptance translates to interpersonal acceptance. One component analysis on the interpersonal effects of mindfulness found that practicing mindfulness meditation decreased loneliness and increased social contact, compared to attention monitoring alone, suggesting acceptance may influence interpersonal behaviour (Lindsay et al., 2019).

Intrapersonal acceptance, however, plays a more direct role once the observer begins to feel emotions in response to the emotional expression of another. Judgements they make about their own emotional response may also affect empathic accuracy. Lack of acceptance of internal

experiences can lead to emotional suppression (Hayes et al., 2009), which may diminish emotional responses that arise in response to another's emotional expression. Additionally, lack of emotional acceptance is also thought to lead to secondary emotions (Mitmansgruber et al., 2009). For example, if one views their emotional response to be too extreme they may feel overwhelmed or anxious. Conversely, if they view their emotional response to be too little, they may feel guilty or frustrated. In both of these instances non-acceptance of one's emotional response creates secondary emotions which are no longer congruent with the emotional expression being observed. There is some evidence to suggest that both awareness and acceptance of one's internal experience are individually beneficial to empathy. Rampoldi et al. (2019) found that, in a sample of 389 medical students, awareness and acceptance of emotions were separate predictors of clinical empathy. The beta coefficient for awareness was roughly 1.5 times larger than the beta coefficient for acceptance, suggesting that emotional awareness may play a larger role in self-reported empathy.

Despite having some seemingly independent effects on empathy, the two components of mindfulness are theorised to work synergistically (Lindsay & Creswell, 2017). At the intrapersonal level, it is easier to sustain attention on experiences that one can fully accept versus experiences that are deemed to be overwhelming, inappropriate or otherwise unacceptable (which as noted previously can lead to experiential avoidance or secondary emotions). Similarly, at the interpersonal level non-acceptance can lead to judgements, which takes the observer away from paying attention to another's emotional expression, and into their opinions about it.

This theoretical link between mindfulness and empathy is supported by a number of studies demonstrating a correlation between these two constructs (Barbosa et al., 2013; Kemper & Khirallah, 2015; Raab, 2014). Furthermore, there are multiple experimental studies showing

that mindfulness programs have the capacity to increase empathy. Shapiro et al. (1998) found that medical students who completed an eight-week MBSR course exhibited higher levels of empathy than those who did not. Similarly, Beddoe and Murphy (2004) found that an 8-week MBSR course resulted in greater empathy in nurses compared to the control. Martin-Allan et al. (2021) found that even a single 15 minute period of mindfulness meditation was enough to increase empathy towards characters observed on film. Although there is a considerable body of research into the broad effects of mindfulness on empathy, it is still unclear how the individual components of attention-monitoring and acceptance function in relation to empathy.

This study aims to break down the individual effects of the two primary components of mindfulness (acceptance and attention-monitoring) and to determine their differential effects on empathy. Furthermore, it aims to investigate whether these components work synergistically (i.e., whether combining these components creates a greater effect).

It is hypothesised that mindfulness meditation will elicit greater empathetic response compared to acceptance meditation and attention-monitoring meditation. Furthermore, it is hypothesised that the meditation conditions will elicit a greater empathetic response compared to the control group.

3.3. Methods

3.3.1. Participants

The initial sample consisted of 113 undergraduate university students. In order to screen out participants who may not have listened to the meditation instructions or control audio, a basic multiple choice question was asked after each condition (i.e., “what was the focus of the audio?”). Participants who incorrectly answered this question were screened out. A further four outliers were removed (the rationale for removal of these outliers is outlined in the data analysis

section). Of these, 101 (70 females, 31 males, average age of 21.27, SD = 5.67) participants remained and contributed to the analyses. 67% of participants reported having had some meditation experience, while only 27% of participants had meditated in the past week. Of those who had meditated in the past week the average total time was 42.86 minutes (SD = 42).

3.3.2. Measures

The Five Facet Mindfulness Questionnaire (FFMQ) is a self-report measure comprising 39 items which assess five facets of mindfulness: observing, describing, acting with awareness, non-judgement and non-reactivity (Baer et al., 2006). Responders use a Likert scale ranging from never or very rarely true (one) to very often or always true (five). The FFMQ is one of the most widely used measures of mindfulness and demonstrates good validity and internal consistency (Baer et al., 2008). Within the sample the FFMQ demonstrated acceptable reliability with Chronbach's alphas ranging between .74 and .90 for each of the five facets.

The Discrete Emotions Questionnaire (DEQ) is a 32 item questionnaire which measures a range of state emotions (Harmon-Jones et al., 2016). Respondents are asked to rate the extent to which they felt an emotion during a task from not at all (one) to an extreme amount (seven). The DEQ measures a number of state emotions, however, only the subscales of happiness, anxiety and sadness were measured in this study as the aim was to measure emotional congruence towards three videos of individuals experiencing either happiness, anxiety or sadness. The other subscales were excluded, as including these would prolong response time, and thus impact the validity of state effects measured (as states are by definition time-limited). Thus, 16 items were used in this study. The DEQ has been found to have adequate reliability and validity (Harmon-Jones et al., 2016). Within the current sample the Chronbach's Alpha ranged from .71 to .94 (although the reliability was between .86-.94 for scales which corresponded to

the emotion being elicited in the video, e.g., when individuals were asked how anxious they were after watching an anxiety inducing video).

The State Empathy Scale (SES) comprises 12-items, split across three subscales (affective empathy, associative empathy and cognitive empathy), which are subfacets of state empathy, which the scale intends to measure (Shen, 2010). Respondents are asked to what extent they agree with statements which range from not at all (one) to completely (five). This measure was chosen as it has a specific subscale for affective empathy (a focus of this paper) and it is designed to measure empathy during the presentation of an emotive stimulus (i.e., a message) which allows for easy adaptation for other emotive stimuli (i.e., videos). Shen (2010) found that the SES demonstrated good discriminant validity, construct validity and internal reliability ($\alpha = .92$). For the current study the word “message” was replaced with “video” for each item, as the scale was developed for a written stimulus and the current study asked participants to empathise with individuals in videos. Within the current sample the Cronbach’s alpha was .83-.87.

3.3.3. Meditation Conditions.

Participants were randomly assigned to listen to one of four 15-minute audio recordings with instructions specific to each (attention-monitoring, acceptance, mindfulness, and the control). The scripts for each audio recording were approximately 600 words ($\pm 5\%$) and as such had a similar balance of silence and speaking. The audio was recorded using the same microphone and mastered to ensure the volume was similar across recordings. Each meditation condition began the same way, instructing individuals to adjust their posture to a relaxed but upright position and close their eyes. In each meditation condition there were 20 keywords or phrases that were used to prime the desired state, and the mindfulness condition included an equal mix of attention-monitoring and acceptance priming keywords or phrases (i.e., 10 of each).

Attention-Monitoring (MO) instructions encouraged participants to focus on their breathing and to continuously bring their attention back to their breath if it wandered. The instructions included 20 keywords or phrases which referred specifically to present-moment attention (e.g., present, right now, moment-to-moment). This meditation script was based on a combination of mindfulness scripts used in previous research, with references to non-judgement and acceptance removed (Martin-Allan et al., 2021).

Acceptance meditation (AM) instructions encouraged participants to make no attempt to control their attention, allowing their mind to move freely. Within this group the primary instruction was for them to be accepting and non-judgemental towards whatever arose during the meditation session. The instructions included 20 keywords or phrases which referred specifically to non-judgement or acceptance (e.g., acceptance, without judgement, there is no wrong way to feel). In contrast to typical meditation instructions, participants were encouraged to allow their mind to wander, become distracted, or zone-out if this occurred naturally. This meditation script was in part based on the recollective awareness approach to meditation, as this is a type of meditation that focuses primarily on tolerating and accepting one's experience and does not encourage the meditator to actively monitor their attention, suggesting that attempts to do so may create further judgements about what is an appropriate object of attention (Siff, 2014).

Mindfulness meditation (MM) instructions encouraged participants to focus on their breathing, as well as notice, label and accept if their attention wandered before returning to focus on the breath. They were instructed to bring a non-judgemental attitude to both breathing and distractions. The instructions included 10 keywords or phrases which referred specifically to present-moment awareness and 10 which referred to non-judgement.

The control condition involved listening to an audio recording of the history of the telephone with a similar pace and tone to the other meditation conditions.

Videos used in this study were taken from Martin-Allan et al. (2021), which had been used to prime each primary emotion in the study. Videos were found to effectively prime each emotion both in the primary study, and in a pilot study conducted prior. Happiness was elicited by a 4:38 minute video where individuals recall the happiest day of their life. Anxiety was elicited by a 3:19 minute video taken from the film “Zodiac” where a man fears he is talking to a serial killer. Sadness was elicited by a 4:21 minute video where individuals read text messages from deceased loved ones.

3.3.4. Procedure

Participants were recruited via the university’s research participation scheme. After signing up, reading the information form and consenting to participate in the study, participants were asked for basic details and informed they would be contacted on a weekly basis to complete each stage of the study. Participants were then randomised into four groups: attention-monitoring, acceptance, mindfulness and a control condition. Participants were given the FFMQ, then asked to complete a 15-minute meditation. After this, they completed an empathy task, followed by the SES and the DEQ.

3.3.5. Data Analyses

Prior to testing the hypotheses, an ANOVA was conducted comparing each group based on their FFMQ scores to ensure that no group exhibited unusually high or low levels of mindfulness. Furthermore, participants were asked how much time they had spent meditating in the past week. No significant difference was found between groups in either measure. Furthermore, multiple ANOVAs were run to determine if meditation experience had any effect

on the primary variables (which it did not). A disproportionate amount of participants who spent longer than 20 minutes on the initial page were in the control group (46%). Thus, these participants were retained in the analysis across all groups as to remove them would mean some groups were up to 50% larger than the control.

Target emotions were calculated by averaging each participants' endorsement of emotions that were primed specifically by each video (e.g., how happy participants felt while watching the happiness-inducing video). Non-target emotions were calculated by averaging each participants' endorsement of emotions that were not specifically primed by each video (e.g., how anxious or depressed participants felt while watching the happiness-inducing video). Empathic accuracy was calculated by subtracting an individual's non-target emotion score from their target emotion score.

Prior to performing the analysis, assumptions of normality and homogeneity of variance were tested. Both assumptions were met for each group when examining empathic accuracy, target emotions and empathy, however, when examining groups in terms of non-target emotions the assumption of normality was violated. Thus, a Kruskal-Wallis test was used to compare groups based on their non-target emotion scores, as this test does not assume normality.

Two multivariate models of state empathy were tested as part of the primary analysis. The first was one used by Martin-Allan et al. (2021) for a study of similar design, and used SES affective empathy and empathic accuracy as measures of latent affective empathy. The standardized canonical discriminant function coefficient for SES empathy (.32) in the study was only marginally above the cut-off of .3. Whilst this is an acceptable coefficient, it is possible that substituting other variables into the analysis may produce a more robust multivariate model of affective empathy. An alternative variable would be to simply use target emotions. This is a more

parsimonious variable, and is more in line with Lovett and Sheffield's (2007) definition of affective empathy (i.e., having an emotional response than one would expect the other to feel, rather than having the same emotional experience as them). Thus, the current study tested a second multivariate model using target emotions (i.e., the degree to which they felt similar emotions to characters in the videos) in place of empathic accuracy (i.e., the degree to which they felt similar emotions to characters in the videos minus emotions that were not primed in the videos). In addition to the primary analysis, groups were also compared on target emotions, emotional congruence and state empathy using three one-way ANOVAs. Tukey-Kramer HSD tests were used to examine post-hoc differences in these groups.

Mis-reporting in the form of random responding or standardization error resulting from failure to complete some or all of the meditation task are both liable to create outliers in data (Osborne & Overbay, 2019). This is an even greater risk in online studies where participants are unsupervised. Osborne and Overbay (2019) suggest that in cases where mis-reporting or standardization errors are possible, removing outliers is likely to give a more accurate reflection of the population.

Outliers were initially detected using the boxplot method, whereby a case was considered an outlier if it lay 1.5 times the interquartile range above or below the upper or lower quartile across conditions on the primary variables. Seven outliers were detected in total. Out of these seven outliers, there were five respondents who would be considered extreme outliers (i.e., their responses placed them three times the interquartile range above or below the upper or lower quartile). Upon further examination at least three of these outliers appeared to exhibit random responding (which is often an issue in online studies). This is exemplified by their very low or negative emotional congruence scores (-.75 to .33), indicating they experienced nearly the same

or higher non-target emotions than target emotions. The studentized residuals for each of these individuals was above 2.00 for emotional congruence, which is another indicator of unusual responding (Ahmad et al., 2012). These outliers were removed.

Another outlier was examined further as they exhibited unusually high emotional congruence (.5 of an SD above the next highest individual from any other condition). Responses such as this which are anomalies both within their group and between groups require further investigation (Osborne & Overbay, 2019). Their studentized residuals for both empathy and emotional congruence were also consistent with the respondent being an outlier (1.99 and 2.80 respectively). Examination of the responder indicated they almost entirely endorsed extremes (either the minimum or maximum) for each of the questions, and did in fact experience extreme emotional incongruence on one of the videos (feeling maximal anxiety during the video priming depression) despite experiencing perfect emotional congruence on another video (feeling minimal depression and maximum anxiety on the video priming anxiety). This extreme and inconsistent responding pattern may be indicative of task misinterpretation (e.g., trying to guess what the characters are feeling rather than what they themselves are feeling) or random responding. Thus, this individual was also removed from analysis. In total, four outliers were removed of which two were in the AM group, one was in the MM group and one was in the control. The inclusion or exclusion of outliers did not affect the significance of the primary analyses, however, it did affect the robustness of the post-hoc discriminant analysis as well as post-hoc tests of differences between individual variables.

3.4. Results

Findings demonstrated significant differences between groups on the first multivariate model $F(6, 190) = 3.09, p < .01, \text{partial } \eta^2 = .09$. As part of post-hoc DDA, two functions were

tested (function 1a and function 1b). Examination of the canonical discriminant functions revealed a large canonical correlation ($\eta = 0.31$) for function 1a. The full model test of function 1a was statistically significant (Wilk's $\lambda = 0.83$, $df = 6$, $\chi^2 = 17.85$, $p < .01$). The standardized canonical discriminant function coefficients were .88 for SES empathy and .24 for empathic accuracy. In this model, non-judgement meditation produced the greatest effect on empathy (.38), followed by mindfulness (.24), followed by the control (-.30), followed by present-moment (-.36). Empathic accuracy was below the cutoff (.3) for what is considered to be a robust function. Function 1b was statistically significant (Wilk's $\lambda = 0.92$, $df = 2$, $\chi^2 = 8.02$, $p = .02$), and the standardized canonical discriminant function coefficients were for empathic accuracy and total empathy were .48 and .97 respectively. In this model MO and MM loaded onto the function highest (.29 and .24 respectively), followed by non-judgement (-.19) and finally the control (-.40).

Findings demonstrated significant differences between groups using the second multivariate model (SES empathy and target emotions) $F(6, 190) = 3.56$, $p < .01$, partial $\eta^2 = .10$. As part of post-hoc DDA, two functions were tested (function 2a and function 2b). Examination of the canonical discriminant functions revealed a large canonical correlation ($\eta = 0.36$) for function 1a. The full model test of the first function produced was statistically significant (Wilk's $\lambda = 0.84$, $df = 6$, $\chi^2 = 17.17$, $p < .01$). The standardized canonical discriminant function coefficients were well above .3 (.65 for SES and .98 for target emotions), which indicates they both loaded onto the function sufficiently to produce a multivariate model (Stevens, 2012). The functions at group centroids reveal the direction of this relationship indicating that mindfulness meditation (.46) produced greater state empathy than present-moment meditation and non-judgement meditation (.07, .09 respectively), which produced greater state empathy than the

control (-.74). The full model test of function 1b was not significant (Wilk's $\lambda = 0.97$, $df = 2$, $\chi^2 = 3.41$, $p = .18$).

Out of the four functions tested, function 1a was the most robust measure of differences between groups in terms of multivariate affective empathy. Tests of between subjects' effects indicated that there were significant differences between groups in individual variables (i.e., empathy, emotional congruence and target emotions). Additionally, there were significant differences between groups in terms of non-target emotions $H(3) = 16.24$, $p < .001$. Multiple comparisons were conducted to determine the nature of the difference between each of the individual dependent variables. Both AM and MM exhibited greater SES empathy compared to the control ($p = .04$ and $p = .02$ respectively). Both AM and MM also exhibited greater non-target emotions compared to the control ($p < .01$ for both). In addition, AM exhibited greater non-target emotions than the MO, however, this was only approaching significance ($p = .05$). AM, MO and MM all exhibited greater target emotions compared to the control ($p = .03$, $p = .01$, $p = < .001$ respectively). Finally, MM and MO exhibited greater emotional congruence compared to the control ($p = .02$, $p = .05$ respectively), although MO was only marginally significant.

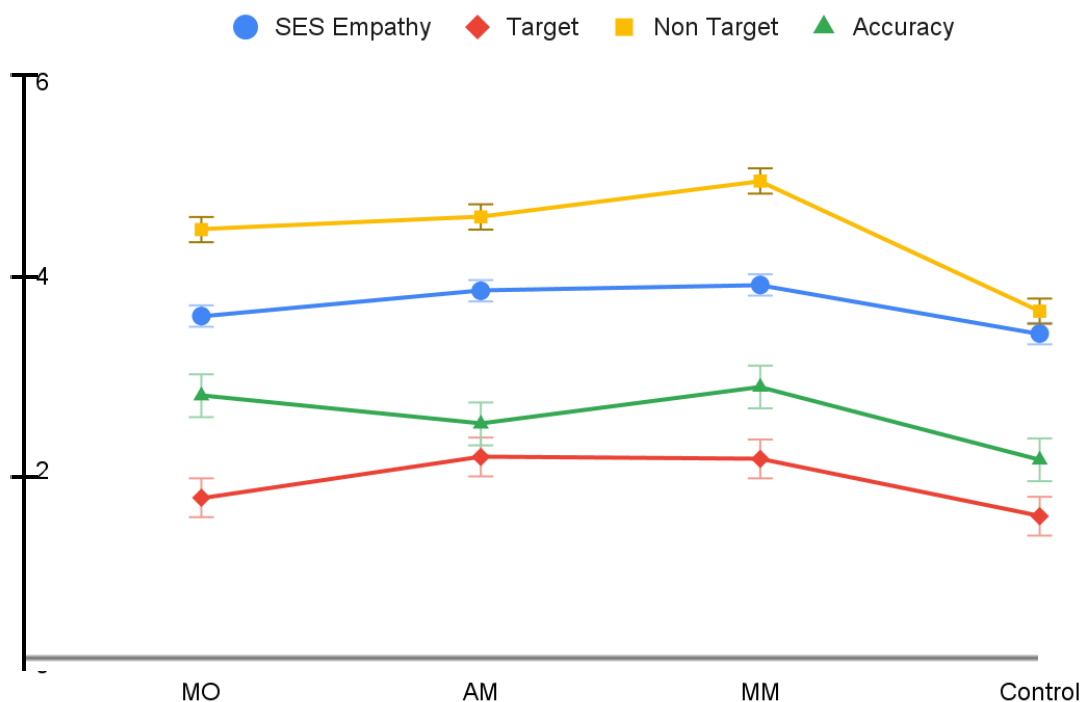


Figure 3.1.

A line graph demonstrating the differences in means between each group on each dependent variable (MO: attention monitoring group, AM: acceptance meditation group, MM: mindfulness meditation group). Error bars represent across-participant standard error.

3.5. Discussion

This study examined the difference in state effects between MO, AM and MM. Overall, MM produced the greatest affective empathy, followed by AM and MO, followed by the control. Multiple comparisons of individual facets indicated that the acceptance group experienced a greater emotional reaction to watching videos (including emotions not intended to be elicited by the videos), as well as significantly greater empathy compared to the control group. In contrast, MO appeared to exhibit greater empathic accuracy (although this was only approaching significance) compared to the control. MM exhibited both greater empathy, specificity and

overall emotionality compared to the control. This suggests that attention-monitoring and acceptance prime empathy in different ways, and that these two components work synergistically within mindfulness to enhance each component.

The synergistic relationship between the mindfulness components is highlighted by the finding that MM increased multivariate empathy more than both AM and MO. This supports the growing body of research that mindfulness has the capacity to prime empathy (Barbosa et al., 2013; Beddoe & Murphy, 2004; Walsh, 2008). Furthermore, the length of the intervention supports previous findings indicating that empathy can be primed using a meditation intervention as short as 15 minutes (Martin-Allan et al., 2021). Overall, these findings indicate that cultivating internal acceptance and attention translates to paying attention to and feeling connected with another's emotional experience. This supports MAT which suggests that acceptance aids with attention monitoring (by limiting reactivity to distraction), and that attention aids with acceptance (by allowing one to maintain focus on present-moment, objective experiences: Lindsay et al. 2017). This is further highlighted by the finding that effects unique to each meditation (i.e., greater empathic accuracy for MO, and greater empathy for AM), were even more pronounced during MM.

Two different models of multivariate affective empathy were tested using either empathic accuracy or target emotions in combination with SES affective empathy. The more parsimonious construct of target emotions in combination with SES affective empathy produced a significantly more robust discriminant function. This suggests that self-reported empathy is more closely related to feeling the emotion perceived to be experienced by another individual, rather than feeling this emotion over and above other emotions. This supports Lovett and Sheffield (2007)

who suggest affective empathy is simply about having an emotional response that one would expect the other to feel, rather than having the same emotional experience as them.

The study also found that the AM and MM group experienced greater self-reported empathy compared to the control. This suggests that the construct of acceptance (which was the common factor in both groups) primes individuals to feel emotionally connected to others. From a theoretical perspective, non-acceptance of emotions which arise in response to another's emotional expression may lead to suppression of these emotions, resulting in lower affective empathy. The construct of acceptance as a whole is proposed to play a role in increasing interpersonal connection and empathy, and as such is an integral component of many therapeutic approaches (Gilbert, 2009b; Raskin & Rogers, 2005). Thus, it may also be that AM primed greater acceptance towards the emotions of the characters in the videos. Whilst it is difficult to determine to what degree these results are attributable to internal acceptance of emotion and external acceptance of emotion, these findings do suggest that acceptance has a key role to play in the relationship between mindfulness and empathy.

The study found that both MO and MM enhanced empathic accuracy. This suggests that the construct of attention-monitoring primes individuals to feel the same emotions as others, over and above other emotions that may be felt. Attention-monitoring as a skill in meditation relates to the ability to maintain concentration in the present-moment. Attention is often instructed to be placed upon one salient experience such as the breath or body which is viewed as the primary object of meditation over and above other experiences that arise (Lindsay & Creswell, 2017). Similarly, these findings suggest that attention-monitoring allows the observer to experience the primary emotion of the individual they are observing, over and above other emotions which may arise. This may be due to greater ability to pay attention to cues both within oneself and the

individual being observed, allowing for more information from which to produce an accurate empathetic response.

The study found that all three meditation conditions produced higher levels of target emotions. This suggests that despite differences in theoretical mechanisms of priming empathy, both AM and MO are sufficient to increase an individual's ability to feel the same emotions as someone they are observing.

The study found that both the MM and AM had higher prevalence of non-target emotions. Both MM and AM instruct the meditator to pay more attention to thoughts, feelings and body-sensations compared to MO (even if it is just to briefly note and accept them). This finding runs counter to the notion that acceptance reduces the prevalence of secondary emotions (Mitmansgruber et al., 2009), as it would be expected that judgements about the target emotion may lead to non-target emotions arising. It is possible that turning attention to a wider range of emotions and being more accepting of one's experience may in fact cause individuals to allow secondary emotions that would normally not be deemed appropriate to arise (e.g., feeling happy when another individual is sad).

3.5.1. Limitations and future research:

This highlights the first limitation of the study: the conclusions made in this study are limited to state effects of mindfulness on predominantly novice meditators. Much in the same way exposure to anxious situations (as in exposure therapy) increases anxiety before reducing it (Abramowitz et al., 2019), mindful attention towards inappropriate emotions may intensify them in the short term. Applying this same methodology to a 6-8 week MBSR style group intervention would be a logical extension of the current study, and would help to determine the trait changes caused by each individual component of mindfulness.

One further limitation of this study is that, due to the study being conducted online, the participants received no supervision to ensure they were completing the tasks. Students who were unable to answer the comprehension question correctly were removed, however, these questions were basic and could be easily answered if the student only listened to part of the meditation. Furthermore, it could not be ensured that the participants closed their eyes or remained in their seats for the duration of the meditation session. If this limitation was present, however, it is likely that it would only serve to reduce the effects of the meditation performed in the study. Thus, the true effect sizes may in fact be larger than reported in the current study. The literature would benefit from verifying these results using in-person interventions.

Another limitation is that members of the control group spent longer on the audio page, indicating they may have left the audio condition at some point and returned. This means that the variables common across groups (i.e., sitting and listening to audio for 15 minutes immediately before watching the videos), may not have been completely controlled for. In this study, however, removing such participants would diminish the control group's size (which was already smaller than other groups), affecting statistical power. Furthermore, it would remove students who may have left the task due to characterological reasons which affect empathy (e.g., low conscientiousness; Barrio et al., 2004). Given that the control group is used to compare the differences between meditating and not meditating, it is still possible to use this group as a comparison while acknowledging that it may not completely control for common conditions such as sitting still, closing one's eyes and listening to a soothing voice. This finding does, however, indicate that listening to meditation audio may be more engaging than listening to educational audio (i.e., the history of the telephone). Whilst this type of audio may be appropriate where students are supervised, future research using unsupervised student samples may be able to

reduce the likelihood of control dropouts by using more engaging audio (e.g., a short story) or a relaxation condition.

An additional limitation is that the majority of constructs were measured using Likert-style questionnaires which may lead to common methods bias (Podsakoff et al., 2003). The repetitive nature of these types of questionnaires has the potential to affect the accuracy of results due to response styles, repetition fatigue, and priming effects. Using alternative methods (such as skin conductance to measure stress) would help to verify these results.

Another issue common to studies which use psychology students to create a sample is a demographic imbalance that is not representative of the general population (the majority of the participants were young females). While this study can make inferences about a university-based demographic, further research with a sample more representative of the general population would benefit the literature.

There are a number of additional directions for future research. The study's methodology was not able to determine whether mindfulness of one's internal emotional response or applying attention and acceptance towards the characters in the videos primarily accounted for the increase in empathy. Examining the differential effects of mindfulness on intrapersonal versus interpersonal acceptance would help to further clarify the mechanisms underlying mindfulness' effect on affective empathy.

Previous studies which explore the tenets of MAT normally use an MO and MM group, as Lindsay et al. (2017) notes that acceptance may be difficult to prime in the absence of attention monitoring. Because of this, component analyses of MAT have used a MO and MM group, without an AM group. In this study, however, the AM group produced effects that were distinct from MO, and the MM group produced effects present in both other groups. This lends

validity to the AM manipulation used in the current study, indicating acceptance can be individually primed. This type of manipulation may be helpful in future MAT research, allowing for a better understanding of the distinct effects of each component. Furthermore, high attention monitoring ability coupled with low acceptance is associated with poor outcomes (Bravo et al., 2018b; K. F. Lam et al., 2018; Pearson et al., 2015) compared to high overall mindfulness. Research into whether AM can help to level the mindfulness profiles of these types of individuals may be of benefit.

A logical application of these findings would be in contexts where increased affective empathy would have practical benefits, such as in helping professions. Mindfulness has the added advantage of decreasing emotional burnout (Duarte & Pinto-Gouveia, 2016; Kinnunen et al., 2019; N. Z. Taylor & Milllear, 2016), which is an issue often experienced by those in helping professions. Within psychology the degree to which a client feels the therapist is empathetic towards them is the second biggest predictor of positive therapeutic outcomes (Drisko, 2004). The findings of the current study, however, give insight into how empathetic a university student feels towards a character in a video. Examining how these components work in helping professions, specifically from the perspective of the helpee, would help to develop these findings into something which can be practically applied for the benefit of others.

An additional area of potential research is exploring the difference between empathy (i.e., feeling an emotional response in relation to another person) and empathic accuracy (i.e., feeling a similar emotion to what another individual feels) in relation to burnout (Lovett & Sheffield, 2007). Whilst there is research suggests that client's perception of a therapists empathy (which as a construct lines up with empathic accuracy), is most beneficial for client outcomes as opposed to empathy (Drisko, 2004), there is little research into which is "healthiest" for the therapist in

terms of burnout. Future research exploring the difference between empathy and empathic accuracy in terms of therapist burnout would benefit the literature .

Chapter Four: Study Three - Latent Profiles of Mindfulness Evolve over Time: Examining Longitudinal Change in Mindfulness and Burnout over a University Semester

Martin-Allan, J., Leeson, P. and Lovegrove, W. Latent Profiles of Mindfulness Evolve over Time: Examining Longitudinal Change in Mindfulness and Burnout over a University Semester." Submitted to *Mindfulness* (2021).

4.1. Abstract

Objectives: Previous studies have applied Latent Profile Analysis (LPA) to identify different subgroups of university students based on their Five Factor Mindfulness Questionnaire (FFMQ) scores. These studies have often employed a cross-sectional design to explore differences in emotional outcomes between groups. However, there are few studies which explore differences in longitudinal outcomes. This study aimed to explore differences in burnout trajectory between latent profiles of university students over the course of a semester. Furthermore, the study also aimed to determine whether profiles of mindfulness scores remained stable in the face of increased demands as the semester progressed.

Methods: 167 university students completed the Five Factor Mindfulness Questionnaire and Copenhagen Burnout Inventory - Student Sample at weeks three, 10 and 12.

Results: Three latent profiles were identified: High Mindfulness (HM), Judgmentally Observing (JO) and Non-Judgmentally Aware (NJA). HM and NJA experienced significantly less burnout over the semester compared to JO ($p < .001$). Burnout increased linearly over the course of the semester for all groups ($p < .001$). However, there was no difference between groups in terms of change in burnout over time. There was a reduction in awareness of action across all groups over the course of the semester ($p < .001$). Aside from this, the HM group remained stable over the course of the semester in terms of their FFMQ profile. The NJA group significantly increased their observe ($p = .01$) and non-react scores ($p < .01$) over the semester. The JO group significantly increased their non-judging score ($p < .01$).

Conclusions: The latent profiles that emerged in this study were consistent with previous research (although some other studies have found a fourth, low-mindfulness profile to be present). Furthermore, the finding that NJA and HM had lower burnout compared to JO is

consistent with previous research, suggesting JO is associated with poor outcomes. The changes observed in mindfulness scores between profiles suggest that the increase in burnout students experience over the course of the semester is accompanied by unique changes in mindfulness profiles that are sometimes adaptive (i.e., increased non-reactivity and non-judgement) and sometimes maladaptive (i.e., decreased awareness of action). Further research is required to clarify why certain latent profiles exhibited specific changes in mindfulness where others did not.

4.2. Introduction

Mindfulness is most commonly defined as paying attention to the present moment in a non-judgemental way (Kabat-Zinn, 1982). The majority of measures conceptualise mindfulness as a multifaceted construct, with facets generally either measuring how well one pays attention to the present moment, or the degree to which one is non-judgemental and accepting towards their experience (Bergomi et al., 2013). Some measures break this down further. For example, the Five Factor Mindfulness Questionnaire (FFMQ) contains three facets which predominantly measure one's ability to notice or articulate what is happening in their experience (acting with awareness, observing and describing) and two facets which measure the way in which they respond to their experience (non-judgement and non-reactivity; Baer et al., 2008). Whilst many studies use the FFMQ to measure mindfulness as a unitary construct (Mesmer-Magnus et al., 2017), there is growing evidence to suggest the facets within the scale have heterogenous and sometimes even contradictory effects. For example, some studies have found the observing facet has a positive relationship with psychological distress and even constructs which are thought to be inverse constructs to mindfulness, such as thought suppression (de Bruin et al., 2012; Lau et al., 2018). Monitor and Acceptance Theory (MAT), suggests that simply increasing one's awareness of emotions may in fact *increase* distress, unless it is paired with acceptance (Lindsay & Creswell, 2017). If one feels they cannot accept or tolerate certain emotions, heightened awareness of these emotions is likely to heighten their distress. Conversely, being aware of one's internal experience with an *accepting* attitude (i.e., being mindful) is associated with a host of positive outcomes including greater sustained attention, emotional regulation and interpersonal outcomes (Bartels-Velthuis et al., 2015; Lindsay et al., 2019; Rahl et al., 2017).

There are a number of ways in which researchers have attempted to take into account the heterogeneity and interdependence of mindfulness constructs. For example, some studies separate each facet and examine linear correlations between each individual facet and a set of outcomes (e.g., affective outcomes; (Hawley et al., 2017; Mattes, 2019). The issue with these methods is that they measure each facet of mindfulness independently of each other, which does not take into account the interdependent nature of facets such as observing and non-judgement. Latent Profile Analysis (LPA) is a type of analysis which aims to categorise individuals based on common profiles that may exist within the population, and provides a methodology for exploring how mindfulness facets may interact in specific subgroups of individuals (Spurk et al., 2020).

Pearson et al. (2015) applied this methodology to mindfulness, using an LPA to categorise university students, finding a four-profile model to be the best fit. These profiles were as follows: a high mindfulness group (HM), low mindfulness group (LM), judgmentally observing group (JO), and non-judgmentally aware group (NJA). They found that the JO (individuals who were highly aware of their internal experience and also judgemental of it), had the most maladaptive outcomes (i.e., higher depression, anxiety, emotional instability and distress intolerance). These outcomes were poor even in comparison to the low mindfulness group. This is consistent with MAT's hypothesis: that the ability to pay attention to emotions may be detrimental if it is not paired with acceptance skills.

Since Pearson et al. (2015), a number of other studies have examined the differential effects of mindfulness on outcomes. The initial number of classes identified (i.e., four) appears to be the most common across samples, however, there is some variance depending on the sample. Other models have found the best fit within their sample to be two or three classes (Bravo et al., 2018; Calvete et al., 2020; Gómez-Odriozola & Calvete, 2021). In these studies the classes

identified are nevertheless consistent with the initial classes identified in Pearson et al.'s initial study, despite not all four being present.

For example, Calvete et al. (2020) found a three-class solution (JO, NJA and moderate mindfulness) emerged when examining latent profiles among adolescent's mindfulness. Similar to Pearson et al. (2015), who found the JO group had the poorest outcomes including increased stress and stress-related hormones, depression, maladaptive schemas and poorer executive function.

Whilst there is good evidence to suggest that differing mindfulness profiles may co-occur with higher or lower traits such as vulnerability to stress, there is less research which explores the differences between classes in response to stress over time. This is important to explore, as individuals' perceptions of their ability to cope with stress does not always align with reality.

Burnout is a construct which aims to measure an individual's response to cumulative perceived stress over time. Burnout as a construct in psychology pertains to exhausting physical and emotional resources, particularly in the context of work or school (Falkum, 2000).

Kristensen et al. (2005), who developed the Copenhagen Burnout Inventory (CBI), note that a key feature of burnout is the attribution of exhaustion towards specific domains in one's life which can be broad or very specific. For example, one can be burnt out by their social life (broad) or just a single relationship with an over-demanding friend (specific). Thus, the CBI measures burnout across a range of domains which vary in specificity. Personal burnout, for example, measures feelings of exhaustion generally, whereas work-related burnout pertains to feelings of exhaustion that are specifically attributable to work.

Burnout is often investigated amongst university students, as this group is commonly affected by it and is a readily available population. There are a number of studies which show

mindfulness is effective in reducing burnout (Abenavoli et al., 2013; Kinnunen et al., 2019; Luken & Sammons, 2016). As such, mindfulness is often encouraged as a tool for university students to combat burnout, and many universities have begun to explore integrating mindfulness within their student wellbeing programs (Al-Ghalib & Salim, 2018; Goretzki & Zysk, 2017). Thus it is important to investigate the difference between mindfulness profiles in terms of their effect on burnout.

Kinnunen et al. (2019) examined the latent profiles that emerged in both burnout and mindfulness over the course of a mindfulness-based intervention. They found that the majority of participants benefited somewhat (71%), however, there was a distinct subgroup that improved their mindfulness skills without a resulting change in burnout (29%). Unfortunately, the study used a mean score of the FFMQ and so it is difficult to determine which facets increased and which did not. A large improvement in the observing facet in the absence of other skills, for example, could account for the lack of overall improvement in burnout despite an improvement in mindfulness.

A review of the literature suggests there are no studies to date exploring changes in university-related burnout over time in relation to mindfulness profiles. In the absence of empirical research, applying mindfulness theory may give some indication of how the four commonly identified mindfulness profiles may function over the course of a university semester. MAT suggests that, at higher levels, the skills of acceptance and attention monitoring complement each other (Lindsay & Creswell, 2017). Acceptance allows an individual to pay attention to the present moment, without becoming caught up with distractions or becoming overwhelmed with what they are presently experiencing (which in turn allows greater sustained attention in the present moment). Given burnout occurs when an individual perceives their

emotions to be overwhelming, having this accepting attitude towards emotions which may arise is likely to reduce burnout. Furthermore, being able to pay attention to the present moment is likely to help with self-efficacy regarding studying (which requires sustained present-moment attention towards university work), which may reduce burnout. The HM group is one in which this synergy between constructs would occur, and is generally associated with the best outcomes across the literature (Bravo et al., 2016, 2018; Lam et al., 2018). Conversely the LM group is consistently associated with poor burnout-related outcomes (i.e., stress, depression, emotional dysregulation), indicating that when mindfulness facets are relatively homogenous, greater overall mindfulness is associated with better outcomes, and would predict lower burnout.

The heterogenous profiles of the JO and NJA groups require a more nuanced application of theory. MAT suggests that when attention monitoring is high and acceptance is low (as in JO), emotional outcomes are likely to be poor as there is a high awareness of emotions paired with a low window of tolerance for them. This is likely to be compounded in situations where there is significant stress, as emotions are more likely to be intense and thus sit outside of their window of tolerance. When an individual feels they cannot tolerate an emotion (e.g., stress), this often creates a secondary emotion (e.g., overwhelm; (Mitmansgruber et al., 2009)). The more internally aware this type of individual is, the more likely they are to identify emotions that initiate this process.

Act with awareness (one of the facets which is elevated within NJA), isn't included as a measure of attention monitoring within MAT. The conception of mindfulness within Acceptance and Commitment Therapy (ACT), however, emphasises the importance of awareness of action and therefore may provide a better theoretical framework as to how non-judgement and act with awareness may interact. ACT is described as a behavioural therapy at its core, and focuses on

identifying and pursuing valued behaviours. Developing acceptance towards emotions is primarily conceived as a tool for one to be able to move towards valued behaviours and fully engage with them. That is, if one is non-judgemental towards their inner thoughts, feelings or body sensations, these experiences can go on in the background without conflicting with their ability to be fully present with meaningful behaviours. There are a number of randomized controlled trials which have found ACT training to be effective in reducing a range of different types of burnout including professional burnout, educator burnout and relationship burnout (Emery & Vandenberg, 2010; Hosseinaei et al., 2013; Morshedi et al., 2016; Towey-Swift et al., 2022). It is important to note, however, that ACT encompasses a range of different techniques including values identification, behavioural activation and psychological flexibility exercise (Hayes et al., 2009). Thus it is difficult to ascertain the degree to which mindfulness practices within ACT contribute to changes in burnout. The NJA group that commonly emerges within latent class analysis provides an ideal profile to measure the effects of burnout on individuals who have a mindfulness profile consistent with the elements emphasised by ACT (i.e., awareness of action and acceptance). Both non-judgment and acting with awareness are associated with positive emotional outcomes (Mattes, 2019), furthermore, the ability to give sustained attention towards one's actions aids with one's ability to study (Steinmayr et al., 2010), which in turn is likely to further reduce burnout.

In addition to changes in burnout over the semester, it is also important to consider the degree to which levels of mindfulness may change in response to distress. A student's social, emotional and occupational landscape is often different at the start of the semester versus the end. Therefore, it is likely that their ability to pay attention and be accepting towards their experience may also change towards the end of the semester. Despite the FFMQ aiming to

measure trait mindfulness, large changes can be observed in small time periods. For example, one study observed a two standard-deviation change in non-reactivity within the first week of an MBSR course (Baer et al., 2012). Furthermore, there is a host of evidence suggesting other trait constructs, such as personality, can change in response to life stressors (Caspi et al., 2005; Roberts & Mroczek, 2008). This raises the question as to whether profiles of mindfulness will remain stable in response to the change in stressors over the course of the university semester.

The aim of the current study is to identify how different profiles of mindfulness may affect changes in burnout over time. Assuming a four factor model as identified in Pearson et al. (2015), it is hypothesised that the LM and JO groups will have the greatest level of overall burnout. This would be followed by the NJA group, and the HM group which is predicted to experience the lowest total burnout. It is also predicted that changes in burnout will follow a similar pattern, whereby LM and JO will experience the greatest increase in burnout, followed by NJA and finally HM. This study also aims to explore whether there were changes over time in terms of mindfulness between each group.

4.3. Methods

4.3.1. Participants

The sample comprised 167 undergraduate psychology students. Of this 167, 20 identified as male and 146 identified as female, and one did not disclose gender. The average age of participants was 21.29 years ($SD = 6.24$). 12 participants dropped out between week three and week ten, and a further seven participants dropped out between week 10 and 13.

4.3.2. Materials

The Five Facet Mindfulness Questionnaire (FFMQ) assesses five facets of mindfulness: Observing, describing, acting with awareness, non-judgement and non-reactivity

(Baer et al., 2008). The FFMQ is one of the most widely used measures of mindfulness, and demonstrates good reliability and validity (de Bruin et al., 2012). It is a self-report instrument, which asks responders to give answers to questions ranging from never or very rarely true (one) to very often or always true (five). The FFMQ demonstrated acceptable reliability with Chronbach's alphas ranging between .79 and .92 for each of the five facets in the current sample.

The Copenhagen Burnout Inventory – Student Sample (CBI). The CBI is a relatively new instrument adapted from the Copenhagen Burnout Inventory designed to measure burnout specifically in university students. It is comprised of four subscales: 1) personal burnout (e.g., “do you often feel tired?”) 2) university burnout (e.g., “are your studies emotionally exhausting?”) 3) Colleague Burnout (e.g., “are you tired of working with colleagues?”) and 4) Teacher Burnout (e.g., “do you sometimes wonder how long you will be able to continue working with teachers?”). Initial studies indicate it is a reliable and valid measure of student burnout when compared to other measures of student burnout (Campos et al., 2013). The Chronbach's alpha for this sample ranged from .84 to .91 indicating good reliability in this sample.

4.3.3. Procedure

Once recruited, initial details such as gender and age were collected. Participants were then informed they would be emailed the questionnaires at different time points throughout the semester as part of a longitudinal study. A link to the FFMQ and CBI was emailed to students in weeks three, 10 and 12 of a 13 week-long university semester. Week three was chosen as a time-point as it allowed for time to recruit participants in the first weeks of semester, whilst still being at a point where the students had relatively low demands in terms of assessments and study at the university where this study was conducted. Week 10 was chosen as it is when major

assignments for subjects start to be due at the university where the study was conducted, and week 12 was chosen as throughout that three week period major assignments continue to be due and exams begin to approach. Once the students were emailed the link they had one week to complete the questionnaires. After completing the questionnaires the students were awarded course credit.

4.3.4. Data Analysis

Prior to performing analysis missing data was removed. Furthermore, z scores were calculated for each of the FFMQ facets to determine if outliers were present. For an LPA, individuals with a z-score of ± 3 on any facet would be considered an outlier (Kannan & Raj, 2019). Two outliers were detected. The analysis was performed with and without outliers, as extreme values can impact significantly on the goodness of fit of LPAs. Furthermore, the focus of an LPA is to detect distinct subgroups (Osborne & Overbay, 2019), and individuals with extreme values are unlikely to fit within these distinct subgroups. The Lo-Mendell-Rubin Adjusted Likelihood Ratio Test (LRT) was used to determine the number of latent classes that existed within the current sample (Lo et al., 2001). Variability was constrained to be equal across classes, and covariance was constrained to 0.

Once the model had produced distinct classes, two mixed factorial Analysis of Variance (ANOVA) were used to measure the effect of time (within-subject independent variable), and LPA group membership (between-subject independent variable) on university-related burnout and personal burnout. The assumptions of homogeneity of variance and sphericity were met for this analysis. There was a violation of normality in the high mindfulness group for the first time point (Shapiro Wilk, $p = .02$), however, this violation was not maintained over time, and ANOVAs are generally robust against minor departures from normality in a single variable

(Blanca Mena et al., 2017). Colleague burnout and teacher burnout exhibited significant departures of normality at multiple timepoints (Shapiro Wilk, $p < .001$), so a non-parametric factorial analysis of variance was conducted to measure changes in these two variables. A further five mixed factorial ANOVAs were conducted to explore the changes in mindfulness profiles both over time and between groups. Bonferroni adjustments were made to adjust for the number of ANOVAs conducted, primary tests were Bonferroni adjusted for the number of tests required to test each hypothesis. That is, the p-values for the primary tests on the FFMQ were divided by 5 (as five tests were run), and the p-values for the primary tests on burnout were divided by four (as four tests were run). Post-hoc tests were conducted using Fisher's LSD to account for multiple comparisons (Williams & Abdi, 2010).

4.4. Results

As seen in table 1, the improvement in AIC and BIC upon removal of the outliers indicates that they were affecting the robustness of the model, therefore, a second model (which removed the two outliers) was used for the remaining analysis. The LRT indicated that a 2-class solution fit better than a 1-class solution ($p < .001$), a 3-class solution fit better than a 2-class solution ($p = 0.024$), but a 4-class solution did not fit better than a 3-class solution ($p = .48$). A summary of goodness of fit statistics can be seen in table 4.1.

Table 4.1

Goodness of fit statistics for LPA with and without outliers.

Goodness of fit statistics with outliers included						
	1	2	3	4	5	6
AIC	1983.97	1923.30	1901.05	1891.90	1882.62	1879.20

BIC	2015.67	1973.38	1969.91	1979.54	1989.03	2004.39
Adjust BIC	1983.60	1922.72	1900.25	1890.88	1881.38	1877.74
Entropy		0.70	0.71	0.77	0.8	0.78
Small n	169	72	38	8	3	3

Goodness of fit statistics with outliers removed

	1	2	3	4	5	6
AIC	1923.14	1866.32	1843.77	1833.08	1821.47	1833.47
BIC	1954.32	1916.20	1912.37	1920.38	1927.48	1958.19
Adjust BIC	1922.66	1865.55	1842.71	1831.73	1819.83	1831.54
Entropy		0.71	0.71	0.78	0.76	0.79
Small n	167	71	39	8	3	0

Upon examining the goodness-of-fit tables, the three class model appeared to be superior to the two-class model in every respect. The AIC, BIC and adjusted BIC are all smaller in the three class model. The entropy of the four class model (0.78) is greater, and the AIC and adjusted BIC are smaller (although the total BIC is greater). The smallest group, however, is just below 5% of the total sample, which is likely why the LRT suggested a three class solution was optimal. The three class solution produced three classes which are consistent with classes observed in previous literature (1) High mindfulness, $N = 56$ (2) Judgmentally Observing, $N = 72$, and (3) Non-judgmentally Aware, $N = 39$ (Bravo et al., 2016). The profiles of each of these groups can be seen in figure 4.1. Means and standard deviations for each group in terms of the primary measures (i.e., FFMQ and burnout levels) can be seen in tables 4.2 and 4.3.

Table 4.2.

Means and standard deviations for each of the LPA groups for FFMQ factors.

Describing		Non-Reacting			
JO	Mean	2.86	JO	Mean	2.67
	Std. Deviation	0.70		Std. Deviation	0.67
HM	Mean	3.70	HM	Mean	3.32
	Std. Deviation	0.71		Std. Deviation	0.53
NJA	Mean	3.25	NJA	Mean	2.35
	Std. Deviation	0.740		Std. Deviation	0.55
Non-Judging		Observing			
JO	Mean	2.28	JO	Mean	3.36
	Std. Deviation	0.57		Std. Deviation	0.57
HM	Mean	2.28	HM	Mean	3.71
	Std. Deviation	0.574		Std. Deviation	0.472
NJA	Mean	3.82	NJA	Mean	2.52
	Std. Deviation	0.618		Std. Deviation	0.47
Awareness					
JO	Mean	2.61			
	Std. Deviation	0.64266			
HM	Mean	3.45			
	Std. Deviation	0.61			
NJA	Mean	3.31			
	Std. Deviation	0.54			

Table 4.3.

Means and standard deviations for each of the LPA groups for burnout.

Teacher Burnout		University Burnout			
JO	Mean	2.00	JO	Mean	3.37
	Std. Deviation	0.81		Std. Deviation	0.66
HM	Mean	1.51	HM	Mean	2.66
	Std. Deviation	0.51		Std. Deviation	0.750
NJA	Mean	1.50	NJA	Mean	2.86
	Std. Deviation	0.56		Std. Deviation	0.70
Personal Burnout		Colleague Burnout			
JO	Mean	3.22	JO	Mean	2.62
	Std. Deviation	0.67		Std. Deviation	0.88

HM	Mean	2.75	HM	Mean	2.05
	Std. Deviation	0.72		Std. Deviation	0.84
NJA	Mean	2.88	NJA	Mean	1.942
	Std. Deviation	0.69		Std. Deviation	0.67

The mindfulness profiles of each of these groups changed significantly over the course of the semester. There was a significant interaction between group and time for observing ($F = 8.68$, $df = 4$, $p < .001$, partial $\eta^2 = .10$). Bonferroni-adjusted multiple comparisons indicated that NJA's observing scores increased significantly between weeks three and 10 ($p = .01$), whilst the JO group's observing scores demonstrated a marginally significant trend towards decreasing between weeks three and 10 ($p = .05$; HM's observing scores did not significantly increase). Furthermore, there was a significant interaction between group and time non-judging of inner experiences ($F = 5.70$, $df = 4$, $p < .001$, partial $\eta^2 = .07$). Bonferroni-adjusted multiple comparisons indicated that the JO increased their non-judgement score between weeks three and 12 ($p < .01$).

Finally, there was an interaction between time and group for non-reactivity ($F = 5.79$, $df = 4$, $p < .001$, partial $\eta^2 = .07$). Bonferroni-adjusted multiple comparisons indicated that NJA's non-reactivity scores increased significantly between weeks three and 10 ($p < .01$). There was also an increase in non-reactivity across groups $F(2) = 3.51$, $p = .03$, partial $\eta^2 = .02$. There was an overall decrease in act with awareness over the course of the semester $F(2) = 10.63$, $p < .001$ across all groups, partial $\eta^2 = .07$.

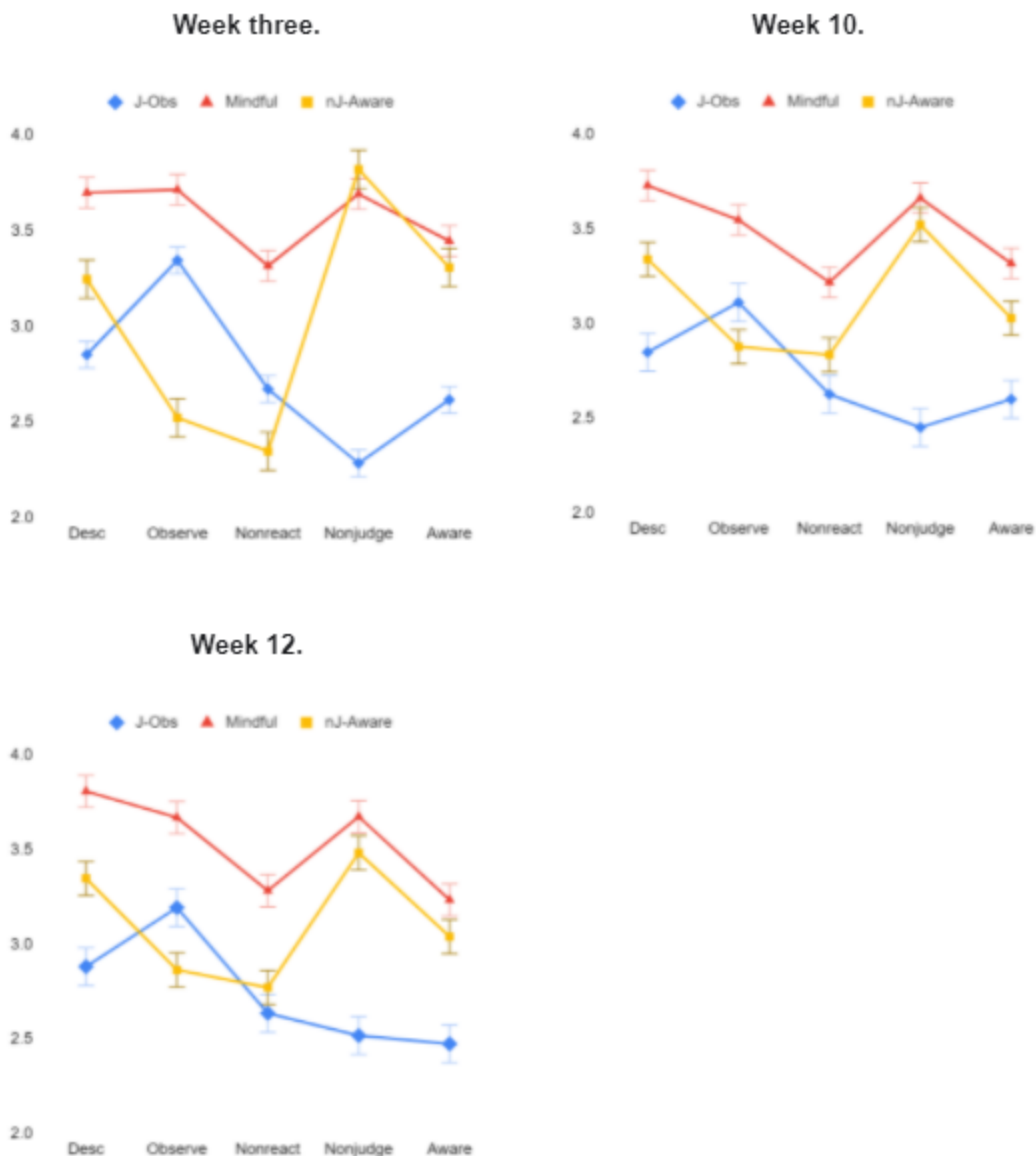


Figure 4.1.

Changes in mean FFMQ scores for latent profiles over time.

There was a significant increase in university-related burnout over time, $F(2) = 27.79, p < .001$, partial $\eta^2 = .15$. Multiple comparisons indicated that increased significantly between weeks three and 10 and this change was maintained until week 12 ($p < .001$ for comparisons between week three and 10, and weeks three and 12). The main effect of LPA group membership was significant $F(2) = 13.45, p < .001$, partial $\eta^2 = .14$, indicating a significant difference

between groups in terms of burnout levels. The high mindfulness and non-judgmentally aware groups had significantly lower burnout ($p < .001$, $p < .01$ respectively) than the judgmentally observing group. The mean difference between JO and HM was .58 (95% confidence interval = .30-.85), and the mean difference between JO and NJA was .37 (95% confidence interval = .07-.68).

Personal burnout was found to increase over time, $F(1.93) = 10.61$, $p < .001$, partial $\eta^2 = .06$. Mauchly's test of sphericity was violated, and therefore the Huynh-Feldt epsilon adjustment was applied to the degrees of freedom for this test. The main effect of LPA group membership was significant $F(2) < .001$, partial $\eta^2 = .10$. The interaction between time and group was not significant. Multiple comparisons indicated that the NJA and HM group experienced significantly lower burnout than the JO group ($p = .02$, $p < .001$ respectively). The mean difference between JO and HM was .45 (95% confidence interval = .19-.72), and the mean difference between JO and NJA was .34 (95% confidence interval = .05-.64).

Groups differed significantly both over time $W(2) = 52.57$, $p < .001$ and between groups $W(2) = 24.51$, $p < .001$ in terms of teacher burnout. There was no interaction between time and group $W(4) = 7.60$, $p = .11$. The level of burnout increased over time on average across groups. There was a significant difference between groups JO (Mean rank = 301.22) and NJA ($p = .03$, Mean rank = 207.62) and between groups JO and HM ($p < .01$, 204.44).

Groups differed significantly both over time $W(2) = 18.85$, $p < .001$ and between groups $W(2) = 14.12$, $p < .01$ in terms of colleague burnout. There was no interaction between time and group $W(4) = 5.3$, $p = .26$. The level of burnout increased over time on average across groups. There was a significant difference between groups. NJA (mean rank = 203.58) and HM (mean

rank = 220.91) had significantly lower colleague burnout than JO (Mean rank = 289.29; $p < .01$, and $p = .02$ respectively).

4.5. Discussion

Latent class analysis produced three distinct classes that were consistent with three of the four classes initially identified by Pearson et al. (2015): NJA, HM and JO. Whilst the four-class solution produced greater entropy, the fourth class had too small a sample (i.e., <5% of the total sample) for a robust set of latent profiles to be produced. There was a consistent increase in all types of burnout across time, as well as a consistent difference between groups in all types of burnout whereby NJA and HM groups suffered significantly less burnout than JO. The study also examined changes in mindfulness between groups over time. It was found that the ability to be aware of one's actions decreased over time across groups. In the NJA group the facets of non-reactivity and observing increased as the semester continued. In the JO group the facets of non-judgement and observing increased as the semester continued (although for observing this was only marginally significant; $p = .05$).

The finding that HM was associated with consistently lower levels of burnout compared to JO is consistent with the overall literature suggesting that greater total levels of mindfulness is associated with reduced burnout (Abenavoli et al., 2013; Taylor & Milllear, 2016). NJA, however, was also found to reduce burnout compared to JO. The consistently higher levels of burnout observed within the JO group is consistent with MAT, which suggests that high internal awareness paired with low ability to accept internal states is liable to intensify distress (Lindsay & Creswell, 2017). The finding of null difference between HM and NJA is also consistent with previous research, however, it is inconsistent with MAT. MAT predicts that the higher levels of acceptance within the HM group paired with high attention-monitoring (i.e., observing) would be

more protective against burnout when compared to the NJA group (which exhibited the lowest levels of observing across all profiles). This suggests that either non-judgement, awareness of action or their combination play a bigger role in emotional regulation than the other traits. This finding in combination with similar previous findings gives validity to conceptualisations of mindfulness which focus on awareness of action and non-judgement such as ACT (Hayes et al., 2009).

It is also possible, however, that there are unmeasured latent variables present in both HM and NJA which account for the similarity in emotional outcomes and profile membership. For example, Lam et al. (2018) suggest that self-compassion may be a latent variable which explains the similarities between both groups as it is similarly dependent upon an individual's capacity to accept both themselves and their inner world.

Across groups the ability to act with awareness decreased over time, indicating that by the end of the semester this cohort of university students had increased mind-wandering and distractibility. Act with awareness has been found to correlate with burnout (Taylor & Millier, 2016). It is difficult to determine whether there is a causal relationship between the changes in these variables. It is possible that the increase in cognitive demands placed on students as the university semester progresses necessitates future-focused thinking (e.g., managing time and planning) as opposed to focusing on present-moment action. It is also possible that the increased burnout observed later in the semester may lead to increased rumination and worry, which in turn would reduce an individual's ability to act with awareness.

Over the course of the semester individuals in the JO group also experienced a marginal decrease in observing ($p = .05$). There is evidence to suggest that high levels of observing are paradoxically associated with experiential avoidance (i.e., the tendency to avoid unpleasant

internal experiences; Mitmansgruber et al., 2009). It is possible that as stress increased over the course of the semester, this group's reduction in observing was a result of increased avoidance of an increasingly distressing internal state.

Experiential avoidance, however, is also associated with non-acceptance of internal states (Hayes et al., 2009; Mitmansgruber et al., 2009), and individuals in the JO group actually exhibited an increase in non-judgement, suggesting that as the semester continued they became more accepting of their inner-experience. This finding occurred despite experiencing greater levels of burnout, which is a characteristically difficult emotion to be accepting towards. Whilst this is most certainly an adaptive change, it is unexpected, as this group is otherwise characterised by maladaptive outcomes (i.e., overall higher burnout in this study and a host of poor outcomes in other studies; Pearson et al., 2015, Bravo et al., 2016). It is possible that, due to their heightened emotional awareness, this group may have been more likely to engage with positive coping strategies that increased non-judging of inner experiences when they recognised increasing levels of burnout (e.g., meditation or therapy). The marginal decrease in observing, however, somewhat confounds this explanation as meditation or therapy would be expected to increase emotional awareness.

The NJA group experienced an increase in both non-reactivity and observing. Given this group already had high levels of non-judgement, according to MAT, an increase in internal awareness is likely to be adaptive. This combined with the increase in non-reactivity reflects an adaptive change in this group to environmental stress, and may offer another explanation as to why this group had outcomes comparable with the HM group.

4.5.6 Limitations and future research

The profiles observed in this study had significantly changed over the course of the semester, indicating that classification is likely to be affected by environmental stressors. The degree to which different groups of individuals mindfulness profiles adapt to stress is an important consideration for future research. The finding that there were significant changes in FFMQ levels over time brings into question the degree to which the FFMQ measures trait mindfulness, which by definition should be relatively robust to environmental changes (e.g., university stress). Previous research has found mindfulness levels to change significantly (i.e., up to two standard deviations) within the first within the first week of an MBSR course (Baer et al., 2012). There is also a host of evidence suggesting that trait measures of personality change significantly in response to environmental stressors, where it was once assumed that personality was relatively stable (Caspi et al., 2005; Roberts & Mroczek, 2008). Whilst change in mindfulness scores over time does not invalidate the notion that the FFMQ measures changes in traits, it does highlight the need for similar longitudinal research into the degree to which the FFMQ functions as a measure of trait versus state mindfulness.

One of the limitations of this study is the use of self-report measures. Given that each group is categorised by the way they are aware of and respond to their experiences, it is possible that there are differences in responding biases that are group-dependent. For example, the NJA group had the lowest level of observing across all groups, indicating a poorer ability to accurately assess their internal world. This may offer an alternative explanation as to why this group reported lower burnout, as it is possible they were simply not aware that they were experiencing it. It is important that future research use alternative methods such as skin-conductance or electroencephalography in conjunction with self-report measures.

Another limitation of this study is the sample size compared to some other studies which use latent profile analysis (Bravo et al., 2016, 2018; Pearson et al., 2015). Despite the sample being large enough to produce distinct groups, with acceptable entropy and robust fit, it is possible a four-class solution would have been possible with a larger sample size. A four-class solution would have allowed the results to sit more neatly with other similar studies, as this is the most common set of latent profiles that emerge in university students. Nevertheless, there are some studies with large samples that observe a three-class solution to be the best fit (Bravo et al., 2018; Zhang et al., 2019). This limitation in sample size was because of the longitudinal nature of the study (i.e., students were required to sign up before week three of the university semester and complete all three measurements). A significant number of students complete research participation later in the semester, as it is not required to be completed until the end of the final week of university. The sample obtained in this study (i.e., students who were actively completing their research participation early in the semester), may be different from samples in previous studies, which may be an alternative explanation as to why a three-class solution emerged within this sample. Despite the longitudinal nature of the study limiting the sample size, it also contributed to the central findings of the study, and demonstrates the value of longitudinal analysis of latent profiles which future research can continue to explore ideally with larger samples.

The FFMQ traits that changed over time generally moved from extreme to more moderate over the course of the semester, which indicates that these results may be partially due to regression towards the mean (i.e., the notion that extreme values tend to move towards moderate values over time). However, it is important to note that the class with the most

consistently extreme values (i.e., the HM group) was the only class that did not exhibit any group x time interaction. This suggests that either the HM group is more robust to regression towards the mean than other groups, or that regression towards the mean does not entirely explain the results. Future research using longitudinal structural equation models (e.g., latent transition analysis or latent growth analysis; Jung & Wickrama, 2008) would allow for investigation of change over time whilst accounting for regression towards the mean.

There are a number of directions for future research in light of the results of this study. Firstly, further exploration into possible explanations for the changes in mindfulness profiles observed over time would benefit the literature. It is possible that differences in coping strategies may account for these changes, and similar longitudinal research with added exploration into how often students meditate, whether they attend therapy and levels of experiential avoidance would provide further insight into potential mechanisms for change in latent profiles over time.

Another avenue of inquiry would be to explore whether changes in mindfulness over the semester remained stable over time, or are more the result of trait mindfulness being influenced by fluctuations in state mindfulness. There is evidence to suggest other trait constructs (e.g., personality) are subject to change in response to life stressors (Caspi et al., 2005; Roberts & Mroczek, 2008). Furthermore, Robinson, Nofle, Guo, Asadi and Zhang (2015) found that changes in personality which occur in the first year of university are stable over a 12 month period: indicating either an age-related change that commonly occurs, or that the novel experience of attending one's first year of university is sufficient to effect change in personality. Research using a similar methodology to the current study, but adding in measurements after the semester or at the beginning of the next semester would help to determine whether these changes in mindfulness are stable or simply a result of trait fluctuation due to environmental change.

This research as well as previous studies highlighted the importance of acting with awareness and non-judging as predictors of positive outcomes. Whilst MAT gives a good theoretical account for how acceptance and attention monitoring (as measured by FFMQ observing) may interact (Lindsay & Creswell, 2017), there is less direct theoretical attention given to how acceptance may interact with awareness of action (as this is not included in the attention-monitoring component of MAT). The NJA group had outcomes comparable to HM and even experienced an adaptive change in their mindfulness profile in response to stress, suggesting that these two traits (non-judging and acting with awareness) may be key factors in explaining the positive outcomes associated with mindfulness. Further research and theoretical development into how these traits would benefit the literature, as MAT already provides a good theoretical account of how other FFMQ facets interact.

Chapter Five: Study Four - Unpacking Mindfulness: The Moderating Effect of Non-Judgement and Awareness on the Relationship Between Stress and Grades

Martin-Allan, J., Leeson, P. and Lovegrove, W. "Unpacking Mindfulness: The Moderating Effect of Non-Judgement and Awareness on the Relationship Between Stress and Grades." Submitted to *The Journal of Contemplative Practice* (2021).

5.1. Abstract

Objectives: The aim of this study was to determine how the two mindfulness facets of non-judgement and present-moment-awareness interact to affect the relationship between stress, anxiety and academic achievement in university students.

Methods: 207 undergraduate psychology students completed the Five Factor Mindfulness Questionnaire (FFMQ) and the Five Factor Personality Inventory (FFPI) during the 12th week of semester.

Results: The model indicated that non-judgement moderated the relationship between stress and academic achievement. Furthermore, when awareness was added to the model, high awareness and low non-judgement predicted the strongest negative relationship between stress and academic achievement. Conversely, high non-judgement and high awareness predicted the weakest relationship between stress and academic achievement. Interestingly, for those with low levels of non-judgement, an increase in awareness was associated with a greater negative relationship between stress and academic achievement.

Conclusions: These results suggest that individual components of mindfulness do not act independently, but rather synergistically. Non-judgement appeared to be unanimously positive, however, awareness was either beneficial or detrimental, depending on levels of non-judgement.

5.2. Introduction

Mindfulness as an area of research has grown one-hundred fold in the last 20 years (Chiesa et al., 2011). It is described as purposeful, non-judgemental awareness of the present moment (Kabat-Zinn, 1982). Non-judgement refers to an individual's ability to be accepting of their experience as it is, without classifying it as desirable or undesirable (Baer et al., 2006). Pop-psychology articles, however, sometimes refer to mindfulness as simply being aware of the present moment, without making reference to non-judgement (Search Inside Yourself Leadership Institute, 2020; Tinsley, 2022). Consequently techniques such as grounding, breathing retraining and progressive muscle relaxation are sometimes referred to as mindfulness techniques, as they are present-moment focused, however they do not incorporate non-judgement.

It is important to note, however, that breathing retraining and progressive muscle relaxation are core elements of many Cognitive Behavioural Therapies (CBT), the gold-standard therapy for the majority of mood and anxiety disorders (Kuhn et al., 2016). Studies which compare mindfulness to these techniques show little difference in terms of primary outcome measures (e.g., depression and anxiety), aside from outcomes which specifically measure non-judgement (G. Feldman et al., 2010; Jain et al., 2007). This raises the question as to whether non-judgement is an active component within the mindfulness construct. This question is fundamental to the theoretical positioning of mindfulness, as non-judgement is central to its very definition.

Mindfulness interventions have consistently been applied to help reduce levels of stress (Baer, Lykins, et al., 2012; Creswell & Lindsay, 2014; Krusche et al., 2012). The most well-researched mindfulness intervention, Mindfulness Based Stress Reduction (MBSR), was designed for this very purpose (Kabat-Zinn, 1982). Nevertheless, the primary aim of mindfulness

interventions is not necessarily to reduce “negative” emotions, as aiming to do so places judgement on them which runs counter to the very foundations of mindfulness (Baer et al., 2006). Therefore, in assessing the impact of mindfulness on emotions it is important to consider how it moderates the relationship between emotional experiences and secondary outcomes related to them.

One such emotion-outcome relationship is the association between stress and academic performance. A recent study of American college students found that 36.5% listed stress as the main factor contributing to reduced academic performance over the last 12 months (American College Health Association, 2020). Theoretically, stress is proposed to have both positive and negative effects on study. In one sense it serves as a motivating emotion, signalling that there is an issue that needs to be resolved through action. On the other hand, it can also cause a number of symptoms which are distressing and may interfere with study (e.g., increased cortisol production, reduced sleep, reduced immune functioning), especially if chronic or at high levels (Åkerstedt, 2006; Bozovic et al., 2013; Marsland et al., 2002). Yerkes and Dodson (2015) suggested that stress should exhibit an “inverted u” relationship with performance, where a moderate amount produces a balance between enhancing motivation without overtaxing the sympathetic nervous system and causing burnout.

While most studies demonstrate that stress decreases learning ability and academic achievement (Sohail, 2013; Zajacova et al., 2005), there are a few studies which demonstrate the exact opposite (Haley et al., 2006; Sarid et al., 2004). In instances where the relationship between two constructs is ambiguous, it is important to explore whether variables exist which moderate the nature of the relationship. Such moderating variables may explain why stress predicts academic success and learning in some contexts but not others.

One potential moderator which could help to elucidate this ambiguous relationship is mindfulness. Empirically, it is related to both constructs, predicting better grades and less stress (Baer, Lykins, et al., 2012; Beauchemin et al., 2008; Rosenstreich & Margalit, 2015). It also appears to moderate the relationship between certain emotions and associated negative outcomes in other contexts. For example, Elwafi et al. (2013) found that individuals who were mindful were less likely to smoke as a result of the feeling of craving. A number of studies have found that mindfulness moderates the relationship between emotionality and other outcomes such as anger symptoms, depressive symptoms and well-being (Barnhofer et al., 2011; Muris et al., 2005; Wenzel et al., 2015). That is, individuals high in mindfulness do not necessarily react to their emotions in a way that creates further distress.

From a theoretical perspective, the facet of non-judgement should reduce the degree to which secondary outcomes occur. If an individual does not judge certain emotions to be distressing, they are less likely to act in ways which immediately remove the emotion. For example, an individual may feel the emotion of craving towards smoking a cigarette, but if they can tolerate the feeling of craving, they do not need to smoke in order to remove/satisfy the craving. The aforementioned studies, however, use mindfulness as a univariate construct in their moderational analysis and thus it is difficult to determine whether individual components (such as non-judgement) are more responsible than others.

The concept of procrastination (i.e., avoidance of study) serves as a theoretical link between stress, mindfulness and academic performance. Avoidance of short-term emotion through procrastination and substance use are negatively related to mindfulness (Sirois & Tosti, 2012; Zgierska et al., 2009) and academic achievement (Carden et al., 2004; Cox et al., 2007). Stress activates a number of processes (e.g., increased cortisol, heart rate, vigilance) which are

believed to have evolved to help humans to deal with threats (Maduka et al., 2015). As stress is often unpleasant, any behaviour that quickly removes this feeling is negatively reinforced. This functions very well to keep humans safe in the type of fight-or-flight situations stress likely evolved to help with (e.g., being attacked by a predator). In the present-day, however, the concept of a threat is far more abstract. For example, when a student is handed an assignment they are at risk of receiving a poor grade many weeks later. In this case, the assignment itself is both associated with threat (i.e., a bad grade), and a means of resolving said threat. As stress is generally short-term focused, avoidance of an immediate threat (i.e., distracting oneself from thinking about an overwhelming assignment) is negatively reinforced by a reduction in stress. An individual high in judgement by definition is likely to judge their stress more negatively, and thus may be more likely to avoid it via procrastination. Conversely, an individual high in non-judgement may be more likely to tolerate stress allowing for rational action (i.e., doing their assignment) against the perceived threat (i.e., getting a bad grade), as opposed to action which reduces the intensity of the emotion (i.e., procrastinating). The ability for non-judgement to aid with tolerating emotions is often cited as the primary theoretical factor within mindfulness that diminishes the relationship between emotions and negative outcomes (Baer et al., 2012).

Awareness in the mindfulness literature is regulated attention to the present moment, and can be described as behaving consciously, or without automaticity (Kabat-Zinn, 1982). Greater present-moment awareness is associated with lower anxiety and stress (Baer et al., 2012, Creswell & Lindsay, 2014).

Being attuned to the present-moment in and of itself, however, is not necessarily always positive. For example, a core feature of panic disorder is acute internal awareness of present-moment body sensations (e.g., pounding heart, difficulty breathing; American

Psychiatric Association, 2013). In this case, however, there is a high level of interoceptive awareness combined with a negative orientation towards it, and perceived inability to tolerate the negative experience (i.e., high level of judgement). Similarly, if one feels they cannot tolerate the stress symptoms associated with study, they are likely to avoid it (e.g., through procrastination). The more aware they are of their present-moment internal experience, the greater contact they have with the negative thoughts and feelings associated with stress. If an individual feels they cannot tolerate their negative thoughts and feelings associated with stress, higher awareness could potentially lead to a greater impact of stress. Conversely, an individual who is highly judgemental, but poorly attuned to their internal world will have less contact with these feelings and as such may feel better able to tolerate them. For this reason, non-judgement is an integral aspect of mindfulness, as one needs to be able to tolerate the present moment in order to feel as though they can safely inhabit it.

Monitor and Acceptance Theory (MAT) breaks down mindfulness into two components which correspond to Kabat-Zinn's original definition: Attention-monitoring (which corresponds to purposeful, present-moment awareness) and acceptance (which corresponds to non-judgement; Lindsay & Creswell, 2017). MAT presents a number of hypotheses in line with the paragraph above, including the proposition that attention-monitoring without concurrent acceptance may in fact be detrimental. MAT suggests that the Five Factor Mindfulness Questionnaire (FFMQ) items of non-judgement and non-reactivity correspond to acceptance, whilst observing corresponds to attention-monitoring. Importantly, the "act with awareness" subscale is omitted from the attention-monitoring component, despite the questions primarily focusing on one's ability to be consciously aware of present-moment actions and to act without automaticity (which aligns closely with Kabat-Zinn's initial conception of present-moment

awareness). Lindsay et al. (2017) argues that this subscale may implicitly measure acceptance, as the opposite of automatic and distracted behaviour is an openness to engaging with one's experiences. This argument, however, could easily be applied to the observing subscale, as the willingness to place one's attention on sense-perceptions, thoughts and emotions (which observing measures) could also be defined as an openness to engaging with one's experiences. A good theoretical account of how acting with awareness functions is important, given that this facet and non-judgement are the most protective against negative affective outcomes (Carpenter et al., 2019). Furthermore, latent profile analyses have sometimes found that individuals with high non-judging and act with awareness have similar outcomes to individuals with an overall high mindfulness profile (despite being very low on facets such as observing and non-react), suggesting these facets may have a disproportional effect on positive outcomes (Kimmes et al., 2017; Lam et al., 2018; Pearson et al., 2015). The fact that these facets co-occur in latent profile analysis certainly lends credence to Lindsay et al.'s hypothesis, that acting with awareness may implicitly measure aspects of non-judgement. Nevertheless, at an explicit level acting with awareness measures one's ability to pay attention to their actions, and it is also possible that its interaction with non-judgement may explain why non-judgmentally aware individuals have outcomes comparable to those with high overall mindfulness.

Acceptance and Commitment Therapy (ACT) offers some explanation for how these variables may interact, as its concept of awareness is less focused on awareness of thoughts, feelings and sense-perceptions (which observing measures) and more focused on awareness of actions than more traditional mindfulness therapies such as MBSR. At its core ACT is a behavioural therapy (Hayes et al., 2009). It focuses on developing non-judgement towards inner-experiences in order to be more present when performing valued behaviours. Battling to

suppress emotions interferes with one's ability to engage with tasks that are important to them. For example, if an individual is trying to study (valued behaviour) but is feeling anxious, and is judgemental towards that stress, they also have to work to suppress that stress. The act of being aware of a present moment activity (e.g., studying) involves consistent redirection of the mind when it becomes distracted. Individuals high in judgement are more likely to place a negative judgement (e.g., "I shouldn't be worrying, I need to focus") on internal experiences that are distracting (e.g., stress, anxiety), before redirecting their attention. In this case the negative judgement of these distractions may create secondary negative emotions (i.e., frustration around worrying) which may further interfere with study. Individuals low in judgement are more likely to simply redirect their attention without placing a judgement on the object of their distraction. Rahl et al. (2017) found that individuals who received mindfulness training which included acceptance, had greater sustained attention than individuals who just received mindfulness training which focused on attention redirection. These findings support the notion that non-acceptance of internal states has the capacity to reduce an individual's ability to pay attention to external stimuli.

The ability to quickly redirect and sustain attention on a present-moment object has long been viewed as a significant component of academic ability, even prior to mindfulness becoming a popular topic of Western psychology research (C. M. Lam & Beale, 1991). Furthermore, scales which purport to measure intelligence (e.g., the Weschler scales of intelligence) frequently also include subscales specifically aimed at measuring attention, indicating that attention is in fact a component of intelligence itself (Flanagan & Alfonso, 2017). Studies have found that mindfulness practice aids with academic achievement, which is often suggested to be due to an increased ability to redirect and sustain attention (Beauchemin et al., 2008; Rosenstreich &

Margalit, 2015). The greater number of times an individual can redirect their attention towards the present moment, the more efficient they will be at studying. On the other hand, if they are judgemental, with an increase of redirection, there is also an increase in opportunity to judge what is perceived as interfering.

Thus, the relative benefits and costs of awareness in relation to study may be dependent on non-judgement. On the one hand, present-moment awareness is likely to aid in helping an individual focus during academic activities such as study. On the other hand, it is also likely to bring them more in contact with feelings such as stress, which if they judge to be intolerable may cause procrastination and avoidance of study.

Mindfulness is a broad construct, which can be applied to a whole spectrum of human experiences. The ability for mindfulness to moderate the link between emotions and outcomes is not proposed to be specific to stress and academic performance. In order to test whether the mechanisms of mindfulness are functioning in the way that this paper has proposed, a different, but functionally similar, emotion should produce the same effect on outcomes. Anxiety is an example of another emotion which is associated both with increased and decreased academic performance depending upon the sample (Carden et al., 2004; Seipp, 1991). It is also functionally similar to stress as it occurs in response to a perceived threat, involves increased sympathetic nervous system activity and associated hormones (e.g., cortisol, epinephrine; Marsland et al., 2002). Anxiety is also strongly associated with the flight reflex and thus can cause individuals to engage in avoidance behaviours such as procrastination. Similar to stress, it is proposed that if an individual is higher in non-judgement they may be able to tolerate the emotion more and work to resolve the threat, as opposed to avoiding contact with the intolerable emotion through procrastination.

This study will aim to determine how mindfulness moderates the relationship between stress, anxiety and academic performance. More specifically it will examine how non-judgement and awareness interact within this moderation. It is proposed that, for individuals low in non-judgement, higher awareness will increase the negative relationship between stress and academic performance. For individuals high in non-judgement, however, it is predicted that higher awareness will increase the positive relationship between stress and academic performance. Given anxiety is a functionally similar emotion to anxiety in this context, it is proposed that a similar pattern of results will be observed. This study will test these hypotheses using both “observe” and “act with awareness” as two separate measures of awareness.

5.3. Methods

5.3.1. Participants

The sample was comprised of 207 undergraduate psychology students. Of this 207, 24 identified as male and 179 identified as female, one identified as non-binary, and three did not disclose gender. The average age of participants was 21.44 years (SD = 6.41). Measurements were taken during week 12 of a 13 week-long university semester. This time-point was chosen as the study is aiming to examine how mindfulness interacts with stress/anxiety, and generally students exhibit the highest levels of stress/anxiety in the weeks before their final exams (Baghurst & Kelley, 2014). The exam period finished four weeks after the final measurement.

5.3.2. Materials

The Five Facet Mindfulness Questionnaire (FFMQ) is a self-report instrument which assesses five facets of mindfulness: observing, describing, acting with awareness, non-judgement and non-reactivity (Baer et al., 2008). Responses to questions are given using a Likert scale ranging from one (never or very rarely true) to five (very often or always true). The FFMQ

demonstrates good internal consistency in numerous samples, good construct validity as evidenced by its ability to differentiate meditators and non-meditators, as well as demonstrating relationships with other mindfulness questionnaires and constructs related to mindfulness (Baer et al., 2008). Within the sample the FFMQ demonstrated acceptable reliability with Chronbach's alphas ranging between .79 and .92 for each of the five facets. The facet which best fit with the construct of non-judgement was "non-judging of inner experience". An example of a non-judging question is, "I tell myself I shouldn't be feeling the way I'm feeling." "Act with awareness" was selected to represent the construct of present-moment awareness. An example of an "act with awareness" question is, "I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted". Note that both these questions were reverse coded.

The International Personality Item Pool representation of the Revised NEO

Personality Inventory (IPIP-120) is a Five-Factor Model questionnaire which assesses five dimensions of personality: Neuroticism, extroversion, agreeableness, openness and conscientiousness (Maples et al., 2014). Each dimension consists of six facets which encompass different elements of that dimension. Each facet is formed from four questions for a total of 120 items. Only the dimensions of conscientiousness and neuroticism were measured in this current study, and only the facets of anxiety and stress were used for these analyses. Examples of these items include, "I'm not a worrier" and, "I complete tasks successfully." The responses are measured on a five point Likert scale (zero = strongly disagree, four = strongly agree). The alpha coefficients for anxiety and vulnerability to stress (the two traits used in analysis for this study), were .86 and .83 respectively, which indicates good reliability. Personality variables were used to measure trait levels of stress and anxiety as they measure an individual's propensity to

experience these emotions, just as the FFMQ measures an individual's propensity to be in mindful states.

Academic achievement was measured by taking an average of the students' marks for the subjects they completed during the semester they participated in the research.

5.3.3. Procedure

Once recruited, initial details such as gender and age were collected. Participants also gave their name, student number, phone number and email address so that they could be followed up and their data could be linked. Participants were then informed they would be emailed the questionnaires at different time points throughout the semester as part of a longitudinal study. The participants for this study were taken from the last wave of the sample in study three. A link to the FFI and FFMQ was emailed to students in the twelfth week of university, and academic results were collected at the end of the semester.

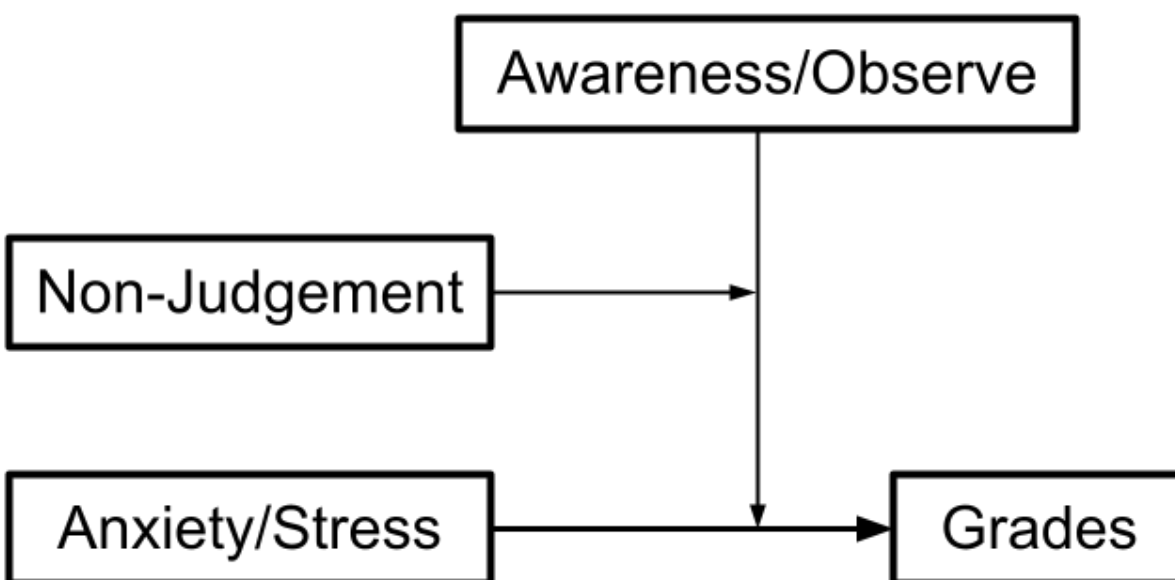
5.3.4. Data Analysis

Prior to performing the primary analysis multiple independent samples t-tests were conducted to determine if there were significant differences between genders in terms of anxiety, stress, mindfulness and academic performance. None of these tests were significant, indicating that there were no major differences between genders in terms of the primary variables. The first analysis employed a moderated moderation model to test whether non-judgement (secondary moderator) influenced the degree to which act with awareness (primary moderator) impacted upon the relationship between stress (independent variable) and academic performance (dependent variable). The second analysis used an identical statistical test, however, anxiety was used as the independent variable. The third and fourth analysis were identical, however, observe was used in place of act with awareness as the primary moderator. SPSS with the PROCESS

macro add-on was used to test for the moderated moderation. Two outliers were removed as both their Cook's and leverage statistics were above the cutoff, a further two outliers were removed as their standardised residuals were above three. The remaining data sufficiently met the assumptions of normality, linearity and homoscedasticity of residuals. The correlation between the independent variables and moderators was below .7, indicating that multicollinearity would not significantly affect interpretability of results. Inspection of the scatterplots indicated the sample's grades were approximately normally distributed.

Figure 5.1.

A summary of the moderated moderation model used to determine the effect of non-judgement and awareness/observe on the relationship between stress or anxiety on academic results (note the same model was used for both stress and anxiety).



5.4. Results

Prior to performing moderations a bivariate correlation was conducted between each variable involved in analysis. The results are summarised in table 5.1. Descriptive statistics are also summarised in table 5.2.

Table 5.1.

A summary of the bivariate correlations between variables tested in the primary analyses of the study.

	Grades	Stress	Anxiety	Non-Judging	Acting Aware	Observing
Grade	1	-.190*	-0.120	.152*	0.079	-0.121
Stress	-.190*	1	.824**	-.532**	-.514**	-.221**
Anxiety	-0.120	.824**	1	-.591**	-.490**	-.170*
Non-Judging	.152*	-.532**	-.591**	1	.520**	0.077
Acting Aware	0.079	-.514**	-.490**	.520**	1	.215**
Observing	-0.121	-.221**	-.170*	0.077	.215**	1

Table 5.2.

A summary of descriptive statistics for variables tested in the primary analyses of the study.

Descriptive Statistics		
	Mean	Std. Deviation
Grades	69.44	11.14
Stress	2.975	0.76
Anxiety	3.29	0.78
Non-Judging	3.15	0.912
Acting Aware	2.88	0.75
Observing	3.29	0.70

The first moderated moderation explored the effect of non-judgement and awareness on the relationship between stress and grades. The overall model was significant, $F(7, 169) = 2.41, p = .04, R^2 = .08$. The R^2 increase due to the three-way interaction was also significant $F(5.2, 169) = 6.11, p = .02$. As demonstrated in table 5.3., a combination of low non-judgement and high awareness produced the largest effect ($B = -7.00$), indicating that for these individuals a one-point increase in stress (which corresponds to the adjacent higher Likert response, e.g., moving from agreeing with statements endorsing stress to strongly agreeing with them) is correlated with a seven-point decrease in average academic results for the semester. Conversely, the combination of high non-judgement and high present-moment awareness meant that a one-point increase in stress was correlated with a one point decrease in academic results for the semester (which was non-significant).

Table 5.3.

A summary of the moderated moderation examining the effect of non-judgement and act with awareness on the relationship between stress and academic results.

Non-Judge	Awareness	Effect	se	T	p
2.25	2.13	-.73	1.94	-.38	.71
2.25	2.88	-3.9	1.66	-2.32	.02
2.25	3.63	-7.00	2.86	-2.43	.02
3.14	2.13	-1.80	1.84	-.98	.33
3.14	2.88	-2.90	1.33	-2.18	.03
3.14	3.63	-4.00	1.94	-2.06	.04
4.03	2.13	-2.88	2.72	-1.06	.29

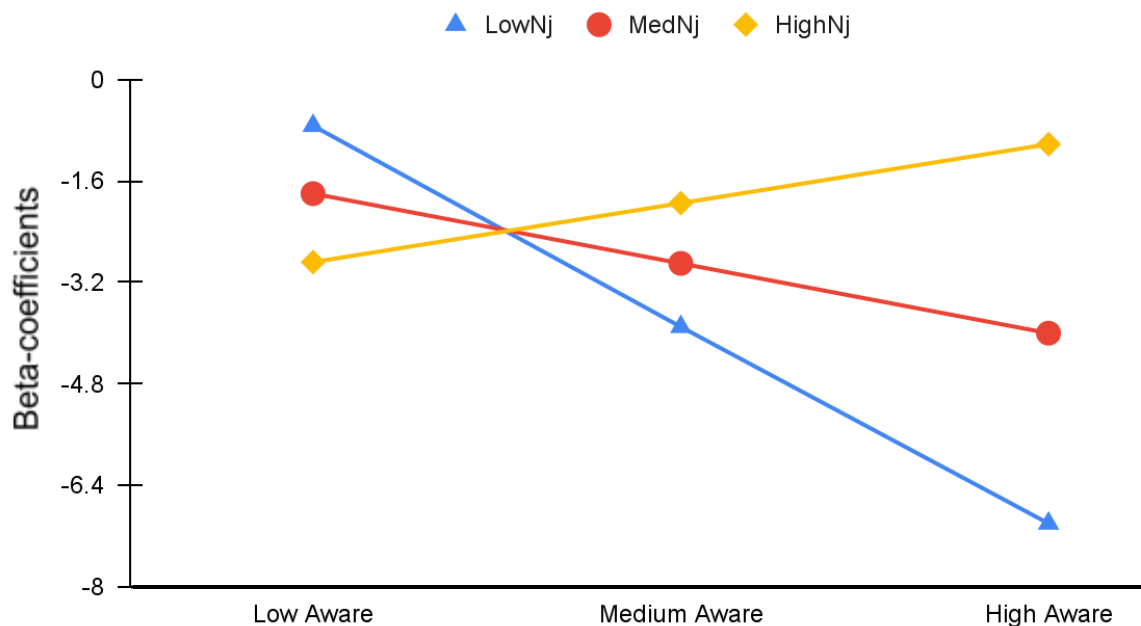
4.03	2.88	-1.95	1.90	-1.03	.31
4.03	3.63	-1.02	1.81	-.57	.57

Note. The values in the left two columns (for non-judgement and awareness) correspond to low, medium and high values for each variable. The medium value is the mean, whereas the low and high values are determined by adding or subtracting one standard deviation from the mean.

The high-non-judgement group exhibited a trend opposite to the low and medium non-judgement group. For those with high non-judgement, the negative relationship between grades and stress became smaller as awareness increased. For those with average or low non-judgement the negative relationship between grades and stress became larger as awareness increased. The gradient of this increase was largest for the low non-judgement group. A summary of these trends can be seen in figure 5.2.

Figure 5.2.

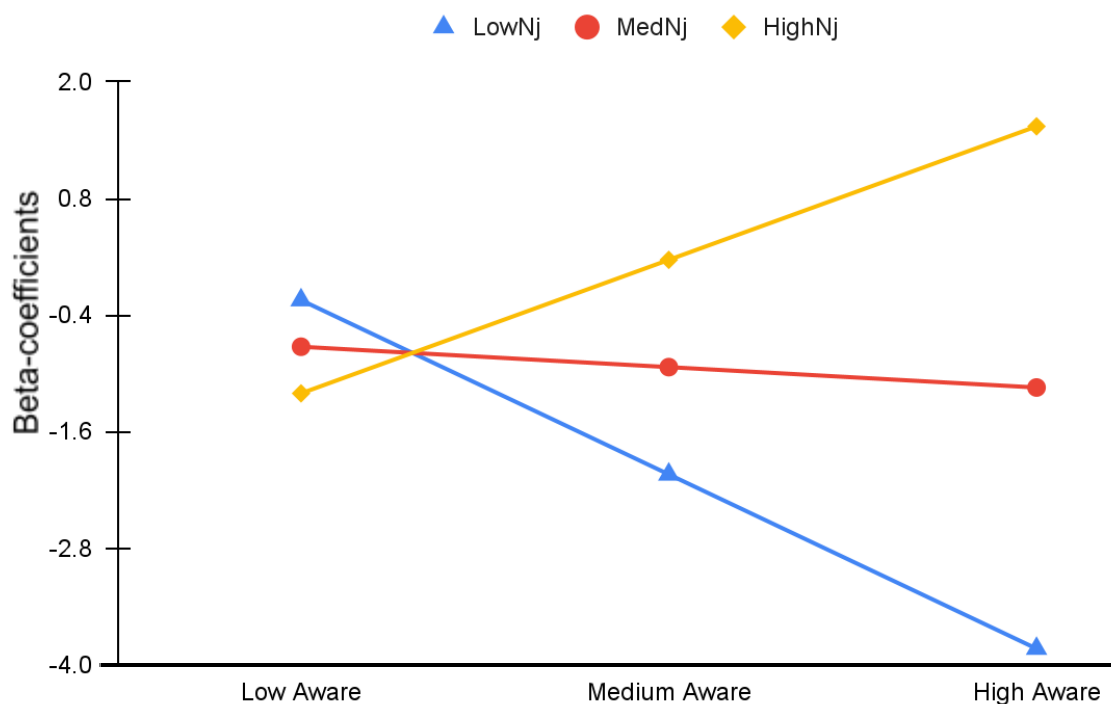
A line graph demonstrating the different beta-coefficients for the relationship between stress and academic results for each level of non-judgement and act with awareness.



The second moderated moderation explored the effect of non-judgement and awareness on the relationship between anxiety and academic results. The overall model was trending towards significant, $F(7, 169) = 1.78, p = .09, R^2 = .07$. The R^2 increase due to the three-way interaction, however, was significant $F(5.02, 169) = 5.02, p = .03$. None of the conditional effects were significant (i.e., the effect of anxiety on academic results at each level of the moderator), however, Figure 5.3 demonstrates a similar trend observed in the previous analysis.

Figure 5.3.

A line graph demonstrating the different beta-coefficients for the relationship between anxiety and academic results for each level of non-judgment and awareness.



The third moderated moderation explored the effect of non-judgement and observing on the relationship between stress and academic results. The overall model was significant, $F(7, 170) = 2.41, p = .04, R^2 = .30$, however, the R^2 increase due to the three way interaction was not significant $F(7, 170) = .46, p = .50$. These results are summarised in table 5.4 and figure 5.4. Furthermore, the fourth moderated moderation, which explored the effect of non-judgement and observing on the relationship between anxiety and academic results, was not significant $F(7, 170) = 1.99, p = .01, R^2 = .08$.

Table 5.4.

A summary of the moderated moderation examining the effect of non-judgement and observe on the relationship between stress and academic results.

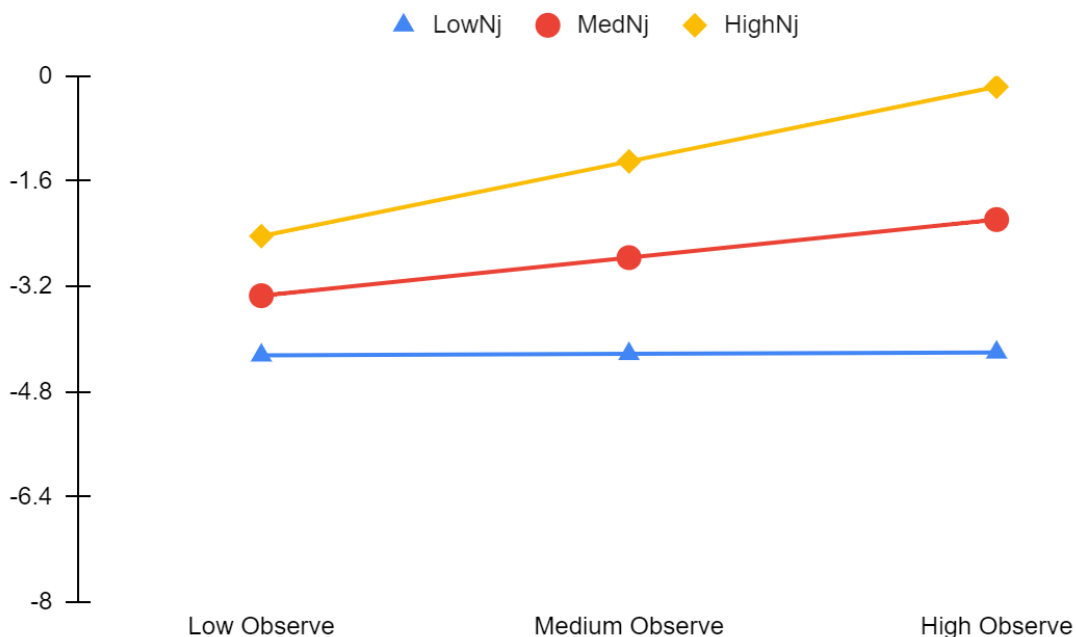
Non-Judge	Awareness	Effect	se	T	p
2.23	2.57	-4.25	2.26	-1.88	0.06

2.23	3.28	-4.23	1.59	-2.66	<.01
2.23	3.99	-4.20	2.20	-1.91	0.06
3.13	2.57	-3.34	1.76	-1.90	0.06
3.13	3.28	-2.76	1.31	-2.11	0.04
3.13	3.99	-2.18	1.81	-1.21	0.23
4.04	2.57	-2.44	2.36	-1.03	0.30
4.04	3.28	-1.30	1.74	-0.75	0.45
4.04	3.99	-0.17	2.03	-0.08	0.95

Note. The values in the left two columns (for non-judgement and awareness) correspond to low, medium and high values for each variable. The medium value is the mean, whereas the low and high values are determined by adding or subtracting one standard deviation from the mean.

Figure 5.4.

A line graph demonstrating the different beta-coefficients for the relationship between stress and academic results for each level of non-judgement and observe.



5.5. Discussion

The results of this study indicated that stress predicts poorer academic performance on average. Furthermore, this relationship was found to depend upon levels of “act with awareness” and non-judgment. For those with high levels of non-judgment, greater ability to act with awareness resulted in a reduction in the negative relationship between stress and academic results. Conversely, for those with low levels of non-judgment, greater ability to act with awareness increased the negative relationship between stress and academic results. High levels of acting with awareness and high non-judgment predicted the weakest relationship between stress and academic performance, conversely, high levels of awareness and low non-judgment predicted the largest relationship between anxiety and academic performance. A similar pattern was observed when anxiety was substituted for stress in the same model, although the model was only marginally significant. When the same model was tested with “observe” in place of “act

with awareness”, the model itself was significant, however, the interaction between observe and non-judgement did not significantly contribute to the model (i.e., there was no increase in R^2 due to the three-way interaction).

The finding that stress predicts poorer academic performance on average is consistent with the sum of research reviewed in this study indicating that, overall, stress is detrimental to overall performance (Sohail, 2013; Zajacova et al., 2005). Non-judgement was found to protect against the negative effects of stress on academic grades. Previous research has found that mindfulness moderates the relationship between emotions and secondary outcomes (e.g., whether craving leads to smoking behaviour, whether neuroticism leads to depression symptoms; Barnhofer et al., 2011; Muris et al., 2005; Wenzel et al., 2015). It was proposed that non-judgement was the mindfulness component most likely to be affecting secondary outcomes, as, if an individual is able to tolerate their emotions without wanting them to be different, they are less likely to want to immediately change them in ways that are counterproductive in the long-term (e.g., reducing craving by smoking). In this instance, if individuals were non-judgemental towards their stress, their stress was less likely to negatively impact their academic grades. Individuals who feel they cannot tolerate or should not feel stress are more likely to act in ways which remove the stress as quickly as possible through means such as procrastination, as opposed to long-term focused behaviours (such as study) which are likely to initially increase stress. It is important to note, however, that these hypotheses around the mechanism of action have not been fully investigated in the study, as procrastination was not included as a variable of interest in the moderation.

The primary intention of this paper was to explore the interaction between non-judgement and awareness. For individuals low in non-judgement, as awareness increased, the negative

relationship between stress and grades became larger. For individuals high in non-judgement, however, increased awareness had the opposite effect (i.e., as awareness increased, the negative relationship between stress and grades became smaller). These findings are consistent with how these constructs are theoretically proposed to work (Williams & Kabat-Zinn, 2011).

Present-moment awareness as a construct simply measures how much contact an individual makes with the present moment, whereas non-judgement measures the type of contact an individual makes with the present moment. Therefore, if someone is judgemental of the present moment, greater awareness of the present moment is likely to increase their unease. Experiential avoidance (i.e. dissociating from the present-moment) is proposed to be a common strategy used for individuals to reduce their contact with present-moment unease (Hayes et al., 2009). These findings suggest that, for individuals who are judgemental, experiential avoidance may in fact be an adaptive strategy, as judgemental individuals who were less aware of the present moment performed better academically.

Present-moment awareness as a construct is similar to the paradigm of attention, which is itself a facet of academic ability (Flanagan & Alfonso, 2017). There is also research which indicates that being in the present-moment is protective against emotions associated with burnout such as anxiety, depression and stress (Baer et al., 2012; Barnhofer et al., 2009; Beauchemin et al., 2008). Thus, being in the present-moment has the potential to increase contact with emotions that may be difficult to tolerate (which is detrimental to study), as well as increase one's ability to stay focused on present-moment activity (which is supportive of study). Higher non-judgement, by definition, decreases the degree to which one views internal experiences (such as stress) as being difficult to tolerate. Thus, those high in non-judgement are likely to have the same access to the positive effects of increased awareness, with less of the negative effects.

This may explain why the effect of awareness on the relationship between stress and grades is inverse in the high non-judgement group, compared to the low non-judgement group.

A secondary finding was that when the same test was performed with anxiety in place of stress, a similar pattern of results was observed (although the anxiety model was only marginally significant). That is, the degree to which anxiety led to academic achievement was dependent upon the interaction between non-judgement and awareness. These findings similarly indicate that high non-judgement and high awareness (i.e., having both components of mindfulness), is optimal for moderating the degree to which a “negative” emotion (i.e., stress/anxiety) leads to negative outcomes (i.e., poor grades). Having high levels of awareness, but low non-judgement, led to the largest inverse relationship between stress and grades. This indicates that a similar moderator relationship exists across multiple constructs.

MAT predicts that attention-monitoring is dependent upon acceptance to produce positive outcomes, and the interaction between acting with awareness and non-judgment suggests that acting with awareness functions in the way an attention-monitoring variable would. Previous research has found that non-judgment and act with awareness have the largest effect on emotional outcomes out of FFMQ facets (Carpenter et al., 2019), and this study suggests that at high levels they interact to protect against negative effects of emotional outcomes (i.e., reduced academic performance). These findings taken together offer potential explanation as to why some latent profile analysis studies find that non-judgmentally aware individuals have outcomes comparable to individuals with a high overall mindfulness profile (Kimmes et al., 2017; Lam et al., 2018; Pearson et al., 2015), as the already disproportional effect of these two variables may be further increased by an interaction at which occurs in individuals with high levels of both variables. It is important to note, however, that the current study examined how these variables

interacted to affect the relationship between stress and academic achievement, and the interactions observed between mindfulness variables observed in the study may not generalise to other domains. It is also important to note that when act with awareness was substituted for observe, the statistical model was no longer significant. This finding is relevant to MAT, which suggests that observe is the primary FFMQ measure of attention-monitoring. In the context of this study, however, acting with awareness functioned in a way that was consistent with an attention-monitoring variable where observe did not. This indicates that it is worth exploring the viability of act with awareness as an additional candidate to measure attention monitoring within MAT.

One of the key implications this research has illuminated, along with other studies which have explored the moderating effects of mindfulness, is that mindfulness not only has a direct impact on variables like stress and academic achievement, but also has the capacity to change the way such variables relate to each other. It also has shown that certain elements within mindfulness change the way other elements of mindfulness impact upon other variables. This supports the notion that components of mindfulness work synergistically, as opposed to independently (Baer et al., 2012). It validates the prevalent research definition of mindfulness as “non-judgemental, present moment awareness”. These findings also suggest techniques such as PMR, breathing retraining and mantra meditation which may come under the umbrella of mindfulness are incorrectly classified as mindfulness as they do not emphasise an active component (i.e., non-judgement). It also suggests that these practices may not necessarily produce the same effects as mindfulness techniques as they do not actively encourage non-judgement.

5.5.1. Limitations and Future Research

It is important to note, however, that these are questions raised by this research, rather than conclusions that can be reached from the results of the current study, as there was no intervention and causation cannot be inferred. Furthermore, the current study only explored the relationship between a few variables (i.e., stress, anxiety and grades), and further research would have to be performed to determine whether this pattern of results occurs in other emotion-outcome relationships.

Another limitation of this study is the imbalance in gender. The current study had an uneven ratio of males to females, with 82% of the sample being female. It is unclear whether levels of mindfulness, and the relationship between mindfulness and other variables, differs between males and females. A number of studies have found no significant difference between males and females (Goodall et al., 2012; Howell et al., 2008; Kong et al., 2014; MacKillop & Anderson, 2007). One study, however, found gender differences in the 'observe and describe' facet when using a Swedish sample (Lilja et al., 2011). A systematic review of gender differences in mindfulness-based interventions for substance abuse indicated that some quasi-experimental studies found gender differences in response, however, more rigidly designed studies failed to find any differences (Katz & Toner, 2013). Thus, whilst it is possible there may be differences between males and females in levels of mindfulness, they do not appear to be large enough to produce consistent, observable differences between genders. The current study found no significant difference in any of the measured outcomes (i.e., anxiety, stress, academic performance and mindfulness) in the sample. This, combined with limited findings of gender differences in other studies, suggests that these results are at least somewhat generalizable across genders.

A further limitation of this study is its sample size, which is relatively small for a double-moderation (Memon et al., 2019). This is especially relevant for this study as there were multiple null findings, which may have simply been due to insufficient statistical power. Future research using a larger sample would therefore benefit the literature.

The finding that act with awareness interacts with non-judgement in a way consistent with an attention-monitoring variable where observe did not brings into question its omission from MAT (Lindsay & Creswell, 2017). Given the FFMQ is one of the most commonly used measures of mindfulness, and act with awareness and non-judgement have the largest effect on emotional outcomes, it is important that researchers continue to develop and test theories about how these variables interact. The current study raises the possibility that act with awareness may be subsumed under the attention monitoring component of MAT, however, further research is required to confirm this hypothesis. Alternatively, research into how the act with awareness component functions may be better informed by theories which place awareness of behaviour at their center (e.g., ACT; Hayes et al., 2009).

This study highlights that the tendency within pop-psychology to focus on the “here and now” or “in the moment” (i.e., present-moment awareness), while neglecting other aspects of mindfulness (i.e., non-judgement), may in fact be harmful for those who are high in judgement. It is acknowledged, however, the area in which this has been explored is narrow (i.e., the correlation between academic achievement and anxiety/stress). It is therefore important to explore whether a similar pattern of findings exists in other emotion-outcome relationships. There is a growing body of research which suggests that mindfulness has no effect, or even a detrimental effect in a small proportion of people. The current study suggests that certain

components of mindfulness can have a detrimental effect when there is imbalance. This would be a useful area for future research to explore in light of the current study's findings.

The finding that non-judgement affects the way awareness interacts with other constructs (i.e., stress and academic achievement) may open up avenues for exploration in clinical research. It suggests that in a therapeutic context, it may be important to consider the nature of awareness being developed (i.e., judgemental versus non-judgemental). It would be helpful to explore whether the effects of increased awareness developed in a therapeutic context are also dependent upon levels of non-judgement. This finding applies more broadly than just within therapies which explicitly employ mindfulness as a technique, as most therapies aim to increase awareness and change the relationship the client has with their experience.

These findings suggest that individual differences in mindfulness traits affect how other mindfulness traits interact, which may be an important avenue of exploration to help explain why some individuals benefit more or less from mindfulness interventions. Furthermore, these findings also suggest that future research could explore whether targeting mindfulness training to the individual may be more beneficial than a broad brush approach. That is, individuals high in non-judgement may benefit from techniques which improve present-moment awareness (e.g., breath meditation). Individuals low in non-judgement, may in fact experience detrimental effects from meditation techniques which improve present-moment awareness (e.g., concentrative breath meditation), but may be more likely to gain benefit from non-judgement focused meditation techniques (e.g., open-awareness meditation). Future research which explores the difference in effect between awareness-focused meditation versus non-judgement focused meditation could help to better explore the components of mindfulness and their differential

effects. This in turn could hopefully minimise psychological harm caused by such interventions and maximise benefit.

Chapter 6: Discussion

6.1. Preamble

The four studies conducted in this thesis have contributed new insights into the differential effects of mindfulness and compassion, as well as the differential effects of individual mindfulness components. This final chapter aims to summarise and synthesise these findings, as well as discuss common limitations and future research prompted by these findings.

6.2. Overview of Main Findings

6.2.1. Aims of the Thesis

The specific aims of this thesis were to:

- Determine the optimal ordering of two meditation types (i.e., mindfulness and compassion) before and after emotional engagement with another, in order to prime empathy during engagement, and prime emotional regulation post-engagement (study 1).
- Determine the differential effects of AM, MO and MM on empathy, in order to better understand the mechanism whereby mindfulness leads to greater empathy (Study 2).
- Identify latent classes with mindfulness and determine how these differentially affect burnout the course of a university semester (study 3).
- Identify whether these latent classes of mindfulness are stable over time (study 3).
- Identify how the FFMQ facets of non-judgement and acting with awareness interact to affect the relationship between stress/anxiety and academic achievement (study 4).

6.2.2. Summary of main findings

The findings of this thesis suggest mindfulness is a complex construct consisting of multiple facets which uniquely affect each other. The first study found that a short meditation period of either mindfulness or compassion was effective in priming empathy before watching an emotionally evocative video. Follow-up meditation that was consistent with the initial meditation

(e.g., compassion meditation performed before and after watching the video) produced positive emotions in meditators compared to the control, whilst changing the meditation technique did not (e.g., compassion meditation before the video and mindfulness meditation after watching the video). This suggests that, at least in the short term, the detrimental effects of changing meditation techniques (i.e., having to change one's mindset, reduced practice) do not outweigh any possible synergy that may exist between these two meditation styles. This is an important finding, given mindfulness training is often included within compassion-based interventions due to the hypothesised synergistic relationship between these constructs (Bartels-Velthuis et al., 2015; Neff & Germer, 2013). The first study examined state effects and therefore cannot make definitive conclusions about longer-term interventions. It is nevertheless common within a single meditation sitting to include a brief period of mindfulness meditation in order to establish concentration prior to compassion meditation (Neff & Germer, 2013). Study one suggests that focusing on one meditation type may be more effective at producing positive affective outcomes in the short term. A further implication of this first study, which informed the second, was that empathy can be primed using meditation in a relatively short amount of time (i.e., 15 minutes).

Whilst the theoretical link between compassion and empathy is relatively linear, the link between mindfulness and empathy is less so. Non-judgement is a common factor between the constructs of mindfulness and compassion (Gilbert, 2009b), and the findings of study one raise the question as to whether priming non-judgement may partially explain raised levels of empathy in both meditation conditions. Both meditation techniques also require the individual to monitor their attention on a primary meditation object (i.e., either the breath or compassionate phrases; Barthels-Velthuis et al., 2015). Furthermore, attentional capacity is linked to empathy (Groen et

al., 2018; Morelli & Lieberman, 2013), and thus the attention-monitoring component of both techniques may also partially explain their ability to prime empathy.

Thus, the aim of the second study was to disentangle the effects of attention-monitoring and acceptance on empathy, in order to better understand the mechanisms that link mindfulness training and empathy. It was found that MM produced the greatest levels of multivariate affective empathy (as measured their levels of emotions congruent with the emotion being primed in an emotion-inducing video, and SES affective empathy), followed by AM and MO, and then the control. This supports a hypothesis of MAT (Lindsay & Creswell, 2017), that attention monitoring and acceptance in combination have a synergistic relationship and produce better outcomes than either component alone. Multiple comparisons indicated that each component of mindfulness primed different aspects of empathy. For example, both MM and AM resulted in an increase in all emotions (target and non-target), as well as SES affective empathy. MO, on the other hand, resulted in an increase in target emotions (i.e., emotions congruent with what was being primed in the video), but no increase in non-target emotions. This resulted in a marginally significant increase in empathic accuracy (i.e., target emotions minus non-target emotions). MM, however, resulted in a significant increase in empathic accuracy.

Interestingly, the distinct outcomes observed in AM and MO were present together in MM. This suggests that the meditation conditions for AM and MO were able to effectively prime different aspects of mindfulness. Attention-monitoring appeared to facilitate a more focused awareness of another individual's emotions, priming the target emotion more effectively than non-target emotions. This parallels with the typical role of attention-monitoring within mindfulness meditation: the ability to sustain attention on the primary meditation object over and above distractions which may arise (Lindsay & Creswell, 2017). Non-judging by comparison

appeared to facilitate a deeper feeling of connection and attunement towards another individual (as measured by self-reported empathy). This raises the possibility that the ability to be non-judgemental towards one's own inner-experience may translate to non-judgment of others' inner experience. This explanation is consistent with therapeutic approaches such as person-centered therapy and compassion-focused therapy, which suggest non-judgement is an important skill in fostering empathy (Gilbert, 2009b; Raskin & Rogers, 2005).

The third study aimed to explore differences in burnout trajectory between different latent profiles of university students. Furthermore, as there is little longitudinal research of this nature, it also aimed to explore whether these latent classes remain stable over time. The LPA found three groups to emerge: NJA, JO and HM. It was found that NJA and HM were associated with significantly less burnout than JO, however, there were no differences in burnout trajectory between groups. This supports MAT, indicating that high levels of observing without concurrent mindfulness skills are associated with poor outcomes (Lindsay & Creswell, 2017). It is also consistent with previous findings linking the JO group to a range of poor outcomes including increased anxiety, depression and emotional dysregulation (Bravo et al., 2016, 2018a; Pearson et al., 2015). Whilst the primary subject of investigation was change in burnout over the semester, perhaps the more interesting finding of this study was that the latent classes identified did not remain stable over time. Over the course of the semester all groups experienced a reduction in acting with awareness, indicating that as the semester continues individuals become less engaged with their activities and are more likely to engage with mind wandering. Stress and anxiety are both associated with mind-wandering (Killingsworth & Gilbert, 2010; Seli et al., 2019), and it is likely that as the demands of the semester increase individuals are more likely to engage in

future-focused thinking such as worry or planning which takes them away from the present moment.

The NJA group significantly increased non-reactivity and observing over the course of the semester. Given this group had significantly elevated non-judgement, it is likely that their level of acceptance was such that an increase in attention monitoring is unlikely to be associated with negative outcomes. This suggests that certain mindfulness traits may adaptively change in some individuals to meet the demands of increasing stress.

The profiles that emerged in study three (and have consistently emerged in previous studies) highlight the importance of non-judgement and acting with awareness. Despite acting with awareness primarily focusing on measuring one's ability to maintain their attention in the present moment, MAT suggests it should not be used as a measure of attention monitoring, as it implicitly measures aspects of acceptance (Lindsay & Creswell, 2017). Certainly, the co-occurrence of these traits in low levels for the JO group, and in high levels for the NJA group, suggests that these may have some type of inherent link. Thus, the fourth study aimed to clarify the relationship between these two variables.

The final study of this thesis found that non-judgement affected the way acting with awareness moderated the relationship between stress and academic achievement. High levels of acting with awareness, paired with low levels of non-judging predicted the strongest negative relationship between stress and academic achievement. Contrastingly, high levels of acting with awareness paired with high levels of non-judging predicted the weakest relationship between stress and academic achievement. This suggests that the positive effects of acting with awareness are dependent upon levels of non-judgement. The way these variables interacted in the final study is consistent with how a measure of attention-monitoring variable (in this case acting with

awareness) would interact with a measure of acceptance (in this case non-judgement), which runs counter to Lindsay et al.'s (2017) proposition that acting with awareness may implicitly measure acceptance.

The results of this study, nevertheless, do support the basic conceptualisation underlying MAT (Lindsay et al., 2017). That is, the two primary components of mindfulness, acceptance and awareness, interact to form a whole greater than the sum of its parts. The results from studies two and four especially, highlight that when awareness is combined with acceptance, the effects of both are enhanced. Study four highlighted that, in the absence of acceptance, increased awareness can actually be detrimental. This is consistent with the theory underlying MAT, that is, *judgemental* awareness towards the present moment may in fact be more detrimental than a lack of awareness. This is proposed to occur because judgement itself corresponds to one's inability to tolerate certain experiences, and increased awareness of the present-moment brings one into contact with a range of experiences that are potentially intolerable. In this instance, if one can avoid the present-moment by day-dreaming or other types of experiential avoidance (i.e., dissociating from the present-moment), they have less contact with present-moment experiences that are deemed to be intolerable. If one is able to safely inhabit the present-moment (i.e., they are non-judgementally aware), they are able to connect with the benefits of being present (i.e., increased engagement with others, increased engagement with activities). This also points to the synergistic relationship between the two constructs outlined by MAT: i.e., if one can safely inhabit the present-moment, they are more likely to want to be in a state of presence. The results of study two and four support this conception of a synergistic relationship between these variables. That is, individuals high in both non-judgement and awareness (or who experience meditation which primes both) experienced preferential outcomes when compared to individuals

who have higher levels of one single element (or have a single element primed). It is important to note that these are simply potential theoretical mechanisms to explain the findings of this thesis, and continued research informed by theory is required before these claims can be verified.

6.3. Limitations and future research

The finding in study one that mixing mindfulness and compassion meditation was less effective in producing positive affect than using a consistent meditation technique warrants further exploration, as these two forms of meditation are commonly used in conjunction with each other. Whilst the current study suggests that repeating the same meditation is superior to switching between techniques in the short term, it is important to note that participants watched videos and completed questionnaires in between each 15 minute meditation session. Comparing a combined meditation condition (i.e., compassion and mindfulness) with a pure mindfulness or compassion condition would help to clarify whether this finding extends to single meditation sessions (where compassion and mindfulness are most often combined).

The first two papers explored the difference in effect of a number of meditation typologies, namely Attention Monitoring meditation (MO), Acceptance Meditation (AM), Mindfulness Meditation (MM) and Compassion Meditation (MM) on empathy and emotion. There is conceptual overlap between some of these meditation techniques (e.g., non-judgement is often seen as a component of both mindfulness and compassion; Germer & Siegal, 2012). In a practical sense, the original paper outlining MAT suggested that it may be difficult to prime individual components such as acceptance, without prompting the meditator to monitor their attention in some way (i.e., towards an accepting stance; Lindsay et al., 2017).

Study one also demonstrated some degree of overlap between MM and CM, with small nuanced differences, supporting the notion that these meditation techniques have some

conceptual overlap (Germer & Siegal, 2012), but are still inherently distinct. The acceptance meditation condition in study two appeared to create effects that were consistent with the mindfulness condition, minus the effects of the attention-monitoring condition, which suggests acceptance can be specifically primed. This raises the possibility for more specific component analysis research on MAT, as prior component analyses have either compared attention-monitoring to mindfulness or used an acceptance condition which does not involve meditation (Lindsay, Young, et al., 2018; Rahl et al., 2017). Whilst study two found combining acceptance with attention-monitoring enhanced the effects of both on empathy, there may be domains where specifically priming acceptance may provide more benefit than a combined approach.

Whilst this study suggests acceptance can be primed at a state level, there are still some limitations inherent within this methodology. Firstly, it is difficult to completely remove the attention-monitoring component of meditation, especially when acceptance is being primed by repeated audio prompts. Even instructions asking the student to be accepting may cause them to focus their attention on whether they are being accepting or not. Secondly, as highlighted by Siff (2014), instructing a meditator to be accepting towards their experience may cause non-acceptance if the meditator is unable to enter an accepting state and thus, this type of linguistic priming may not create a completely open, accepting mode for the student to operate from. Nevertheless, traditional mindfulness meditation often prompts acceptance linguistically (Kabat-Zinn, 1982). Thus, the acceptance condition can be thought of as a way of measuring the effectiveness of the linguistic prompts typically used to prime acceptance within mindfulness meditation. This same logic can be applied to each of the conditions used in the studies (i.e., compassion, mindfulness, attention-monitoring and acceptance), which were all linguistically

primed, but may have incidentally primed other components. Given concepts and instructions around meditation must first be communicated linguistically, future research into the effectiveness of different scripts, phrases and words in eliciting specific states of mindfulness may further increase the accuracy with which these types of experiments can effectively prime different components.

Taken together, these first two studies demonstrate that empathy can be primed in a relatively short amount of time using meditation techniques. Furthermore, study one suggests that meditating after an empathy task increases positive affect. This may be of use in contexts where emotional engagement affects outcomes, such as therapy or medicine (Drisko, 2004), as employing these techniques may aid with empathy whilst reducing subsequent emotional burnout. Research into the effectiveness of these techniques in such contexts could be of potential benefit not only to therapists and medical practitioners, but to their patients as well.

One of the limitations of the first two studies is that they only measured the state effects of meditation on participants. Whilst this allowed for a greater understanding of how these techniques work in the short-term, it does limit applicability to meditation interventions, as it is possible there would be a difference in longer term effects. Furthermore, certain aspects of mindfulness (i.e., attention monitoring) have been suggested to develop quicker than other aspects (i.e., acceptance; Lindsay & Cresswell, 2017). Furthermore, compassion programs often suggest that mindfulness meditation skills should be developed prior to compassion meditation training (Bartels-Velthuis et al., 2015; Neff & Germer, 2013). There is evidence to suggest that state changes lead to similar trait changes in individuals (Bauer et al., 2019), however, this does not mean that these conclusions can be applied to longer term interventions. Rather, it prompts

future investigation into whether the state changes observed in the specific meditation interventions observed in this study would be observed in similar longer term interventions.

Studies three and four (and to an extent the entirety of this thesis) highlighted the limits of integration between MAT and FFMQ. Whilst non-judging and non-react align well with measures of acceptance within MAT, they appear to act inversely in certain LPA profiles (i.e., JO and NJA). A similar inverse relationship is observed between acting with awareness and observing, despite both measures focusing on one's ability to pay attention to their present-moment experience. Furthermore, despite being the sole measure of attention-monitoring for MAT, certain questions within the observing construct are not fully aligned with what would be expected of an attention-monitoring variable. Along with one's ability to pay attention to thoughts, feelings and sensations, observing also partially measures how well individuals are able to find links between their thoughts, feelings and sensations. This is more a measure of insight, rather than of ability to pay attention to direct, present-moment experience. One possible direction for future research is into developing and validating scales which specifically measure the constructs outlined within MAT. This would allow for more clarity as to how the specific components of MAT relate to each other, rather than using elements that only partially measure constructs (e.g., non-reactivity and non-judging) or may measure aspects of multiple constructs (e.g., acting with awareness).

One of the limitations of this thesis is that the samples were all drawn from undergraduate psychology students attending an Australian university. The majority of these students were young and female. There is mixed evidence on gender differences in mindfulness, for example, some studies have found males to have greater or similar levels of mindfulness compared to females (Dhandra & Park, 2018; Tasneem & Panwar, 2019). Other studies have

found mindfulness training to be more effective in women than men (Kang et al., 2018; Katz & Toner, 2013). Katz et al. (2013) also found that women are more likely to seek out mindfulness-based interventions, which suggests that a female-dominated sample may in fact be reflective of the target population. Thus, the gender imbalance in the experimental studies (i.e., studies one and two) may in fact help with generalisability. The gender imbalance in studies three and four, however, limits their generalisability, as these studies explore population effects of mindfulness at a trait level, rather than the effects of an intervention.

A further limitation of this thesis is the repeated use of self-report measures. Whilst self-report measures confer a number of advantages in terms of ease of administration, they also are liable to a number of biases. One of these is common-methods bias: Measuring multiple constructs using similar methods is liable to affect the accuracy of the results due to participant boredom, priming and differences between response styles (Podsakoff, 2003). Another limitation more specific to this study is that the subscales in the FFMQ measure one's relationship with their internal world, as well as their awareness and ability to verbally articulate it. Higher levels of describing, for example, is likely to affect reporting of emotional states. These individuals are by definition more adept at accurately identifying and articulating their inner experience, and may be more likely to correctly match their inner experience with linguistic descriptors of emotions on questionnaires. Future research methods that are less dependent upon self-reporting (e.g., skin conductance, electroencephalography) could be used alongside self-report measures to corroborate self-reported levels of stress, anxiety and burnout. Unfortunately mindfulness components are somewhat more difficult to capture using methods other than self-report.

The finding that FFMQ levels changed over time highlights the need for research into the temporal stability of the FFMQ. This is especially important given it is classed as a trait measure,

which by definition should exhibit a degree of robustness to environmental stressors. Previous research has demonstrated significant changes in FFMQ levels in relatively short periods (i.e., one week; Baer et al., 2012). From a theoretical perspective, mindfulness is often described as a state (Kabat-Zinn, 1982), and items in the FFMQ use a Likert scale which asks the degree to which one is in mindful states from very rarely to very often (e.g., “I can stay focused on what is happening in the present”, “I watch my feelings without getting lost in them”). These types of questions and the focus on frequency (rather than the degree to which the statements describe the responder as a person) suggest that the FFMQ implicitly conceptualises trait mindfulness as a collection of states. This conceptualisation is supported by empirical findings such as Kiken et al. (2015), who found that changes in trait mindfulness were the result of preceding increases in state mindfulness. If trait mindfulness is simply a running average of one’s states it makes sense that it is influenced by environmental changes that are likely to reduce one’s ability to be mindful over an extended period, as observed in this study. This conceptualisation of a trait differs from other more traditional traits such as personality variables which generally aim to measure characteristics which underlie patterns of behaviour or ways of thinking (Maples et al., 2014). Future research into the degree to which the FFMQ is a measure of state versus trait mindfulness, as well as conceptual development around its notion of trait mindfulness (i.e., whether it is simply a collection of states or an underlying construct) would benefit the literature, and help to determine whether it is best conceptualised as a trait measure.

The results from study three show that there is still much to understand about the latent FFMQ profiles present in the population. The finding that FFMQ profiles change over time, and that these changes are different depending on one’s initial profile, requires further investigation as there are no obvious explanations that can be provided using the data in the study. This

highlights a broader issue within LPA research, whereby studies often find latent profiles exist, but there is little theory to explain or justify why these groups of traits tend to cluster together. The majority of research, even if it is correlational, aims to determine how mindfulness affects outcomes. Aside from intervention studies, however, there is little research into how one's environment affects mindfulness. Further research into why these profiles emerge, what type of environmental stressors are associated with change in mindfulness profiles is important, is important due to the negative outcomes associated with specific mindfulness profiles (i.e., JO and LM).

6.4. Conclusion

The research presented in this thesis attempted to break down the components of mindfulness and examine how they work together to affect both interpersonal and intrapersonal outcomes. The growth of mindfulness within wider culture has led to a number of misconceptions about the construct, with pop-psychology articles sometimes referring to mindfulness as “being more present” or “being in the here and now” (Tinsley, 2022). The findings of this thesis suggest that these definitions are incomplete, and developing present-moment awareness without concurrent acceptance and non-judgement skills may even be detrimental. Thus, this thesis supports the original definition proposed by John Kabat-Zinn, that mindfulness is paying attention to the present moment, on purpose, in a non-judgemental way (Kabat-Zinn, 1982).

7. References

- Abenavoli, R. M., Jennings, P. A., Greenberg, M. T., Harris, A. R., & Katz, D. A. (2013). The protective effects of mindfulness against burnout among educators. *Psychology of Education Review, 37*(2), 57–69.
- Abramowitz, J. S., Deacon, B. J., & Whiteside, S. P. (2019). *Exposure therapy for anxiety: Principles and practice*. Guilford Publications.
- Abujaradeh, H., Colaianne, B. A., Roeser, R. W., Tsukayama, E., & Galla, B. M. (2020). Evaluating a short-form Five Facet Mindfulness Questionnaire in adolescents: Evidence for a four-factor structure and invariance by time, age, and gender. *International Journal of Behavioral Development, 44*(1), 20-30.
- Ahmad, S., Ramli, N. M., & Midi, H. (2012). Outlier detection in logistic regression and its application in medical data analysis. *2012 IEEE Colloquium on Humanities, Science and Engineering (CHUSER)*, 503–507.
- Ainsworth, B., Eddershaw, R., Meron, D., Baldwin, D. S., & Garner, M. (2013). The effect of focused attention and open monitoring meditation on attention network function in healthy volunteers. *Psychiatry Research, 210*(3), 1226–1231.
- Åkerstedt, T. (2006). Psychosocial stress and impaired sleep. *Scandinavian Journal of Work, Environment & Health, 493–501*.
- Akiskal, H. S. (2019). Anxiety: Definition, relationship to depression, and proposal for an integrative model. In *Anxiety and the anxiety disorders* (pp. 787–798). Routledge.
- Albiero, P., & Matricardi, G. (2013). Empathy towards people of different race and ethnicity: Further empirical evidence for the Scale of Ethnocultural Empathy. *International Journal of Intercultural Relations, 37*(5), 648–655.

- Al-Ghalib, S., & Salim, A. (2018). A mindfulness based intervention to enhance university student wellbeing in Saudi Arabia. *Middle East Journal of Positive Psychology, 4*, 142–157.
- American College Health Association. (n.d.). *National college health assessment II fall 2019*.
- American Psychiatric Association, D. S., & Association, A. P. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Vol. 5). American psychiatric association Washington, DC.
- Anālayo, B. (2019). Meditation on the breath: Mindfulness and focused attention. *Mindfulness, 10*(8), 1684–1691.
- Baer, R., Carmody, J., & Hunsinger, M. (2012). Weekly change in mindfulness and perceived stress in a mindfulness-based stress reduction program. *Journal of Clinical Psychology, 68*(7), 755–765.
- Baer, R., Lykins, E. L., & Peters, J. R. (2012). Mindfulness and self-compassion as predictors of psychological wellbeing in long-term meditators and matched nonmeditators. *The Journal of Positive Psychology, 7*(3), 230–238.
- Baer, R., Smith, G., Hopkins, J., Kreitemeyer, J., & Toney, L. (2006). Using Self-Report Assessment Methods to Explore Facets of Mindfulness. *Assessment, 13*(1), 27–45.
- Baer, R., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*(3), 191–206.
- Baer, R., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329–342.
- Baghurst, T., & Kelley, B. C. (2014). An examination of stress in college students over the

- course of a semester. *Health Promotion Practice*, 15(3), 438–447.
- Baminiwatta, A., & Solangaarachchi, I. (2021). Trends and developments in mindfulness research over 55 years: A bibliometric analysis of publications indexed in Web of Science. *Mindfulness*, 12(9), 2099–2116.
- Barbosa, P., Raymond, G., Zlotnick, C., Wilk, J., Toomey III, R., & Mitchell III, J. (2013). Mindfulness-based stress reduction training is associated with greater empathy and reduced anxiety for graduate healthcare students. *Education for Health*, 26(1), 9–20.
- Barnhofer, T., Crane, C., Hargus, E., Amarasinghe, M., Winder, R., & Williams, J. M. G. (2009). Mindfulness-based cognitive therapy as a treatment for chronic depression: A preliminary study. *Behaviour Research and Therapy*, 47(5), 366–373.
- Barnhofer, T., Duggan, D. S., & Griffith, J. W. (2011). Dispositional mindfulness moderates the relation between neuroticism and depressive symptoms. *Personality and Individual Differences*, 51(8), 958–962.
- Barrio, V. del, Aluja, A., & García, L. F. (2004). Relationship between empathy and the Big Five personality traits in a sample of Spanish adolescents. *Social Behavior and Personality: An International Journal*, 32(7), 677–681.
- Bartels-Velthuis, A. A., Schroevers, M. J., van der Ploeg, K., Koster, F., Fler, J., & van den Brink, E. (2016). A mindfulness-based compassionate living training in a heterogeneous sample of psychiatric outpatients: A feasibility study. *Mindfulness*, 7(4), 809–818.
- Bartels-Velthuis, A. A., Van der Ploeg, K., Schroevers, M. J., & Van den Brink, H. (2015). The effects of a mindfulness based compassionate living training on anxiety and depression in a heterogeneous sample of psychiatric outpatients: A pilot study. *European Psychiatry*, 30(1), 1.

- Bauer, C. C. C., Whitfield-Gabrieli, S., Díaz, J. L., Pasaye, E. H., & Barrios, F. A. (2019). From state-to-trait meditation: Reconfiguration of central executive and default mode networks. *ENeuro*, *6*(6), 1–17.
- Baumont, E., Rayner, G., Durkin, M., & Bowling, G. (2017). The effects of compassionate mind training on student psychotherapists. *The Journal of Mental Health Training, Education and Practice*, *12*(9), 300–312.
- Beauchemin, J., Hutchins, T. L., & Patterson, F. (2008). Mindfulness meditation may lessen anxiety, promote social skills, and improve academic performance among adolescents with learning disabilities. *Complementary Health Practice Review*, *13*(1), 34–45.
- Becker-Asano, C., & Wachsmuth, I. (2008, September). Affect simulation with primary and secondary emotions. In *International Workshop on Intelligent Virtual Agents* (pp. 15-28). Springer, Berlin, Heidelberg.
- Beddoe, A. E., & Murphy, S. O. (2004). Does mindfulness decrease stress and foster empathy among nursing students? *Journal of Nursing Education*, *43*(7), 305–312.
- Bergomi, C., Tschacher, W., & Kupper, Z. (2013). The assessment of mindfulness with self-report measures: Existing scales and open issues. *Mindfulness*, *4*(3), 191–202.
- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., et al. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*(3), 230–241.
- Blakey, S. M., Halverson, T. F., Evans, M. K., Patel, T. A., Hair, L. P., Meyer, E. C., DeBeer, B. B., Beckham, J. C., Pugh, M. J., & Calhoun, P. S. (2021). Experiential avoidance is associated with medical and mental health diagnoses in a national sample of deployed Gulf War veterans. *Journal of Psychiatric Research*, *142*, 17–24.

- Blanca Mena, M. J., Alarcón Postigo, R., Arnau Gras, J., Bono Cabré, R., & Bendayan, R. (2017). Non-normal data: Is ANOVA still a valid option? *Psicothema*, 552–557.
- Boellinghaus, I., Jones, F. W., & Hutton, J. (2013). Cultivating self-care and compassion in psychological therapists in training: The experience of practicing loving-kindness meditation. *Training and Education in Professional Psychology*, 7(4), 267–285.
- Boellinghaus, I., Jones, F. W., & Hutton, J. (2014). The role of mindfulness and loving-kindness meditation in cultivating self-compassion and other-focused concern in health care professionals. *Mindfulness*, 5(2), 129–138.
- Boettcher, H., Brake, C. A., & Barlow, D. H. (2016). Origins and outlook of interoceptive exposure. *Journal of Behavior Therapy and Experimental Psychiatry*, 53, 41–51.
- Bozovic, D., Racic, M., & Ivkovic, N. (2013). Salivary cortisol levels as a biological marker of stress reaction. *Med Arch*, 67(5), 374–377.
- Braaten, E. B., & Rosén, L. A. (2000). Self-regulation of affect in attention deficit-hyperactivity disorder (ADHD) and non-ADHD boys: Differences in empathic responding. *Journal of Consulting and Clinical Psychology*, 68(2), 313–321.
- Bravo, A. J., Boothe, L. G., & Pearson, M. R. (2016). Getting personal with mindfulness: A latent profile analysis of mindfulness and psychological outcomes. *Mindfulness*, 7(2), 420–432.
- Bravo, A. J., Pearson, M. R., & Kelley, M. L. (2018a). Mindfulness and psychological health outcomes: A latent profile analysis among military personnel and college students. *Mindfulness*, 9(1), 258–270.
- Bravo, A. J., Pearson, M. R., & Kelley, M. L. (2018b). Mindfulness and psychological health outcomes: A latent profile analysis among military personnel and college students.

- Mindfulness*, 9(1), 258–270.
- Brito-Pons, Gonzalo, Campos, D., & Cebolla, A. (2018). Implicit or Explicit Compassion? Effects of Compassion Cultivation Training and Comparison with Mindfulness-based Stress Reduction. *Mindfulness*, 9, 1494–1508.
- Brown, D. B., Bravo, A. J., Roos, C. R., & Pearson, M. R. (2015). Five facets of mindfulness and psychological health: Evaluating a psychological model of the mechanisms of mindfulness. *Mindfulness*, 6(5), 1021–1032.
- Brown, K. W., & Ryan, R. M. (2003). Mindful attention awareness scale. *Journal of Personality and Social Psychology*.
- Buchanan, K. E., & Bardi, A. (2010). Acts of kindness and acts of novelty affect life satisfaction. *The Journal of Social Psychology*, 150(3), 235–237.
- Buchheld, N., Grossman, P., & Walach, H. (2001). Measuring mindfulness in insight meditation (Vipassana) and meditation-based psychotherapy: The development of the Freiburg Mindfulness Inventory (FMI). *Journal for Meditation and Meditation Research*, 1(1), 11–34.
- Calvete, E., Fernández-González, L., Echezarraga, A., & Orue, I. (2020). Dispositional mindfulness profiles in adolescents and their associations with psychological functioning and hypothalamic–pituitary–adrenal axis hormones. *Journal of Youth and Adolescence*, 49(7), 1406–1419.
- Campos, J. A. D. B., Carlotto, M. S., & Marôco, J. (2013). Copenhagen Burnout Inventory-student version: Adaptation and transcultural validation for Portugal and Brazil. *Psicologia: Reflexão e Crítica*, 26(1), 87–97.
- Carden, R., Bryant, C., & Moss, R. (2004). Locus of control, test anxiety, academic

- procrastination, and achievement among college students. *Psychological Reports*, *95*(2), 581–582.
- Carpenter, J. K., Conroy, K., Gomez, A. F., Curren, L. C., & Hofmann, S. G. (2019). The relationship between trait mindfulness and affective symptoms: A meta-analysis of the Five Facet Mindfulness Questionnaire (FFMQ). *Clinical Psychology Review*, *74*, 101785.
- Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annu. Rev. Psychol.*, *56*, 453–484.
- Cavanagh, N., Cockett, G., Heinrich, C., Doig, L., Fiest, K., Guichon, J. R., Page, S., Mitchell, I., & Doig, C. J. (2020). Compassion fatigue in healthcare providers: A systematic review and meta-analysis. *Nursing Ethics*, *27*(3), 639–665.
- Chadwick, P., Hember, M., Mead, S., Lilley, B., & Dagnan, D. (2005). Responding to unpleasant thoughts and images: Reliability and validity of the Mindfulness Questionnaire. *Manuscript under Review (as Cited in Baer et al., 2006)*.
- Chiesa, A., Calati, R., & Serretti, A. (2011). Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical Psychology Review*, *31*(3), 449–464.
- Christopher, M. S., & Gilbert, B. D. (2010). Incremental validity of components of mindfulness in the prediction of satisfaction with life and depression. *Current Psychology*, *29*(1), 10–23.
- Chung, W., Chan, S., & Cassels, T. G. (2010). The role of culture in affective empathy: Cultural and bicultural differences. *Journal of Cognition and Culture*, *10*(3–4), 309–326.
- Ciarrochi, J., Parker, P. D., Sahdra, B. K., Kashdan, T. B., Kiuru, N., & Conigrave, J. (2017). When empathy matters: The role of sex and empathy in close friendships. *Journal of*

- Personality*, 85(4), 494–504.
- Contri, D. (2011). Empathy and barriers to altruism. *Peace and Conflict Review*, 6(1).
- Corbett, M. (2015). From law to folklore: Work stress and the Yerkes-Dodson Law. *Journal of Managerial Psychology*, 30(6), 741–752. <https://doi.org/10.1108/JMP-03-2013-0085>
- Cox, R. G., Zhang, L., Johnson, W. D., & Bender, D. R. (2007). Academic performance and substance use: Findings from a state survey of public high school students. *Journal of School Health*, 77(3), 109–115.
- Creswell, J. D., & Lindsay, E. K. (2014). How does mindfulness training affect health? A mindfulness stress buffering account. *Current Directions in Psychological Science*, 23(6), 401–407.
- Curtiss, J., & Klemanski, D. H. (2014a). Factor analysis of the five facet mindfulness questionnaire in a heterogeneous clinical sample. *Journal of Psychopathology and Behavioral Assessment*, 36(4), 683–694.
- Curtiss, J., & Klemanski, D. H. (2014b). Teasing apart low mindfulness: Differentiating deficits in mindfulness and in psychological flexibility in predicting symptoms of generalized anxiety disorder and depression. *Journal of Affective Disorders*, 166, 41–47.
- de Bruin, E. I., Topper, M., Muskens, J. G., Bögels, S. M., & Kamphuis, J. H. (2012). Psychometric properties of the Five Facets Mindfulness Questionnaire (FFMQ) in a meditating and a non-meditating sample. *Assessment*, 19(2), 187–197.
- Desbordes, G., Negi, L. T., Pace, T. W. W., Wallace, B. A., Raison, C. L., & Schwartz, E. L. (2012). Effects of mindful-attention and compassion meditation training on amygdala response to emotional stimuli in an ordinary, non-meditative state. *Frontiers in Human Neuroscience*, 6. <https://doi.org/10.3389/fnhum.2012.00292>

- Dewe, P. J., O'Driscoll, M. P., & Cooper, C. L. (2012). Theories of psychological stress at work. *Handbook of Occupational Health and Wellness*, 23–38.
- Dhandra, T. K., & Park, H. J. (2018). Mindfulness and gender differences in ethical beliefs. *Social Responsibility Journal*.
- Drisko, J. W. (2004). Common factors in psychotherapy outcome: Meta-analytic findings and their implications for practice and research. *Families in Society*, 85(1), 81–90.
- Duarte, J., & Pinto-Gouveia, J. (2016). Effectiveness of a mindfulness-based intervention on oncology nurses' burnout and compassion fatigue symptoms: A non-randomized study. *International Journal of Nursing Studies*, 64, 98–107.
<https://doi.org/10.1016/j.ijnurstu.2016.10.002>
- Eberth, J., & Sedlmeier, P. (2012). The effects of mindfulness meditation: A meta-analysis. *Mindfulness*, 3(3), 174–189.
- Ellis, A. R., Burchett, W. W., Harrar, S. W., & Bathke, A. C. (2017). Nonparametric inference for multivariate data: The R package nrmv. *Journal of Statistical Software*, 76(4), 1–18.
- Elwafi, H. M., Witkiewitz, K., Mallik, S., Thornhill IV, T. A., & Brewer, J. A. (2013). Mindfulness training for smoking cessation: Moderation of the relationship between craving and cigarette use. *Drug and Alcohol Dependence*, 130(1–3), 222–229.
- Emery, D. W., & Vandenberg, B. (2010). Special Education Teacher Burnout and ACT. *International Journal of Special Education*, 25(3), 119–131.
- Evans, S., Ferrando, S., Findler, M., Stowell, C., Smart, C., & Haglin, D. (2008). Mindfulness-based cognitive therapy for generalized anxiety disorder. *Journal of Anxiety Disorders*, 22(4), 716–721.
- Feldman, G. C., Hayes, A. M., Kumar, S. M., Greeson, J. M., & Laurenceau, J. P. (2004).

- Development, factor structure, and initial validation of the Cognitive and Affective Mindfulness Scale. *Unpublished Manuscript*.
- Feldman, G., Greeson, J., & Senville, J. (2010). Differential effects of mindful breathing, progressive muscle relaxation, and loving-kindness meditation on decentering and negative reactions to repetitive thoughts. *Behaviour Research and Therapy*, *48*(10), 1002–1011.
- Flanagan, D. P., & Alfonso, V. C. (2017). *Essentials of WISC-V assessment*. John Wiley & Sons.
- Ghelani, J. (2022, March 20). *Mindfulness and Grounding—Are they the same or different?*
<https://www.brisbaneharmonycentre.com.au/reading/mindfulness-and-grounding-differences/>
- Gilbert, P. (2009a). *The compassionate mind*. Robinson.
- Gilbert, P. (2009b). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment*, *15*(3), 199–208. <https://doi.org/10.1192/apt.bp.107.005264>
- Gleichgerricht, E., & Decety, J. (2013). Empathy in Clinical Practice: How Individual Dispositions, Gender, and Experience Moderate Empathic Concern, Burnout, and Emotional Distress in Physicians. *PLOS ONE*, *8*(4), e61526.
<https://doi.org/10.1371/journal.pone.0061526>
- Goldin, P. R., & Gross, J. J. (2010). Effects of mindfulness-based stress reduction (MBSR) on emotion regulation in social anxiety disorder. *Emotion*, *10*(1), 83–91.
- Gómez-Odrizola, J., & Calvete, E. (2021). The role of dispositional mindfulness profiles as predictors of sleep problems through rumination in adolescents over time. *Personality and Individual Differences*, *180*.
- Goodall, K., Trejnowska, A., & Darling, S. (2012). The relationship between dispositional

- mindfulness, attachment security and emotion regulation. *Personality and Individual Differences*, 52(5), 622–626.
- Goretzki, M., & Zysk, A. (2017). Using mindfulness techniques to improve student wellbeing and academic performance for university students: A pilot study. *JANZSSA-Journal of the Australian and New Zealand Student Services Association*, 25(1).
- Goyal, M., Singh, S., Sibinga, E. M., Gould, N. F., Rowland-Seymour, A., Sharma, R., Berger, Z., Sleicher, D., Maron, D. D., & Shihab, H. M. (2014). Meditation programs for psychological stress and well-being: A systematic review and meta-analysis. *JAMA Internal Medicine*, 174(3), 357–368.
- Groen, Y., Den Heijer, A. E., Fuermaier, A. B. M., Althaus, M., & Tucha, O. (2018). Reduced emotional empathy in adults with subclinical ADHD: Evidence from the empathy and systemizing quotient. *ADHD Attention Deficit and Hyperactivity Disorders*, 10(2), 141–150.
- Haley, D. W., Weinberg, J., & Grunau, R. E. (2006). Cortisol, contingency learning, and memory in preterm and full-term infants. *Psychoneuroendocrinology*, 31(1), 108–117.
- Harmon-Jones, C., Bastian, B., & Harmon-Jones, E. (2016). The Discrete Emotions Questionnaire: A New Tool for Measuring State Self-Reported Emotions. *PLOS ONE*, 11(8), e0159915. <https://doi.org/10.1371/journal.pone.0159915>
- Hawley, L. L., Rogojanski, J., Vorstenbosch, V., Quilty, L. C., Laposa, J. M., & Rector, N. A. (2017). The structure, correlates, and treatment related changes of mindfulness facets across the anxiety disorders and obsessive compulsive disorder. *Journal of Anxiety Disorders*, 49, 65–75.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2009). *Acceptance and commitment therapy*.

American Psychological Association.

- Herlache, A. D. (2017). *Reasonable or restrictive? Mindfulness as a moderator of reactance to environmental messages* [PhD Thesis]. Iowa State University.
- Hölzel, B., & Ott, U. (2006). Relationships between meditation depth, absorption, meditation practice, and mindfulness: A latent variable approach. *Journal of Transpersonal Psychology, 38*(2), 179–200.
- Hooper, N., Villatte, M., Neofotistou, E., & McHugh, L. (2010). The effects of mindfulness versus thought suppression on implicit and explicit measures of experiential avoidance. *International Journal of Behavioral Consultation and Therapy, 6*(3), 233.
- Hosseinaei, A., Ahadi, H., Fata, L., Heidarei, A., & Mazaheri, M. M. (2013). Effects of Group Acceptance and Commitment Therapy (ACT)-Based Training on Job Stress and Burnout. *Iranian Journal of Psychiatry & Clinical Psychology, 19*(2).
- Howell, A. J., Digdon, N. L., Buro, K., & Sheptycki, A. R. (2008). Relations among mindfulness, well-being, and sleep. *Personality and Individual Differences, 45*(8), 773–777.
- Howells, A., Ivtzan, I., & Eiroa-Orosa, F. J. (2016). Putting the ‘app’ in happiness: A randomised controlled trial of a smartphone-based mindfulness intervention to enhance wellbeing. *Journal of Happiness Studies, 17*(1), 163–185.
- Hsu, E. H. (2002). Visualization meditation and the Siwei icon in Chinese Buddhist sculpture. *Artibus Asiae, 62*(1), 5–32.
- Hwang, J. Y., Plante, T., & Lackey, K. (2008). The development of the Santa Clara brief compassion scale: An abbreviation of Sprecher and Fehr’s compassionate love scale. *Pastoral Psychology, 56*(4), 421–428.

- Jain, S., Shapiro, S. L., Swanick, S., Roesch, S. C., Mills, P. J., Bell, I., & Schwartz, G. E. (2007). A randomized controlled trial of mindfulness meditation versus relaxation training: Effects on distress, positive states of mind, rumination, and distraction. *Annals of Behavioral Medicine, 33*(1), 11–21.
- James, S. (2022). *THE HERE AND NOW: 4 SIMPLE WAYS TO LIVE IN THE PRESENT MOMENT*. <https://projectlifemastery.com/here-and-now/>
- Jensen, C. G., Vangkilde, S., Frokjaer, V., & Hasselbalch, S. G. (2012). Mindfulness training affects attention—Or is it attentional effort? *Journal of Experimental Psychology: General, 141*(1), 106–123.
- Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience, 7*(2), 109–119.
- Jung, D.-J., & Lee, J.-H. (2014). The Study on Effects of Breath-Counting Meditation According to Personal Characteristics. *Journal of Oriental Neuropsychiatry, 25*(1), 39–46.
- Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*(1), 33–47.
- Kang, Y., Rahrig, H., Eichel, K., Niles, H. F., Rocha, T., Lepp, N. E., Gold, J., & Britton, W. B. (2018). Gender differences in response to a school-based mindfulness training intervention for early adolescents. *Journal of School Psychology, 68*, 163–176.
- Kannan, K. S., & Raj, S. S. (2019). Outlier labeling methods for medical data. In *Logistics, supply chain and financial predictive analytics* (pp. 67–75). Springer.
- Katz, D., & Toner, B. (2013). A systematic review of gender differences in the effectiveness of mindfulness-based treatments for substance use disorders. *Mindfulness, 4*(4), 318–331.

- Kemper, K. J., & Khirallah, M. (2015). Acute effects of online mind–body skills training on resilience, mindfulness, and empathy. *Journal of Evidence-Based Complementary & Alternative Medicine, 20*(4), 247–253.
- Kiken, L. G., Garland, E. L., Bluth, K., Palsson, O. S., & Gaylord, S. A. (2015). From a state to a trait: Trajectories of state mindfulness in meditation during intervention predict changes in trait mindfulness. *Personality and Individual Differences, 81*, 41–46.
- Killingsworth, M. A., & Gilbert, D. T. (2010). A wandering mind is an unhappy mind. *Science, 330*(6006), 932–932.
- Kimmes, J. G., Durtschi, J. A., & Fincham, F. D. (2017). Perception in romantic relationships: A latent profile analysis of trait mindfulness in relation to attachment and attributions. *Mindfulness, 8*(5), 1328–1338.
- Kinnunen, S. M., Puolakanaho, A., Tolvanen, A., Mäkikangas, A., & Lappalainen, R. (2019). Does mindfulness, acceptance, and value-based intervention alleviate burnout?—A person-centered approach. *International Journal of Stress Management, 26*(1).
<https://doi.org/10.1037/str0000095>
- Klimecki, O., Leiberg, S., Ricard, M., & Singer, T. (2013). Differential pattern of functional brain plasticity after compassion and empathy training. *Social Cognitive and Affective Neuroscience, 9*(6), 873–879.
- Klimecki, O., Ricard, M., & Singer, T. (2013). Empathy versus compassion: Lessons from 1st and 3rd person methods. In *Compassion: Bridging practice and science* (pp. 272–287).
- Kong, F., Wang, X., & Zhao, J. (2014). Dispositional mindfulness and life satisfaction: The role of core self-evaluations. *Personality and Individual Differences, 56*, 165–169.
- Koszycki, D., Thake, J., Mavounza, C., Daoust, J.-P., Taljaard, M., & Bradwejn, J. (2016).

- Preliminary investigation of a mindfulness-based intervention for social anxiety disorder that integrates compassion meditation and mindful exposure. *The Journal of Alternative and Complementary Medicine*, 22(5), 363–374.
- Kozasa, E. H., Sato, J. R., Lacerda, S. S., Barreiros, M. A., Radvany, J., Russell, T. A., Sanches, L. G., Mello, L. E., & Amaro Jr, E. (2012). Meditation training increases brain efficiency in an attention task. *Neuroimage*, 59(1), 745–749.
- Kristensen, T. S., Borritz, M., Villadsen, E., & Christensen, K. B. (2005). The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work & Stress*, 19(3), 192–207.
- Krusche, A., Cyhlarova, E., King, S., & Williams, J. M. G. (2012). Mindfulness online: A preliminary evaluation of the feasibility of a web-based mindfulness course and the impact on stress. *BMJ Open*, 2(3), e000803.
- Kuhn, E., Weiss, B. J., Taylor, K. L., Hoffman, J. E., Ramsey, K. M., Manber, R., Gehrman, P., Crowley, J. J., Ruzek, J. I., & Trockel, M. (2016). CBT-I coach: A description and clinician perceptions of a mobile app for cognitive behavioral therapy for insomnia. *Journal of Clinical Sleep Medicine*, 12(4), 597–606.
- Kuyken, W., Byford, S., Taylor, R. S., Watkins, E., Holden, E., White, K., Barrett, B., Byng, R., Evans, A., & Mullan, E. (2008). Mindfulness-based cognitive therapy to prevent relapse in recurrent depression. *Journal of Consulting and Clinical Psychology*, 76(6), 966.
- Lam, C. M., & Beale, I. L. (1991). Relations among sustained attention, reading performance, and teachers' ratings of behavior problems. *Remedial and Special Education*, 12(2), 40–47.
- Lam, K. F., Lim, H. A., Kua, E. H., Griva, K., & Mahendran, R. (2018). Mindfulness and cancer

- patients' emotional states: A latent profile analysis among newly diagnosed cancer patients. *Mindfulness*, *9*(2), 521–533.
- Laska, K. M., Gurman, A. S., & Wampold, B. E. (2014). Expanding the lens of evidence-based practice in psychotherapy: A common factors perspective. *Psychotherapy*, *51*(4), 467–481.
- Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., Shapiro, S., Carmody, J., Abbey, S., & Devins, G. (2006). The Toronto mindfulness scale: Development and validation. *Journal of Clinical Psychology*, *62*(12), 1445–1467.
- Lau, W. K., Leung, M.-K., Wing, Y.-K., & Lee, T. M. (2018). Potential mechanisms of mindfulness in improving sleep and distress. *Mindfulness*, *9*(2), 547–555.
- Layous, K., Nelson, S. K., Oberle, E., Schonert-Reichl, K. A., & Lyubomirsky, S. (2012). Kindness counts: Prompting prosocial behavior in preadolescents boosts peer acceptance and well-being. *PloS One*, *7*(12), e51380.
- Leaviss, J., & Uttley, L. (2015). Psychotherapeutic benefits of compassion-focused therapy: An early systematic review. *Psychological Medicine*, *45*(5), 927–945.
- Leppma, M., & Young, M. E. (2016). Loving-kindness meditation and empathy: A wellness group intervention for counseling students. *Journal of Counseling & Development*, *94*(3), 297–305.
- Lilja, J. L., Frodi-Lundgren, A., Hanse, J. J., Josefsson, T., Lundh, L.-G., Sköld, C., Hansen, E., & Broberg, A. G. (2011). Five facets mindfulness questionnaire—reliability and factor structure: A Swedish version. *Cognitive Behaviour Therapy*, *40*(4), 291–303.
- Lindsay, E. K., Chin, B., Greco, C. M., Young, S., Brown, K. W., Wright, A. G., Smyth, J. M., Burkett, D., & Creswell, J. D. (2018). How mindfulness training promotes positive

- emotions: Dismantling acceptance skills training in two randomized controlled trials. *Journal of Personality and Social Psychology*, *115*(6), 944–973.
- Lindsay, E. K., & Creswell, J. D. (2017). Mechanisms of mindfulness training: Monitor and Acceptance Theory (MAT). *Clinical Psychology Review*, *51*, 48–59.
- Lindsay, E. K., Young, S., Brown, K. W., Smyth, J. M., & Creswell, J. D. (2019). Mindfulness training reduces loneliness and increases social contact in a randomized controlled trial. *Proceedings of the National Academy of Sciences*, *116*(9), 3488–3493.
- Lindsay, E. K., Young, S., Smyth, J. M., Brown, K. W., & Creswell, J. D. (2018). Acceptance lowers stress reactivity: Dismantling mindfulness training in a randomized controlled trial. *Psychoneuroendocrinology*, *87*, 63–73.
- Lippelt, D. P., Hommel, B., & Colzato, L. S. (2014). Focused attention, open monitoring and loving kindness meditation: Effects on attention, conflict monitoring, and creativity—A review. *Frontiers in Psychology*, *5*, 1083.
- Lo, Y., Mendell, N. R., & Rubin, D. B. (2001). Testing the number of components in a normal mixture. *Biometrika*, *88*(3), 767–778.
- Lomas, T., Medina, J. C., Ivztan, I., Rupprecht, S., & Eiroa-Orosa, F. J. (2017). The impact of mindfulness on the wellbeing and performance of educators: A systematic review of the empirical literature. *Teaching and Teacher Education*, *61*, 132–141.
- Lovett, B. J., & Sheffield, R. A. (2007). Affective empathy deficits in aggressive children and adolescents: A critical review. *Clinical Psychology Review*, *27*(1), 1–13.
- Lu, J., Mumba, M. N., Lynch, S., Li, C., Hua, C., & Allen, R. S. (2019). Nursing students' trait mindfulness and psychological stress: A correlation and mediation analysis. *Nurse Education Today*, *75*, 41–46.

- Luberto, C. M., Shinday, N., Song, R., Philpotts, L. L., Park, E. R., Fricchione, G. L., & Yeh, G. Y. (2018). A Systematic Review and Meta-analysis of the Effects of Meditation on Empathy, Compassion, and Prosocial Behaviors. *Mindfulness, 9*(3), 708–724.
<https://doi.org/10.1007/s12671-017-0841-8>
- Luken, M., & Sammons, A. (2016). Systematic review of mindfulness practice for reducing job burnout. *The American Journal of Occupational Therapy, 70*(2), 1–10.
- Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences, 12*(4), 163–169.
- Lynch, J., Prihodova, L., Dunne, P. J., Carroll, A., Walsh, C., McMahon, G., & White, B. (2018). Mantra meditation for mental health in the general population: A systematic review. *European Journal of Integrative Medicine, 23*, 101–108.
- MacKillop, J., & Anderson, E. J. (2007). Further psychometric validation of the mindful attention awareness scale (MAAS). *Journal of Psychopathology and Behavioral Assessment, 29*(4), 289–293.
- Maduka, I. C., Neboh, E. E., & Ufelle, S. A. (2015). The relationship between serum cortisol, adrenaline, blood glucose and lipid profile of undergraduate students under examination stress. *African Health Sciences, 15*(1), 131–136.
- Maples, J. L., Guan, L., Carter, N. T., & Miller, J. D. (2014). A test of the International Personality Item Pool representation of the Revised NEO Personality Inventory and development of a 120-item IPIP-based measure of the five-factor model. *Psychological Assessment, 26*(4), 1070–1084.
- Marsland, A. L., Bachen, E. A., Cohen, S., Rabin, B., & Manuck, S. B. (2002). Stress, immune reactivity and susceptibility to infectious disease. *Physiology & Behavior, 77*(4–5),

- 711–716.
- Martin-Allan, J., Leeson, P., & Lovegrove, W. (2021). The Effect of Mindfulness and Compassion Meditation on State Empathy and Emotion. *Mindfulness, 12*(7), 1768–1778.
- Mascaro, J. S., Rilling, J. K., Negi, L. T., & Raison, C. L. (2013). Pre-existing brain function predicts subsequent practice of mindfulness and compassion meditation. *Neuroimage, 69*, 35–42.
- Mattes, J. (2019). Systematic review and meta-analysis of correlates of FFMQ mindfulness facets. *Frontiers in Psychology, 10*.
- McCluskey, D. L., Haliwa, I., Wilson, J. M., Keeley, J. W., & Shook, N. J. (2020). Experiential avoidance mediates the relation between mindfulness and anxiety. *Current Psychology, 1-11*.
- McCracken, L. M., & Thompson, M. (2009). Components of mindfulness in patients with chronic pain. *Journal of Psychopathology and Behavioral Assessment, 31*(2), 75–82.
- McIntyre-Mills, J. (2010). Wellbeing, mindfulness and the global commons. *Journal of Consciousness Studies, 17*(7–8), 47–72.
- Memon, M. A., Cheah, J. H., Ramayah, T., Ting, H., Chuah, F., & Cham, T. H. (2019). Moderation analysis: issues and guidelines. *Journal of Applied Structural Equation Modeling, 3*(1), 1-11.
- Mesmer-Magnus, J., Manapragada, A., Viswesvaran, C., & Allen, J. W. (2017). Trait mindfulness at work: A meta-analysis of the personal and professional correlates of trait mindfulness. *Human Performance, 30*(2–3), 79–98.
- Mitmansgruber, H., Beck, T. N., Höfer, S., & Schübler, G. (2009). When you don't like what you feel: Experiential avoidance, mindfulness and meta-emotion in emotion regulation.

- Personality and Individual Differences*, 46(4), 448–453.
- Morelli, S., & Lieberman, M. (2013). The role of automaticity and attention in neural processes underlying empathy for happiness, sadness, and anxiety. *Frontiers in Human Neuroscience*, 7. <https://doi.org/10.3389/fnhum.2013.00160>
- Morrison, A. B., & Jha, A. P. (2015). Mindfulness, attention, and working memory. In *Handbook of mindfulness and self-regulation* (pp. 33–45). Springer.
- Morshedi, M., Davarniya, R., Zahra, K., Mahmudi, M. J., & Shakarami, M. (2016). The effectiveness of acceptance and commitment therapy (ACT) on reducing couple burnout of couples. *Iranian Journal of Nursing Research*, 10(4), 76–87.
- Muris, P., Roelofs, J., Rassin, E., Franken, I., & Mayer, B. (2005). Mediating effects of rumination and worry on the links between neuroticism, anxiety and depression. *Personality and Individual Differences*, 39(6), 1105–1111.
- Neale-Lorello, D., & Haaga, D. A. (2015). The “observing” facet of mindfulness moderates stress/symptom relations only among meditators. *Mindfulness*, 6(6), 1286–1291.
- Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology*, 69(1), 28–44.
- Ortega-Campos, E., Vargas-Roman, K., Velando-Soriano, A., Suleiman-Martos, N., Canadas-de la Fuente, G. A., Albendin-Garcia, L., & Gomez-Urquiza, J. L. (2019). Compassion fatigue, compassion satisfaction, and burnout in oncology nurses: A systematic review and meta-analysis. *Sustainability*, 12(1), 72.
- Ortner, C. N., Kilner, S. J., & Zelazo, P. D. (2007). Mindfulness meditation and reduced emotional interference on a cognitive task. *Motivation and Emotion*, 31(4), 271–283.
- Osborne, J., & Overbay, A. (2019). The power of outliers (and why researchers should ALWAYS

- check for them). *Practical Assessment, Research, and Evaluation*, 9(1).
<https://doi.org/10.7275/qp69-7k43>
- Pearson, M. R., Lawless, A. K., Brown, D. B., & Bravo, A. J. (2015). Mindfulness and emotional outcomes: Identifying subgroups of college students using latent profile analysis. *Personality and Individual Differences*, 76, 33–38.
<https://doi.org/10.1016/j.paid.2014.11.009>
- Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(879), 10–1037.
- Prakash, R., Rastogi, P., Dubey, I., Abhishek, P., Chaudhury, S., & Small, B. J. (2012). Long-term concentrative meditation and cognitive performance among older adults. *Aging, Neuropsychology, and Cognition*, 19(4), 479–494.
- Qu, H.-Y., & Wang, C.-M. (2015). Study on the relationships between nurses' job burnout and subjective well-being. *Chinese Nursing Research*, 2(2), 61–66.
<https://doi.org/10.1016/j.cnre.2015.09.003>
- Raab, K. (2014). Mindfulness, self-compassion, and empathy among health care professionals: A review of the literature. *Journal of Health Care Chaplaincy*, 20(3), 95–108.
- Raffone, A., Marzetti, L., Del Gratta, C., Perrucci, M. G., Romani, G. L., & Pizzella, V. (2019). Toward a brain theory of meditation. In *Progress in brain research* (Vol. 244, pp. 207–232). Elsevier.
- Rahl, H. A., Lindsay, E. K., Pacilio, L. E., Brown, K. W., & Creswell, J. D. (2017). Brief mindfulness meditation training reduces mind wandering: The critical role of acceptance. *Emotion*, 17(2), 224–230.

- Rampoldi, G., Ardenghi, S., & Strepparava, M. G. (2019). *Emotion regulation: A useful predictor of empathy in medical students*. International Association for Medical Education, Austria Center, Vienna, Austria.
- Raskin, N. J., & Rogers, C. R. (2005). *Person-centered therapy*.
- Reniers, R. L., Corcoran, R., Drake, R., Shryane, N. M., & Völlm, B. A. (2011). The QCAE: A questionnaire of cognitive and affective empathy. *Journal of Personality Assessment*, 93(1), 84–95.
- Riley, B. (2014). Experiential avoidance mediates the association between thought suppression and mindfulness with problem gambling. *Journal of Gambling Studies*, 30(1), 163–171.
- Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science*, 17(1), 31–35.
- Robinson, O. C., Nofhle, E. E., Guo, J., Asadi, S., & Zhang, X. (2015). Goals and plans for Big Five personality trait change in young adults. *Journal of Research in Personality*, 59, 31–43.
- Rosenstreich, E., & Margalit, M. (2015). Loneliness, mindfulness, and academic achievements: A moderation effect among first-year college students. *The Open Psychology Journal*, 8(1).
- Rudkin, E., Medvedev, O. N., & Siegert, R. J. (2018). The five-facet mindfulness questionnaire: Why the observing subscale does not predict psychological symptoms. *Mindfulness*, 9(1), 230–242.
- Sarid, O., Anson, O., Yaari, A., & Margalith, M. (2004). Academic stress, immunological reaction, and academic performance among students of nursing and physiotherapy. *Research in Nursing & Health*, 27(5), 370–377.

- Schuling, R., Huijbers, M. J., van Ravesteijn, H., Donders, R., Cillessen, L., Kuyken, W., & Speckens, A. E. (2020). Recovery from recurrent depression: Randomized controlled trial of the efficacy of Mindfulness-Based Compassionate Living compared with treatment-as-usual on depressive symptoms and its consolidation at longer term follow-up. *Journal of Affective Disorders*.
- Schuling, R., Huijbers, M. J., van Ravesteijn, H., Donders, R., Kuyken, W., & Speckens, A. E. (2016). A parallel-group, randomized controlled trial into the effectiveness of mindfulness-based compassionate living (MBCL) compared to treatment-as-usual in recurrent depression: Trial design and protocol. *Contemporary Clinical Trials*, 50, 77–83.
- Search Inside Yourself Leadership Institute. (2020, September 20). *Mindfulness Hacks for the Hyperactive*. <https://siyli.org/resources/mindfulness-hyperactive-hacks>
- Sedlmeier, P., Eberth, J., Schwarz, M., Zimmermann, D., Haarig, F., Jaeger, S., & Kunze, S. (2012). The psychological effects of meditation: A meta-analysis. *Psychological Bulletin*, 138(6), 1139.
- Segal, Z. V., & Teasdale, J. (2018). *Mindfulness-based cognitive therapy for depression*. Guilford Publications.
- Seipp, B. (1991). Anxiety and academic performance: A meta-analysis of findings. *Anxiety Research*, 4(1), 27–41.
- Seli, P., Beaty, R. E., Marty-Dugas, J., & Smilek, D. (2019). Depression, anxiety, and stress and the distinction between intentional and unintentional mind wandering. *Psychology of Consciousness: Theory, Research, and Practice*, 6(2), 163.
- Semple, R. J., Reid, E. F., & Miller, L. (2005). Treating anxiety with mindfulness: An open trial of mindfulness training for anxious children. *Journal of Cognitive Psychotherapy*, 19(4),

379.

- Shapiro, S. L., Schwartz, G. E., & Bonner, G. (1998). Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioral Medicine, 21*(6), 581–599.
- Shen, L. (2010). On a scale of state empathy during message processing. *Western Journal of Communication, 74*(5), 504–524.
- Shorey, R. C., Gawrysiak, M. J., Elmquist, J., Brem, M., Anderson, S., & Stuart, G. L. (2017). Experiential avoidance, distress tolerance, and substance use cravings among adults in residential treatment for substance use disorders. *Journal of Addictive Diseases, 36*(3), 151–157.
- Siegling, A. B., & Petrides, K. V. (2016). Zeroing in on mindfulness facets: Similarities, validity, and dimensionality across three independent measures. *PloS one, 11*(4), e0153073.
- Siff, J. (2014). *Thoughts are not the enemy: An innovative approach to meditation practice*. Shambhala Publications.
- Sirois, F. M., & Tosti, N. (2012). Lost in the moment? An investigation of procrastination, mindfulness, and well-being. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 30*(4), 237–248.
- Sloan, D. M. (2004). Emotion regulation in action: Emotional reactivity in experiential avoidance. *Behaviour Research and Therapy, 42*(11), 1257–1270.
- Sohail, N. (2013). Stress and academic performance among medical students. *J Coll Physicians Surg Pak, 23*(1), 67–71.
- Spurk, D., Hirschi, A., Wang, M., Valero, D., & Kauffeld, S. (2020). Latent profile analysis: A review and “how to” guide of its application within vocational behavior research. *Journal*

of Vocational Behavior, 120.

- Stein, E., & Witkiewitz, K. (2020). Dismantling mindfulness-based programs: A systematic review to identify active components of treatment. *Mindfulness, 11*(11), 2470–2485.
- Steinmayr, R., Ziegler, M., & Träuble, B. (2010). Do intelligence and sustained attention interact in predicting academic achievement? *Learning and Individual Differences, 20*(1), 14–18.
- Stevens, J. P. (2012). *Applied multivariate statistics for the social sciences*. Routledge.
- Strauss, C., Lever Taylor, B., Gu, J., Kuyken, W., Baer, R., Jones, F., & Cavanagh, K. (2016). What is compassion and how can we measure it? A review of definitions and measures. *Clinical Psychology Review, 47*, 15–27. <https://doi.org/10.1016/j.cpr.2016.05.004>
- Tasneem, S. A., & Panwar, N. (2019). Academic confidence and mindfulness: A study on gender differences. *International Journal of Social Science and Economic Research, 4*(6), 4690–4702.
- Taylor, N. Z., & Milleer, P. M. R. (2016). The contribution of mindfulness to predicting burnout in the workplace. *Personality and Individual Differences, 89*, 123–128.
- Taylor, V. A., Grant, J., Daneault, V., Scavone, G., Breton, E., Roffe-Vidal, S., Courtemanche, J., Lavarenne, A. S., & Beaugard, M. (2011). Impact of mindfulness on the neural responses to emotional pictures in experienced and beginner meditators. *Neuroimage, 57*(4), 1524–1533.
- Tinsley, C. (2022, March 26). *How to Increase Your Focus and Productivity With Mindful Drawing*. <https://medium.com/live-your-life-on-purpose/how-to-increase-your-focus-and-productivity-with-mindful-drawing-afcff75337ac>.
- Tout, E. (2022). *Try progressive muscle relaxation*.

<https://www.psychologies.co.uk/try-progressive-muscle-relaxation/>.

- Towey-Swift, K. D., Lauvrud, C., & Whittington, R. (2022). Acceptance and commitment therapy (ACT) for professional staff burnout: A systematic review and narrative synthesis of controlled trials. *Journal of Mental Health*, 1–13.
- Vorontsova-Wenger, O., Ghisletta, P., Ababkov, V., & Barisnikov, K. (2021). Relationship between mindfulness, psychopathological symptoms, and academic performance in university students. *Psychological Reports*, 124(2), 459–478.
- Walsh, R. A. (2008). Mindfulness and empathy. *Mindfulness and the Therapeutic Relationship*, 72–86.
- Wang, Y., Qi, Z., Hofmann, S. G., Si, M., Liu, X., & Xu, W. (2019). Effect of acceptance versus attention on pain tolerance: Dissecting two components of mindfulness. *Mindfulness*, 10(7), 1352–1359.
- Wenzel, M., von Versen, C., Hirschmüller, S., & Kubiak, T. (2015). Curb your neuroticism—Mindfulness mediates the link between neuroticism and subjective well-being. *Personality and Individual Differences*, 80, 68–75.
- Williams, J. M. G., & Kabat-Zinn, J. (2011). Mindfulness: Diverse perspectives on its meaning, origins, and multiple applications at the intersection of science and dharma. *Contemporary Buddhism*, 12(01), 1–18.
- Williams, L. J., & Abdi, H. (2010). Fisher's least significant difference (LSD) test. *Encyclopedia of Research Design*, 218, 840–853.
- Wilson, A. C., Mackintosh, K., Power, K., & Chan, S. W. (2019). Effectiveness of self-compassion related therapies: A systematic review and meta-analysis. *Mindfulness*, 10(6), 979–995.

- Würtzen, H., Dalton, S. O., Christensen, J., Andersen, K. K., Elsass, P., Flyger, H. L., Pedersen, A. E., Sumbundu, A., Steding-Jensen, M., & Johansen, C. (2015). Effect of mindfulness-based stress reduction on somatic symptoms, distress, mindfulness and spiritual wellbeing in women with breast cancer: Results of a randomized controlled trial. *Acta Oncologica, 54*(5), 712–719.
- Zajacova, A., Lynch, S. M., & Espenshade, T. J. (2005). Self-efficacy, stress, and academic success in college. *Research in Higher Education, 46*(6), 677–706.
- Zeng, X., Oei, T. P., & Liu, X. (2014). Monitoring emotion through body sensation: A review of awareness in Goenka's Vipassana. *Journal of Religion and Health, 53*(6), 1693–1705.
- Zgierska, A., Rabago, D., Chawla, N., Kushner, K., Koehler, R., & Marlatt, A. (2009). Mindfulness meditation for substance use disorders: A systematic review. *Substance Abuse, 30*(4), 266–294.
- Zhang, J., Deng, X., Huang, L., Zeng, H., Wang, L., & Wen, P. (2019). Profile of trait mindfulness and its association with emotional regulation for early adolescents. *Personality and Individual Differences, 147*, 12–17.
- Zhang, Y.-Y., Han, W.-L., Qin, W., Yin, H.-X., Zhang, C.-F., Kong, C., & Wang, Y.-L. (2018). Extent of compassion satisfaction, compassion fatigue and burnout in nursing: A meta-analysis. *Journal of Nursing Management, 26*(7), 810–819.